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WHO INVENTED THE REAPER?

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329 Wabash Avenue,
Chicago, July, 1897.

Dear Sir :—

We beg to send you, for your library, a copy of a work entitled, "Who Invented the Reaper?"

During the last century great progress has been made along all the lines of lightening human labor; especially in the development of agricultural implements has this progress been marked, and the Reaper has done more than any other article of field machinery to relieve the farmer of his harvest burden—the gathering of his crops.

This small book is the result of investigation into the historical records upon this subject, and will be interesting to the student of history, as showing that the honor of the invention of the first successful Reaper rests with the late Cyrus H. McCormick. We trust that it may be acceptable, and find a place upon your shelves.

Respectfully yours,

McCORMICK HARVESTING
MACHINE COMPANY.

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C. H. McCormick

WHO INVENTED THE REAPER?

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AN ANSWER TO THE PROTEST STATEMENT SAID TO
HAVE BEEN FILED AT THE TREASURY
DEPARTMENT

R. B. SWIFT.

[Chic. 1897.]

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WHO INVENTED THE REAPER?

AN ANSWER TO THE PROTEST STATEMENT SAID TO HAVE
BEEN FILED AT THE TREASURY DEPARTMENT.

By R. B. Swift.

This Protest was recently published anonymously. It undertakes to prove that Hussey invented the reaper, and therefore the picture of Cyrus H. McCormick should not be put on a new banknote. The Protest, as published, was prefaced by the statement that it was prepared by the representatives of the manufacturers of harvesting machines, and that "The opportunity will at last be presented to settle the question forever." Let any who are interested in this subject read the facts herewith given and judge for themselves as to the merits of the case.

The question is not, Who first had an idea that it would be desirable to reap by machinery? but Who made the first machine that worked successfully? A flying machine that could carry passengers to New York in five hours would be a great invention. Many have planned and built and patented flying machines, yet no one has produced a successful one, and the man who will combine the devices that will make a practical flying machine is truly the inventor, even though he make use of levers, springs, frames and devices that others have tried and with which they have failed.

Before the year 1831 there are accounts of attempts to make a reaper, and some of the machines, it is said, did a few hours work when all conditions were favorable. One or two of the earlier machines had devices that, since being combined in a practical way with other devices, have found a place in the successful reaping machine. It is claimed that Ogle, in 1822, combined more of the elements necessary for success than any other inventor, but the one machine he claimed to have built lacked certain necessary features, and he did not

arrange some of those he had so they would operate. His machine failed. Not one was sold. He did not even take a patent and the world profited nothing by his labors. With the knowledge gained from fifty years of experience with reapers, it is pointed out that only a few changes would have been necessary for him to have produced a successful reaper. He was a schoolmaster, a visionary inventor without mechanical skill, and his reaper was, and would to-day be, a failure.

Bell, in 1828, built a push-machine, a great ark on four wheels, having a cutting device consisting of shears with blades sixteen inches long. A few of these machines were built, but "from their intricacy they fell into disuse." Bell's countrymen have claimed the invention of the reaper for him, but have failed to show that his machine was or could be a success.

The Protest also refers to Pitt's machine. This machine was not even a reaper, as it did not have a cutting apparatus. It had a revolving cylinder with rows of combs to strike into the heads of grain and tear them off. It was a failure. Randall's machine is also mentioned as having been operated in New Jersey in 1833. Randall made a model which he exhibited at a Mechanics' Fair in Utica, N. Y., on January 15, 1835. His patent was issued in April of 1835 and his first machine built for the harvest of 1835. The machine was a failure. It was so pronounced a failure that Randall did not restore his patent. Along in the fifties Randall was a willing witness for pay, and made an *ex parte* affidavit in the McCormick vs. Seymour & Morgan suit, swearing his invention back to 1830. Having never built a machine for sale, it is not to be wondered at that he sold his recollection, but under the stimulus of pay it was too active. He was produced for cross-examination and convicted by the testimony of his own son and others of swearing falsely and of altering his model. So clearly was Randall convicted that Mr. Justice Nelson did not even refer to him in his charge in that case. He referred to the machines of Bell, Schnebly, Hussey, Moore and Hascall, Reed and Woodward, saying:

"With the exception of the patent and machine of Hussey, not one of the machines referred to ever went into general or successful operation. Why they failed we do not know. What was the secret, what the defects, we are not told. All we know is that they were unsuccessful experiments."

Whatever question there is lies between McCormick and Hussey.

Both McCormick and Hussey had machines in the harvest of 1833, and both applied for patents before the harvest of 1834. There is an account of Hussey's machine published in the fall of 1833, and one

MECHANICS' MAGAZINE,

AND

REGISTER OF INVENTIONS AND IMPROVEMENTS.

VOLUME IV.]
FOR THE WEEK ENDING OCTOBER 11, 1834.
[NUMBER 4.

"It is a strange thing to behold what gross errors and extreme absurdities men do commit for want of a friend to tell them of them. The help of good counsel is that which setteth business straight."—Bacon.

CYRUS H. MCCORMICK'S IMPROVED REAPING MACHINE.

To the Editor of the Mechanics' Magazine:

DEAR SIR,—I send you a drawing and description of my Reaping Machine, agreeably to your request.

vibrating bar of wood, with bent teeth; U, reel pulley; W, reel; X, wheel of 15 inches diameter; Y, reel post.

The platform A is of plank, made fast to a frame of wood, for receiving the grain when cut and holding it until enough has been

of McCormick's in the Lexington Union and in the Mechanics' Magazine, also in the fall of 1833. Hussey sent the editor of the Mechanics' Magazine a picture of his machine in 1834, and so did McCormick.

The photolithographic cuts in this article are reproductions of these pictures.

I.—WHO WAS FIRST WITH A MACHINE?

The history of Hussey's reaper as herewith presented shows that it never was a success. As McCormick's was a success, it therefore makes no difference which one was first in point of time. But in addition to this the facts clearly demonstrate McCormick's priority.

In the suit of McCormick vs. Manny, Hussey testified on the 28th day of August, 1855, and was asked this question and gave this answer:

"Have you invented and used any reaping machine, and if so, how long since?"

"I invented and used a reaping machine in 1833."

Hussey never claimed an earlier date of conception than 1833. He published a pamphlet in 1854, written by his friend, Edward Stabler, entitled, "A Brief Narrative of the Invention of Reaping Machines," in which is the following sentence:

"Neither Hussey nor anyone else for him has ever asserted that his invention was prior to 1833."

In the Lexington Union, September 18, 1833, following a long description of McCormick's machine, is the following testimonial:

"July 18, 1833.

"I have seen Mr. Cyrus H. McCormick's grain cutting machine in operation for *two seasons*. It cut for me this season. I think it will perform well where the ground is free of rocks and stumps; and will be a great saving over hand labor and can be so constructed as to cut much wider than at present, and I think it well worth the attention of the public. I think it will cut about 12 acres per day by being well attended.

(Signed) JOHN WIER."

"I certify that Cyrus H. McCormick's reaping machine cut 11 acres of wheat for me on the sixth day of this month, and the grain was cut clean and neat.

"July 13, 1833.

WM. MOORE."

This Wier testimonial carries the McCormick machine back to 1832, and the Moore testimonial shows that it was a success.

The Mechanics' Magazine of April, 1834, contained the picture of Hussey's reaper that we herewith produce. This came to McCor-

mick's notice, and he wrote the editor of that magazine from Rock-bridge, Va., under date of May 20, 1834, as follows:

"To the Editor of the Mechanics' Magazine:

"*Dear Sir.*—Having seen in the April number of your magazine a cut and description of the reaping machine said to have been in-

vented by Obed Hussey, of Ohio, last summer, I would ask a favor of you to inform Mr. Hussey and the public through your columns,

that the principle, namely, cutting grain by means of a toothed instrument, receiving the rotary motion from a crank, with the iron teeth projecting above the edge of the cutter, for the purpose of preventing the grain from partaking of its motion, is a part of the principle of my machine and was invented by me, and operated on wheat and oats in July, 1831. This can be attested to the entire satisfaction of the public and Mr. Hussey, as it was witnessed by many persons. Consequently, I would warn all persons against the use of the aforesaid principle, as I regard and treat the use of it, in any way, as an infringement of my rights. . . . The revolving reel, as I conceive, constitutes a very important, in fact, indispensable, part of my machine.

"Very respectfully yours, etc.,

"CYRUS H. McCORMICK."

As Mr. McCormick stated in this letter, the fact of his having successfully operated his reaper in July of 1831 can be proven "to the entire satisfaction of the public." The fact that he did so operate it in 1831 was not disputed for years, and Hussey admitted its use in 1831 in a brief filed by him in 1848 before the Board of Commissioners for the Extension of Patents. Referring to McCormick's testimony (at the taking of which he was present) to prove the use of his machine in 1831, Hussey wrote:

"There are but two points satisfactorily proved which are not in the records of the Patent Office, to wit: the date of the first trial of the machine, and the abandonment by C. H. McCormick of the double finger."

At this date there is but one living witness of the working of the reaper in 1831, and he, in 1848, testified under oath to its successful operation in 1831. There are in existence numerous affidavits (as yet unpublished) of persons who saw the reaper at work in 1831. There is, also, on file in the Patent Office at Washington, D. C., the sworn testimony of seven witnesses, taken in the spring of 1848, some of whom were cross-questioned by Hussey, to the fact that Cyrus H. McCormick's reaper did successful work in the harvest of 1831. Fifty years ago, when dozens of witnesses were living, no one disputed the fact that McCormick's reaper successfully worked in wheat and oats in the harvest of 1831, and no one who knows the facts disputes it now.

The Committee on Patents of the United States Senate reported March 30, 1852, when there were bills pending before the Committee for the extension of both Hussey's and McCormick's first patents, as follows:

"The testimony was thereupon taken, in compliance with the order of the Board, and by the proof submitted on the part of said McCormick it appears conclusively that he invented his machine, then practically and publicly tested its operation in the harvest of 1831."

And that "from the exhibits referred to your committee, it appears that his (Hussey's) machine was first constructed and operated in 1833."

It was then that Hussey answered, saying that the priority of McCormick should not affect his invention, as "our machines do not conflict."

The late Honorable Edmund Burke, Commissioner of Patents in 1848, wrote Senators Douglas and Shields, March 4, 1850, recommending the extension of both Hussey's and McCormick's patents, saying:

"The testimony of Mr. McCormick presented to the Board of Extension clearly proved that he invented and put in operation his machine in 1831, two years before the date of Hussey's patent. But my opinion is that justice will be subserved by extending the patents of both parties."

Neither, however, succeeded in obtaining an extension.

Mr. Justice Nelson, of the United States Supreme Court, in the suit of McCormick vs. Seymour & Morgan, decided in 1855, among other points, the following:

"It appears from the evidence in the case, that Hussey and McCormick turned their attention to the construction of a reaping machine very nearly at the same period—McCormick two or three years earlier."

Hussey was a witness for Seymour & Morgan in this case.

It is submitted that the proof on the point of priority of McCormick is conclusive.

II.—WHAT WAS MCCORMICK'S MACHINE OF 1831 AND HUSSEY'S OF 1833?

Let us see which one contained the devices that time has demonstrated as being essential to the successful reaping of grain.

(1) *Methods of Draft*.—The pictures show that both machines were drawn by teams, walking at the side of the grain. McCormick's patent, which was issued June 21, 1834, describes both a pull and a push machine, and the drawing of the patent, which is herewith repro-

duced, Fig. 1, shows the shafts for a horse in dotted lines at the front and at the side of the grain, and the tongue behind. This plan of

showing and describing alternate methods of construction was and still is very common in patents. McCormick's idea was, that a machine with a wider cut could be made by pushing than by pulling at the side, and, to effect this, the patent shows the pole behind attached to the rear of the platform nearer the center of the machine than the pole or shafts could be. His platform being just the width of the finger-bar, allows the raker to walk at the rear of the frame of the machine and rake the gavel to the side out of the way of the team, if pushing behind, and out of the way of the team and machine in the next round of the field, whether the machine be drawn or pushed. Hussey's patent shows and describes only a pull machine, because his platform extended the full width of his finger-bar and frame and, therefore, was not adapted to raking the gavel to the side, as was McCormick's. Hussey's gavel was pushed off directly behind the finger-bar, and his machine therefore could not have been pushed, as the team would trample the gavel, nor could it make a second round of the field, even as a pull machine, until the gavel of the first round had been removed from the path of the team. This alternative system of draft described in the patent shows that McCormick had clear ideas in 1834 of a wider machine, similar to the modern header, which must be pushed, and of a narrower machine that could more handily be drawn. His machine was always drawn except on one occasion. The Protest, however, goes to unwarrantable extremes in insisting that the McCormick

patent of 1834 shows only a push machine. Such a mistake could only have been made by a writer ignorant of the subject, or with malice, publishing what he knew to be untrue. This is the main point of the whole argument of the Protest, as is shown by the following quotation:

“Several alleged representations of the 1831 machine have been published, showing a horse in thills, drawing it, differing little from the machine of the McCormick patent of 1845. If these representations are correct, then the machine of the McCormick patent of 1834 shows, practically, an abandonment of the principles of the alleged machine of 1831, for in the patent the reaper was a push machine, somewhat like the Bell of 1826, but mounted on two wheels only—a master wheel and a grain wheel. The tongue, as usual with these machines, extended rearwardly, but had nothing to prevent its end from dropping to the ground; nor had it anything to prevent the draft of the team from raising it. So constructed, it was not as controllable as a wheelbarrow, for the load in the latter will keep the handles from being turned over forward by the pulling action of the arms of the operator. In order to prevent the machine from turning over forward, due provision was made, however, for he says: The tongue is to be supported by the horses by means of a pole, passing across their backs between them, and resting on pad saddles. From this, a pole or chain passes back to the tongue below and suspends it to the desired height. With a machine of the header type in mind, it now seems strange that the idea of supporting its push tongue upon the backs of the horses ever occurred, and it seems equally strange that a man would ever suppose that a team could be so driven as to steer such a machine. A horse might be trained to run a wheelbarrow as a feat, but no one would think of using such a combination for any practical purpose.”

The quotation from the patent that is contained in the above extract, shows that the writer of the Protest must have had before him a copy of the McCormick patent of 1834. What explanation, then, can be offered for his failure to state that the patent also provided for a plan of pulling the machine? Immediately after the description of the plan for pushing the machine the patent describes how it can be drawn. It says:

“One horse may work the machine from this side by substituting shafts for the tongue.”

Again, after speaking of a guide in front of the main wheel to deflect grain to the cutting apparatus, the patent states:

“This triangle is to be moveable on its screw also, and it may be removed altogether for the purpose of inserting shafts, so that the ma-

chine may be drawn by one horse in this manner. The two headpieces are to be lengthened, as also the curved brace projecting towards all of them, about three or four feet. The two broad pieces will be connected at their ends by a bar for the singletree, and, rising from the right hand one near the end, an upright connects it with the curved brace, and by the side of this upright rises another secured to its place to a height sufficient to clear the reel. From this top a brace passes across the reel to the opposite post. Below the inner shaft from the single-tree end, is secured a longer bow or brace, projecting outward somewhat, and continuing along the direction of the shaft to the front of the horse, where it passes around and joins to the other shaft, which has been left purposely longer. The object of this bow is to throw the stalk inward towards the cutting apparatus instead of the triangle removed."

This language, quoted from the patent, is descriptive of a method of pulling the machine as shown by the dotted lines of the drawing. If the eyesight of the writer of the Protest is so poor that he could not see the shafts in the drawing and the language in the specification describing them, is it not fair to presume that his mental faculties are so impaired as to render valueless anything he may write? It is a weak cause that can only be maintained by misleading statements and garbled quotations. Repeatedly during the past fifty years the article from the Lexington Union of September 28, 1833, descriptive of McCormick's reaper, has been reproduced and widely published. This article says:

"This machine [referring to the McCormick reaper of 1833] is so constructed as to leave a long or short stubble, to operate alike on tall or short grain. It is *drawn by one horse walking by the side of the grain in shafts.*"

The paper then proceeds to give a full description of the machine. The following testimonial in relation to the operation of the McCormick reaper in the harvest of 1833 was published in the November, 1833, issue of the Mechanics' Magazine and Register of Inventions:

"I certify that Mr. C. H. McCormick's reaping machine *with a horse* was employed by me in the late harvest and though I did not work it much I was satisfied with its work.

"[Signed] JAMES M'DOWELL."

Mr. McDowell was Governor of Virginia in 1843.

Mr. William S. McCormick testified under oath in 1855, in the suit of McCormick vs. Manny, as follows:

"Cross-Question 175.—How was the horse attached to that machine?"

"Answer.—I do not recollect whether the first machine was worked by one or two horses; but whether or not, I well remember that the horse or horses were always attached to the machine substantially, as now done, using a pair of shafts or pole to suit one or two horses, the horse, or horses, walking outside and alongside of the grain to be cut, with the cutting apparatus on the left, as has been the case ever since."

The Protest makes long extracts from the communication which Mr. McCormick filed in January of 1848, when he sought to have his patent of 1834 extended. It must therefore be presumed that its writer knew and suppressed the following quotation from the same communication:

"The machine at the time of this experiment (1831) contained all the essential parts that were embraced in the patent of June 21, 1834. It had a platform; the straight sickle with the vibrating action by a crank; the fingers, or stationary supports to the cutting at the edge of the blade, and projecting forward into the grain; the reel, and the general arrangements by which the machine was balanced upon two wheels, perhaps nine-tenths of the whole weight being thrown upon the one behind the draft, *thereby attaching the horses in front* and at one side."

Summarizing on the methods of drafts:

(a) The patents show that both machines were drawn by a team walking outside the standing grain.

(b) McCormick's patent shows an alternative device so that the machine could be pushed.

(c) The plan of Hussey's machine is such that it could not be pushed.

(d) Accounts of McCormick's machine, published at Lexington, Va., before any knowledge of Hussey's had penetrated that remote neighborhood, show that the machine was drawn when at work in the harvest of 1833.

(e) Sworn testimony of half a century ago and sworn statements in 1847, of the inventor himself, show that the machine was always drawn from the side.

(f) The picture of McCormick's machine, herewith published, a reproduction of one published in 1834, shows the pull method of draft.

It is submitted that, as to the method of draft, the Protest is utterly misleading and the conclusions drawn therefrom must fall.

(2) *General Plan of the Machines.*—McCormick's machine was mounted on two wheels, a main wheel which supported the greater part of the weight of the machine, gave motion to the crank, reciprocated the knife and revolved the reel, and a grain wheel at the outer end of the platform. Hussey's machine had three wheels at the stubble side, all of which rested upon the ground. The tongue was pivoted loosely to the machine like the usual farm wagon tongue. The platform was rigidly projected to the side, as shown in the picture. It is plain, therefore, that it could not follow the inequalities of the ground, and that any obstruction encountered by the wheels would throw it up and down, leaving a washboard stubble. Hussey's patent provided, however, that if a wide platform was to be used the machine should have four wheels, the extra one at the outer end of the platform. It is evident that such a construction must have drawn as heavy as a stone-boat. (See Fig. 2, taken from Ardrey's "American Agricultural Implements.") Simply to reciprocate the knife and draw the machine took four horses on the trot.

HUSSEY'S REAPER, 1833.

The McCormick construction is identical with that found in modern reapers. The machine had a stiff pole, as have the reapers of to-day, and balanced over the wheels, thus handling like a cart and conforming to the surface of the ground. The weight was positioned largely about the drive-wheel, thus giving power to move the operative parts of the machine. McCormick stated this construction very concisely in the following language, fifty years ago:

"The general arrangement by which the machine was balanced upon two wheels, perhaps nine-tenths of the whole weight being thrown upon the one behind the draft, thereby attaching the horses in front and at one side without the use of the separate two-wheeled cart for the purpose of controlling the running of the machine upon its two

wheels, to accommodate itself to the irregularities of the ground—which construction I claim (and which Hussey adopted).”

In explanation of this last statement Hussey remodeled his machine, adopting Mr. McCormick's plan, in 1841. In a long advertisement in the *American Farmer* of 1842 Hussey states:

“Last year an entire change was made in the general structure of my machine (see illustration, Hussey's reaping machine, 1841, Fig. 3).”

Summarizing on this point:

- (a) The McCormick plan is the one in universal use at this day.
- (b) Hussey abandoned his construction and adopted that of McCormick.

It is therefore submitted that on the general construction of the machine McCormick's plan was the success and Hussey's the failure.

(3) *The Reel*.—The picture of the McCormick machine, the Patent Office drawings, and all the early newspaper accounts speak of McCormick's reel. In the description of McCormick's machine in the *Mechanics' Magazine* in 1833 it is stated:

“There is a reel, as it is termed, which is about 6 or 7 feet in diameter, and the same length of the knife. This is made by framing arms in each end of the shaft, say eight, the points of which are joined together by pieces called ribs, parallel to the shafts. The reel is revolved as the machine advances by a band from the main wheel to one on its shaft, the object of which is to draw the grain back to the knife, which will be done whether straight or tangled, upright or leaning, unless below an angle of 45 degrees, and to throw it upon the apron.”

In a letter written by Mr. McCormick to the editor of the *Mechanics' Magazine*, in May of 1834, is the following:

"The revolving reel, as I conceive, constitutes a very important, in fact, indispensable part of my machine."

Attention is called to the fact that this reel is a reel that will do the work. In all the reapers built by McCormick it could be adjusted up and down and forward and back, the two movements of to-day. It has been said that Bell had a reel, but the descriptions of it show that the arms were only thirteen inches in length. Anyone experienced in harvesting grain knows that such a reel would have no effect in raising lodged and tangled grain, but, on the contrary, would roll it ahead of the knife and be worse than useless. Hussey had no reel, and never had.

The Protest says:

"In its perfected form (referring to Hussey's reaper) it may be considered as existing in the manual-delivery reapers largely used in Europe and extensively manufactured by the McCormick Harvesting Machine Company, the Deering Harvester Company and others, as shown by their annual circulars."

All Europe did not sell 1,000 of these manual-delivery reapers in 1896. The cut herewith (Fig. 4) will show the so-called "manual-

delivery reaper" that is now being made and sold. It is an attachment for a mower, a makeshift for using the mower on the small European farms (which average about five acres each), to reap a small patch

of grain by the use of an extra man. Notice the position of the man with the rake. He is seated well forward so that he can with his rake do the work of the reel. The platform upon which the grain falls is pivoted and controlled by the foot of the raker. When a bundle has been reeled on to the platform by the man with his rake the rear end of the platform is dropped into the stubble and the bundle slips off. Now, what about Hussey? The cut (Fig. 2) shows the raker on the rear end of the machine pushing the bundle from the machine to the ground. His position is such that he could not both act as a reeler and a raker. The platform is not hinged, as in the present form of reaping attachments, and as he could only push the bundle from the machine, the horses are in a trot in order to strike the stalks of grain with sufficient momentum so that the heads will fall to the rear, thus in an impractical way trying to reap without a reel.

Summarizing on the question of the reel:

(a) McCormick's reaper from the beginning had a serviceable, adjustable reel of practically the same diameter, and for the same purpose, as the reels in use to-day.

(b) Hussey's machine had no reel, and never had.

(c) Because a few reaping attachments for mowers are now sold to the small peasant farmers of Europe is a weak excuse for saying that Hussey's reaper exists to-day.

(d) The reaping attachment of to-day has a tilting platform, a divider, and the raker is positioned to do the work of reeling. Hussey's had no tilting platform, no divider, and the raker could not both reel and push the bundle from the rigid platform.

It is submitted that the reel is an essential part of a practical reaping machine. Hussey did not have it, and therefore his machine was a failure.

(4) *The Divider*.—In McCormick's patent of June 21, 1834, is the following description of the first divider ever used on a reaper and also the first to be used in combination with a reel:

"On the opposite side of the machine is another reel post supported by a brace on each side . . . on the outside of which piece . . . may be secured a bow in order to more effectually divide the grain. . . . This reel, by the motion given by the strap, as the horses advance, bears the stalks as they are projected inward by each

end of the termination of the platform upon the cutter, and when separated lands them on the platform."

In the claim of the patent is the following:

"And also the method of dividing and keeping separate the grain to be cut from that to be left standing."

In the newspaper article published in the Lexington Union in September of 1833 is the following description of the divider:

"Alongside the apron, by the point of the knife, and extending some distance before the knife, is raised a partition of cloth for the purpose of dividing and keeping separate the cut grain from that which is left standing."

The pictures of Hussey's machine will show that it had no divider. Later, after Hussey had abandoned his two-wheeled cart and adopted McCormick's construction of mounting the machine upon a main and grain-wheel (Fig. 3), he stood a narrow board edgewise at the end of his platform to protect the top of the grain-wheel from becoming wound with grain and vines, but at no time during the life of the McCormick patent of 1834 did he have upon his machine a divider projecting in front of the cutting apparatus to separate the grain to be cut from that to be left standing. Practical men know that without a reel or a divider Hussey's machine could not be a successful reaper.

The combined action of McCormick's divider and reel is essential in reaping machines. The divider projected ahead of the finger-bar and separated the swath to be cut from the grain to be left standing. It threw the part to be cut inwardly so it could be acted upon by the reel, and thus be separated before it was severed, and while its roots held it to the ground. Judge Nelson stated in the case of McCormick vs. Seymour & Morgan:

"That the plaintiff was seeking to obtain a divider, that would not only divide the standing grain, but one that could be successfully used for dividing grain, whether standing, or tangled, or lodged, or broken. . . . It seems from the testimony of all the witnesses that there is no great difficulty in dividing the grain in the operation of reaping when it stands erect. They say that the reel is of no great utility where the grain is not tangled or leaning; that the operation of Hussey's machine without the reel is as successful as that of any other in cutting standing grain; that the difficulty commences in tangled grain; and that, as great portions of the grain during the harvest, portions, perhaps, of every field, are in that condition, a machine would

be comparatively useless that could operate only on standing grain, leaving that which is tangled to be cut by some other instrument."

Referring again to the reaping attachment (Fig. 4), attention is called to the divider which projects in front of the finger-bar about three feet, and which has welded to its point two solid iron rods that extend rearwardly and upwardly and diverge at their ends, in order to penetrate the grain and separate the swath to be cut from the grain to be left standing. The raker, who, as has been heretofore explained, uses his rake largely as a reel, assists the divider in separating the grain and reeling it upon the platform.

The Protest says: "In its (Hussey's) *perfected* form it exists in the manual-delivery reaper." As it is plain that it is not the machine which Hussey invented and built, the comparison is fatal as a support to the claim that Hussey's was a practical reaping machine, for in order to make the "manual-delivery machine" operative it must have McCormick's divider and place a man with a rake to do the work of McCormick's reel.

Summarizing on this point:

(a) McCormick's machine had a divider from the beginning.

(b) It had a divider in combination with a reel from the beginning.

(c) Hussey's reaper did not contain a divider, during the life of McCormick's first patent.

(d) The reaping attachment for mowers which has been called "*the Perfected Hussey Machine*," clearly shows Hussey's reaper to have been a failure, as the "manual delivery" has a divider, and positions a man upon the machine with a rake to do by hand the reeling and dividing which the McCormick machine always did automatically.

It is submitted that, under this head alone, Hussey's machine must be deemed a failure.

(5) *The Platform*—McCormick's machine from the beginning had a platform of the same width as the finger-bar. The raker was thus enabled to walk behind or ride on the frame of the machine and draw the accumulated gavel from the platform upon the ground at the side of the machine, and out of the way in making the next round of the field.

Hussey's machine had a platform extending the full width of the cutting apparatus and frame. The wide third wheel was placed behind this platform, and the raker, who sometimes sat upon the platform, pushed the accumulated gavel upon the ground immediately behind the platform, and in the path of the team and machine in making the next round of the field. This was the plan of the Hussey machine so long as built. That it was unhandy and a serious disadvantage is fully proven by the following quotation from the *Genesee Farmer*, vol. 16, p. 308:

"Hussey's went on, and the gatherers had to jump and run to keep pace with the fleet horses. . . . McCormick's worked very easy and cut as close and regular as could be desired. There was not a straw to be seen on the whole track over which it went; the sheaves were all beautifully arranged in line, with their butt ends nicely together, as nicely as if done by hand, with care. It cut so perfectly straight that it took the last row at one cut and made a clean sweep, not leaving a single straw to tell the tale.

"While all that was going on, Hussey worked up and down with a legion of busy gatherers following the reaper at a quick step, having a large quantity yet to cut. The poor horses, although young and powerful, driven at a great speed, were completely exhausted. The machine works heavily, it requires too much power to drive its ponderous knife. *Having no side delivery*, a number of men must immediately remove the grain in order to clear the track for the next cut; the men not having time to make neat work left the field strewn with grain. In countries where manual labor is scarce, which is the case everywhere during harvest, this machine could not be employed at all except with a great loss of grain, being tramped out by the horses."

It can hardly be said that Hussey's machine was not a practical reaper, solely because the gavel could not be delivered at one side. But nevertheless the McCormick side-delivery plan has driven every rear-delivery machine out of existence in America.

Summarizing on this point:

(a) McCormick's machine was constructed so that the raker could deliver the grain at one side out of the way of the team in the next round.

(b) Hussey's machine was constructed so that the bundle had to be raked off directly in its path on the next round.

(c) Because of the absence of the reel and divider to get the grain properly on the platform, it was impossible for Hussey's raker

to draw the gavels to one side, even though in 1841 he adopted the McCormick plan of mounting his machine upon two wheels.

It is submitted, on this point, that McCormick's machine had greatly the advantage of Hussey's.

(6) *The Cutting Apparatus*.—Whoever compiled the Protest for the rival manufacturers was adroit in trying to narrow the successful elements of a reaping machine down to the cutting apparatus. Especially is this so when they select Hussey as their hero, whose only invention was an improvement in the cutting apparatus.

The Protest says:

"Twenty or 30 reaping machines had been invented before Hussey's, but all were failures because they would not cut well. When Hussey invented his successful cutting apparatus, he did what Howe did for the sewing machine."

It is not my wish to detract from the honor justly due the many who made improvements on the reaping machine; it is, however, necessary in this case to show what the cutting apparatus was which Hussey invented and used in 1833, and what was McCormick's of 1831.

To show that writers do not agree that reapers "were failures because they could not cut well," I quote from the *Genesee Farmer*, vol. iv, 1834, p. 154:

"Mr. Boyer made an ingenious apparatus to imitate the motion and do the work of the bowed scythe. Even though it cut well, yet it made wretched waste."

There could be many devices for merely severing the stalks were is not necessary to handle the grain gently and preserve it. There is more required of a reaper than to merely cut the stalks. Grain is reaped solely that it may be saved, and the divider, reel and side-delivery platform are more essential in the saving than would be a cutting device which might have the many niceties of construction found in the 500 or more patented improvements made since 1831. Hussey's 1833 cutting apparatus is claimed as follows:

(a) "The straight horizontal saw with teeth *sharp on their two sides* for cutting grain."

(b) "The guards forming double bearings above and below the saw whereby the cutting is made sure, whether with sharp or dull edge, the guards at the same time protecting the saw from rocks or sticks or other large substances it may meet with."

(c) "The peculiar construction that the saw teeth may run free, whereby the necessary pressure and consequent friction of two corresponding edges cutting together as a pair of scissors, are entirely avoided."

The drawing, Fig. 5, shows this cutting apparatus. Attention is called to the fact that the "saw teeth are sharp on their two sides." The saw teeth in use to-day are sharp only on one side. Leaving the teeth sharp on two sides makes a bevel on both sides of the knife section. This is what is meant in the third claim just quoted.

Every farmer's boy knows that a successful cutting device of to-day is one that has "the friction of two corresponding edges cutting together as a pair of scissors," the very element against which Hussey so carefully provided.

The construction of this cutting apparatus of Hussey's must have been known to the compilers of the Protest. If they did not know of this fatal defect in Hussey's cutting apparatus of 1833, they should not be writing so positively on the subject; if they did know, then they are deceiving their readers.

That there may be no question of the drawing above (Fig. 5) correctly representing the Hussey cutting apparatus of 1833, I quote from reissue letters patent No. 449, granted April 14, 1857, to Obed Hussey:

"In my original invention, viz.: the reaping machine patented by me in 1833, the upper part of the guards was fastened to the lower part both before and behind the blades, as represented at C C, and the grass, straw, etc., which was not perfectly cut was forced in by

the shearing motion of the blades and worked back between the blades, and the grass, materially obstructing the free movement of the blades. in wet weather frequently caused what the farmers called choking. . . . In my original sickle, patented in 1833, *the blades are ground with a bevel on both sides of the edge*; the purpose of this is that, by means of the shoulder of the bevel, the sharp edge is prevented from coming in contact with the finger, and when sprung or bent cutting into the finger. . . . By reason of this tendency of the scalloped sickle to force the stalks across and thus entangle them upon the fingers, *all the modes heretofore devised of working this sickle were apparently ineffective.*"

Hussey signed the above, under oath, in 1857, and the Patent Office granted him a patent for an improvement on these statements.

Further proof seems unnecessary to show the failure of Hussey's machine of 1833, after his own sworn statement in 1857. Nevertheless there are many facts, aside from his own statement, which would, of themselves, effectually prove its failure.

In a brief filed in the Patent Office in 1848 Hussey disclaimed everything in his first patent but his cutter, and described that as

"Composed of a row of blades of lancet point shape, arranged on a rod, side by side. *I do not claim to be the inventor of such blades but I claim them in combination with and vibrating through and into double fingers.*"

A discussion, therefore, of the Hussey cutting apparatus is a discussion of his reaper.

Mr. W. N. Whiteley is one of the very few who now have the courage to sign their communications, and who states, in a letter written January 8, 1897, and published with the Protest:

"All reaping machines of the present day embody substantially all of the vital principles given by Obed Hussey in 1833 and at different periods thereafter."

Possibly Mr. Whiteley's memory is better now than it was in 1861, when he had less interest in denying the invention of the reaper by McCormick. All disinterested persons, however, will think that his mind was as vigorous and his judgment on the question of invention as good in 1861 as it is to-day. Hon. Samuel T. Shugert, Acting Commissioner of Patents, says in his opinion, given March 1, 1861, in the application of Eunice B. Hussey for an extension of Obed Hussey's patent:

"The counsel of Wm. N. Whiteley, the opponent of these exten-

sions, have urged with great pertinacity that the inventions are not novel."

Shugert's decision was rendered March 1, 1861, and Lee & Fisher were the attorneys for Whiteley.

On April 11, 1861, the following letter was written to St. Louis by Mr. Geo. M. Lee, of the firm of Lee & Fisher, Whiteley's attorneys:

"Cincinnati, April 11, 1861.

"Messrs. Kingsland & Ferguson:

"Gents—We write you at the instance of various of the mower and reaper manufacturers who oppose the extension of McCormick's patents. . . . We have taken much testimony in the case and obtained a resolution of Congress giving us more time, until May 11, to take further evidence. Now this litigation is for the joint interest of you all, and we have supposed all would sustain it. . . . *If McCormick's patents are extended he will monopolize the entire business and you will all either have to pay him \$15 per machine or quit;* for although he was beaten in the Hussey case he has reissued his patents, as you are aware, so as to cover every machine of any real value. All he waits for now is an extension and he will begin a war on you all, and it will be found almost impossible to beat him in court on these reissues. They are prepared with great care, but he can be beaten in the Patent Office, and he must be beaten now or never. . . . Please, therefore, take hold and help us beat the common enemy. . . . Subscriptions have ranged from \$100 to \$1,000. Respectfully,
LEE & FISHER, by G. M. Lee.

"P. S.—Send in also to the Patent Office some hundreds of remonstrances, if you can, like this. There is no postage to pay.

"To the Commissioner of Patents of U. S.:

"We oppose the extension of C. H. McCormick's patents. He has made money enough off the farmers. [Signed by hundreds.]"

Mr. Whiteley has always opposed McCormick, but it is difficult to see how he could in 1861 have thought "that McCormick's patents will monopolize the entire business and cover every machine of any real value," and to-day state: "The reaper of the present day does not disclose any principles contained in the early efforts of C. H. McCormick; but that cannot be said of Hussey." In 1861, when the fight was on and reaper men knew about the matter, Whiteley's interpretation of the situation was that Hussey's claims "were not novel" and McCormick's "covered every machine of any real value." Mr. Whiteley of 1897 better square himself with Mr. Whiteley of 1861 before his opinions will be entitled to any weight on historical matters. Let it be remembered, however, that Mr. Whiteley had sufficient ability in me-

chanical lines not to adopt any such crazy plan of a cutting apparatus as that of Hussey's. E. N. Dickerson, who was McCormick's counsel in the McCormick-Manny case, in referring to the Hussey cutting apparatus which had been described by George Harding, of Manny's counsel, and frequently Hussey's attorney, characterized the Hussey cutting apparatus as follows:

"My friend (Harding) informs us that the cutting apparatus of Hussey's machine is similar to two bricks and a dull ax, by the use of which you may certainly cut a stick in two if you lay it across between the bricks and strike it with the ax. If you have power enough the stick must yield, but that is a most stupid way of cutting grain, and McCormick was never guilty of anything half so stupid."

Again referring to the drawing (Fig. 5) of Hussey's cutting apparatus, notice that the angle between the knife and the guard is a very acute one—eighteen degrees. The bevel on both sides of the knife and the length of the knife, over four inches with its slight angle, makes the description of Dickerson, of "two bricks and a dull ax," very appropriate. In the cut of the Hussey machine taken from Ardrey's "American Agricultural Implements" (Fig. 2), there are four horses hitched to the machine and they are in a brisk trot. The only work this machine did was to drive the knife, so it is evident that something must have been the matter with his cutting apparatus.

Hussey gave his entire time for nearly thirty years trying to introduce his reaping machine, and of course found some favorable conditions in which it operated; still all accounts of the machine have expressions that show its extreme draft, and the fact that it could be operated only when the grain was dry and free from grass and weeds.

In William C. Dwight's account of the machine published in the *Genesee Farmer*, in Vol. IV, of 1834, he says:

"A change of horses is necessary, as the gait of the horses is too rapid to admit of a heavy draft. The horses go at the rate of four or five miles an hour, and when the growth of straw is not too heavy, a fair trot of the team it not too much."

In the report of the Board of Trustees of the Maryland Agricultural Society for 1836, they say that three mules were used upon the machine and that "they moved with equal facility in a walk or in a trot."

In the report of the Committee of the Philadelphia Agricultural

Society, 1839, it was stated, "A trot is sometimes necessary where the grain is much lodged, or a strong wind drives in the direction of the machine."

Hussey, writing from Baltimore on November 15, 1839, states:

"With the speed of an ordinary brisk walk the cutting is sure. . . . So sure is the cutting at all times that the sharp edge is by no means necessary, for no sharpening is required from beginning to end of harvest, and no difference in the excellency of its work can be discovered between sharp and dull cutters. . . . The machine will also do excellent work in almost any kind of grain in a quick trot, but such a speed should be avoided except when absolutely necessary."

In 1840 Hussey sent several reaping machines to parties near Richmond, but they did not give satisfaction, and Edward Ruffin, the famous agriculturist of Virginia, editor of the *Farmers' Register*, declined to recommend the machine, because "he had not seen a trial of it, and those who have tried it differ as to its merits and economy."

This statement of Mr. Ruffin called forth a letter from Queen Anne County, Maryland, under date of February 18, 1841, and one from Mr. Hussey himself, under date of April 4. The one from Queen Anne County declares that:

"I have not as yet, from my own experience, been able to decide on the value of the reaper. . . . It broke early in the harvest. . . . The knives could not be set to cut higher than nine inches. It cut more straw than was useful, and also grass among the wheat, this imposed unnecessary labor on the horses and a heavy strain on the machine."

Hussey, discussing the cause of the failure in Virginia, states, in his letter to the *Farmers' Register*:

"It is admitted that it may not do everything that is expected of it, when proper management is not used; for instance, when the wheat is rank and mixed with grass, the cutter should be raised to the highest point."

Hussey then made a proposition to Ruffin to send two machines to Virginia, and this proposition was accepted, and the machines were sent to the estates of Wm. B. Harrison, Esq., Upper Brandon, and R. B. Bolden, Sandy Point, James River, both of whom made reports to the *Farmers' Register*. Harrison declined to recommend the machine as time saving, and went on to say, among other things:

"The reaper cannot be started as long as there is any dew on the

wheat in the morning, nor can it operate after much has fallen in the evening. . . . It would add greatly to the value of this machine if the ingenious inventor, Mr. Hussey, can devise some way to make them cut damp straw, so they could be kept at work all day."

Bolden declared that:

"With three mules and a man to drive and one on the machine to rake the wheat from the platform upon which, as it is cut, it falls, we estimated that rather more than one acre per hour was reaped. The machine does not cut well early in the morning, when the wheat is moist."

In 1842, at a meeting of the Prince George County (Va.) Agricultural Society, July 4, a report was submitted by the Committee to the effect that:

"Hussey's wheat reaping machine has been introduced on one of the Brandon estates, but owing principally to its inability to work when the wheat is damp from dew, no material advantage has yet resulted from it."

In March of 1843 Hussey, who had read the glowing accounts of the work of McCormick's machines in Virginia, wrote to the editor of the Southern Planter as follows:

"I saw in your last Planter an account of another reaper in your State, which is attracting some attention, it shall be my endeavor to meet that machine in the field in the next harvest. I think it but justice to give this public notice, that parties concerned may not be taken unawares, but have the opportunity to prepare themselves for such a contest."

McCormick accepted this challenge through the columns of the Richmond Enquirer, and suggested that Hussey meet him on the farm of Mr. Ambrose Hutchinson, where a machine that he had sold to the President of the Virginia State Agricultural Society, Rev. J. H. Turner, would be in operation. In accepting Hussey's challenge, he said:

"I will willingly submit the pretensions of both machines to the arbitrament of a disinterested tribunal of experienced farmers. . . . I shall endeavor to show in the first place that my machine will cut damp or wet wheat, and, in order to do so, propose to commence cutting at sunrise. I shall further endeavor to show that it will cut 15 acres a day, without pushing or driving, and with a very light two-horse draft."

In place of going to the farm of Mr. Hutchinson, Hussey brought

his reaper to the farm of a Mr. Wight, on the James River, on the day on which McCormick was to start in operation a machine purchased of him by Wight. There is a statement of this trial in the *Richmond Enquirer*, from which we learn that the McCormick machine operated well in the wet wheat after a heavy rain, while Hussey's clogged and stopped, and in a length of twenty paces had to be turned out of the crop twice and started in again by his four mules at a hard trot, after which he admitted that his machine would not cut wet or damp grain.

Hussey, not being satisfied, on the 30th of June took his reaper to Hutchinson's. McCormick was there with his machine, and began cutting at 5:15 a. m., as promised. Hussey, however, did not get to the field until after 10 o'clock. A committee was appointed by the spectators, and the machines tried together in different locations. The decision was rendered in favor of the McCormick machine because "it cut damp wheat, was lighter draft, had side delivery, scattering less grain, and better quality of cut." Hussey, however, when defeated, wanted to try again, and the machines met on the farm of a Mr. Roane. At this trial the McCormick machine cut fourteen acres in one day, notwithstanding a loss of some time in the morning and again after dinner.

This was the last seen of Mr. Hussey in Virginia. He was fairly beaten, but never ceased to bewail his failure. At the end of the year 1844 he wrote the editor of *The Cultivator*:

"It is now 10 years since my invention of the reaper. I have been constantly engaged since that time in its improvement. . . . It cannot appear strange if some of these changes may have been for the worse and thereby endangered its good name. . . . My large machine requires four horses."

It has been stated that Hussey was not "strong enough" to push his machine. A careful examination of his various attempts to introduce his machines between the years 1834 and 1845 will show that his failure was not due to lack of ability, but of cutting apparatus. From the sworn testimony of his own foreman, Lovegrove, in the Hussey extension case of 1861, it appears that from 1840 to 1845 he made but from twelve to forty machines annually, and from his own statement he sold in 1847, the last year of his patent, only ten machines. Hussey's brother, who had established himself at Auburn, N. Y., made

no headway. In 1846 the New York Agricultural Society, at its fair held in Auburn, made an award to McCormick over the Hussey-Auburn machine, and Hussey himself afterwards repudiated the Auburn machine.

Before this time McCormick's machine was a pronounced success. Hussey's, as has been shown, was a failure. The question, therefore, as to who invented the first practical reaper would seem to be conclusively settled in favor of McCormick.

Inasmuch as some have assumed that Hussey's patent of 1847 on the open back guard was the invention which made reaping machines practical, it is appropriate to show that for several years after taking out that patent he had no conception of a successful cutting apparatus.

Fig. 6 shows this cutter of 1847. His patent for this improvement, No. 5,227, dated August 7, 1847, says:

"In my original invention (patent of 1833) the plates are ground with a bevel on both sides of the edge. The purpose of this is that by means of the shoulder of the bevel, the sharp edge is prevented from coming into immediate contact with the iron in passing the guard. This bevel is not so necessary for the fork of the blades, as near their points; hence, in this improvement about one inch of edge at the fork is flush, on the under side, leaving the bevel on the upper side. The design of this is that the grass, etc., which is forced in between the blades and the lower part of the guard, shall be cut up and worked out by the flush edge coming close to the iron at the fork."

In this improvement he had two points, which he claimed in the following claims:

(a) "The opening above the blades at A, in combination with vibrating blades."

(b) "The particular application of the flush edge at the fork of the blades for the purpose described."

He still kept his blade's almost four and one-half inches long, and, beveled as they were on both sides to within one inch of their rear, they acted in a manner similar to the "cutting of a stick between two bricks." They still drew much dead grass, weeds and trash into the slots of the guard, part of which worked out at the rear, because of the opening on the top part of the guard. That this apparatus was not a success is very plain from the reports that we have of the operation of the machine.

In 1851, at the World's Fair in London, the official trials were held on the farm of Mr. Mechi, in Essex. The official report of Mr. Johnson, the American Commissioner, says:

"The wheat upon which the trial was to be made was quite green and remarkably heavy, and everything as unfavorable as could well be. . . . The first machine tried was Hussey's, which did not succeed at all, as it clogged very soon and passed over the grain without cutting it. After this had been tried two or three times and failed, it was proposed by one of the jury that no further trial be made, but it was insisted that the other American reaper (McCormick's) should be tried. . . . The machine was started. After it had passed its length the clean path made by the reaper showed that the work was done, and the reaper was successful."

Mr. Hussey, however, was not satisfied, and another trial was obtained. The following is from the report of Mr. Pusey, M. P., who was one of the judges:

"In the first trial at Tip Tree Hall Mr. McCormick's reaper worked well, the other (Hussey's) did not go at all. As the corn, however, was then green, it was thought right to make further trial. . . . The object of our second trial was to decide whether either, or both, was sufficiently good to receive our Council Medal. Mr. McCormick's worked in this trial, as it has since worked at Cirencester College and elsewhere, commanding the admiration of practical farmers, and therefore received the Council Medal. Mr. Hussey's sometimes became clogged, as in the former trial at Tip Tree, and therefore could not possibly obtain that distinction."

The operation of the Hussey machine at Paris in 1855 has been clearly shown by the quotation heretofore given to have been almost a failure, for

"The poor horses, although young and powerful, driven at great

speed, were completely exhausted. This machine works heavily; it requires too much power to drive its ponderous knife."

In a paper read before the British Society for the Advancement of Art and Science, in 1853, Alfred Crosskill, the first manufacturer in England of the Hussey and Bell type of machines, makes as fair a statement for Hussey's cutting apparatus as can be made:

"The shape of the knives and guards varies in both machines. Mr. McCormick's cutters form an angle with the guard of 60 to 70 degrees and have their edges serrated. . . . The cutters used by Hussey make an angle of 10 or 20 degrees with the guard, and are much more acute than those used by his rival. They are plain edged, and their action is to chop the corn (grain) between them and the guard through which they pass. His form of a knife bends the grasses through the guards and in time chokes up the knives."

Again the writer stated:

"In Hussey's they form a very acute angle with the guards, which are plain edged, and therefore chop off the straws by means of very rapid motion through the fingers."

Mr. Jacob Wilson, in his celebrated prize essay before the Royal Agricultural Society, referred to the two machines as follows:

"In Mr. McCormick's machine the knife had a separate edge, the numerous blades being riveted on to the bar in the form of an obtuse angle, consequently its action is similar to that of a saw. It was more desirable, more easily worked, and less liable to choke than Hussey's. In Hussey's the knife formed a very acute angle, which was smooth edged, and chopped the straw by a rapid motion through and against the fingers, but unless driven at a considerable speed was liable to choke. A friend, who worked one of these machines in America for several years, informs me that it was no uncommon practice to have the horses going at a sharp trot during the whole day to prevent the choking—of course having relays of men and horses. . . . The obtuse angle cutter (McCormick's shear draw cut) is simple, effective, durable, seldom requires sharpening, and consumes less power than any other form."

The Royal Agricultural College Farm, in 1852, held a trial between Hussey's and McCormick's reapers lasting nine days. A committee was appointed and the trial was one of the most severe ever held. The report of the judges states:

"McCormick's machine appeared to be free from clogging. The place at which it was necessary for the horses to walk in order to secure the proper working of the machines appeared to us a most

material feature in their claims. The horses which drew Hussey's machine was driven by a man riding on the near horse, and were kept at a fast walk, which we estimated at nearly four miles per hour—certainly at a speed far exceeding the ordinary walk of regular cart horses, and this speed appeared necessary to insure efficient working; a requirement which must be very distressing to heavy horses. McCormick's, on the contrary, was driven by a man seated on a machine at the ordinary pace of cart horses (say, $2\frac{1}{2}$ miles per hour), a rate at which a pair of horses might work for a whole day as at the plow, and with as little distress."

Another great trial was held in 1852, at Driffield, England, and the committee reported:

"Your committee are further of opinion, that from the violent reverberatory motion imparted to every part of Hussey's machine, durability is not to be expected, and that the form of the serrated cutters in McCormick's machine is far preferable to the deeply indented, smooth edged cutters in Hussey's, and that they will not nearly so often need renewing."

In the account of the annual exhibition of the Royal Agricultural Society in 1853, published in the Farmers' Magazine, it is stated:

"Mr. Hussey, the American, also made some excellent work with his improved machine, which is completely altered (by its English maker) since the great exhibition. . . . The speed of the cutting knives is increased so that the horses may go one-fourth slower. The knife used in America, where the climate is very dry, and the crops light, was formed to cut an angle of 20 degrees. It is now made to cut at an angle of 45 degrees, and with sickled edges to suit the moist condition of the heavier crops and humid climate of Great Britain. This form of knife or cutter is not only better adapted for greenish crops in wet or dry weather, but it greatly reduces the liability to clog."

In the Mechanics' Magazine of May 22, 1858, there is a long discussion on reaping machines. In speaking of Hussey the article states:

"The knife of the McCormick consists of a series of very short, obtuse, angular blades, so as to form a cutting edge, which does not depart very considerably from a straight line. The whole of the cutting edges are finely serrated after the manner of the sickle edge. The cut is what is known as a 'draw cut' in opposition to the chopping action of the Hussey knife. . . . In cutting, McCormick's reaper has this great advantage, that the knife would never clog in damp, foul crops, while the Hussey machines would only cut when the crop was dry."

The same article says of the Bell machine:

"This machine had lain dormant for many years. That it was

not successful will be seen from the fact that Crosskill subsequently discarded both the shears and the endless web, substituting McCormick's knife for the shears."

These Englishmen, disinterested, as between McCormick and Hussey, were good critics of these two types of cutting apparatus. Their unanimous opinion was that Hussey's cutting apparatus was not a success until it was changed so that the knife was beveled only on the upper edge, made to fit closely to the guard, and shortened so as to increase the angle. These changes were copied by the makers of Hussey's machines from McCormick, who from the first had a knife that was sharp only on one edge; that had serrations and was so positioned that the angle between the knife and the guard was much greater than in Hussey's, thus giving a "draw cut" instead of a chopping cut.

But Hussey himself did not make these necessary changes. His idea of a chopping cut, with a knife beveled on both edges, was adhered to by him in his own manufactures until the last, and that it is a failure was told by the fact that in 1858 his manufacturing establishment *made but ten machines*. Gideon A. Allen, one of the firm of Minturn & Allen, of Urbana, O., testified in the Hussey extension case on the 5th of February, 1861, as follows:

"Q. What kind of harvesting machines do you make?

"A. Hussey machines.

"Q. Please say what style of knives you used; did you make any changes; if so, what, and why did you make them?

"A. The first years we made the knife like M 2 (a long blade, similar to Fig. 6). After that we commenced cutting them shorter and making them wider; the third year pretty much like M 3 as to size and shape, probably ground a very little way from the point on the under side; after that we kept making them a little shorter and a little wider and quit grinding on the under side, leaving the under side flush all the way. The reason why we ground them only on top was that by leaving the blade lay flat on the guards it would prevent the grass working underneath the blades, which we found it did do in a great measure. There was another advantage, it brought the cutting edge nearer to the guards, and was less liable to leave the grass uncut."

Minturn, his partner, testified to practically the same effect. The changes made by these men on the Hussey cutting apparatus were directly in line with the principles of cutting which McCormick had used for more than ten years and shown to be a success.

In 1856 P. H. Watson, a patent attorney of Washington, who had been interested for the defense in the suit of McCormick vs. Manny, and who had in that connection become familiar with harvester inventions, sought Hussey and explained to him wherein his cutting device was wrong, and urged upon him the reissue of his patent of 1847. Preparatory to this reissue Watson was retained and the following list of lawyers: Stanton, the greatest patent lawyer of his day; Harding, then a young man, but since famous; Gifford, Keller, Dodge, McLean, Law, Hewitt and Scott. The total fees paid these men in four years was \$33,393.87, an exorbitant sum for that early day. These figures and names are taken from the statement filed by Hussey when obtaining the extension of his patent in 1861. The patent of 1847 was then reissued. The original patent stated in the first claim that the guards were to be "*open on top* and to be *used in combination with a knife.*" Watson, from his experience with the McCormick machine, knew that McCormick had used *a knife* in combination with guard fingers that were *open below*, and so this claim was reissued to cover "*a scalloped knife* in combination with *open guard fingers.*" Nothing was said about the beveling of the knife upon both edges; and for the first time Hussey (?) made the invention for which he has been given so much credit. To the average man, however, this invention will appear due to the \$33,000 that he paid to that long array of famous lawyers. This reissue by Hussey of his patents; the employment of the leading patent lawyers of America, paying them immense fees, and the manipulation of his patent through the Patent Office, is ample evidence of Hussey's shrewdness and business ability. At this time his manufacture of machines had decreased to a very few (nineteen in 1857), and he seemed to realize that as a manufacturer he was out of the market, and that his sole opportunity lay in reissuing his patents to cover a cutting device which should contain far more of McCormick's idea than of his own.

If Mr. Hussey's conception in 1846 had been clear on even this feature, he would have been entitled to the credit for an improvement of value; but he had no conception of the essential requisite of a "draw cut." In securing his reissued patent he completely changed it from the original. The knife was changed from "a knife" to "a scalloped knife" and the open guard changed from "a guard open on top" to

"an open guard." This reissue practice finally reached such outrageous extremes that the United States Supreme Court in 1880 turned down the whole subject of reissue. Such a reissue as Hussey's attorneys obtained in 1857 would to-day be absolutely void.

McCormick's Cutting Apparatus.—I quote from the description of McCormick's first reaper, found in the second volume of the *Mechanics' Magazine* of 1833, as follows:

"There is a wheel . . . turning a small crank, and from this crank the knife receives a vibratory motion. It is about $4\frac{1}{2}$ feet long with an edge somewhat like that of a sickle (having teeth), straight and projecting into the grain at right angles to the horse. . . . The grain is prevented from slipping with the edge of the knife by pieces of wire projecting before it, within two or three inches of each other."

I know of no patent, machine, experiment, newspaper report, or tradition of a reciprocating knife driven by a crank with fixed fingers to prevent the grain from slipping with the knife, before that of McCormick, in 1831.

In the McCormick patent of June 1, 1834, two ways of making the knife are described. The one used was:

"A vibrating blade operated by a crank, having the edge either smooth or with teeth, either with stationary wires or pieces above and below, and projecting before it, for the purpose of steadying and supporting the grain while cutting; or using a double crank and another blade or vibrating bar."

The alternative plan of two vibrating blades was never used.

From the testimony, under oath, of Wm. S. and Leander J. McCormick, taken fifty years ago, it appears that the fingers or guards did project over the knife, and were bent back beneath its cutting edge. Wm. S. McCormick, describing these fingers, stated that "the back end of the iron fingers was made in the shape of a fork and that fork extending back to the platform was riveted to a wooden pin, while the front end projected forward over and back under the edge of the reciprocating knife." The drawing herewith (Fig. 7) shows the cutting apparatus that was used in the machine down to 1839. It should be borne in mind that McCormick, after using his reaper in the harvest of 1832 to harvest fifty acres of grain, and in the harvests of 1833-34-35 to harvest considerable crops of grain, went into the business of smelting iron in 1835, which then promised large profits. The panic of

1837 caused the failure of the iron business, and it was not until the harvest of 1839 that he was able again to take up his reaper. In the

Fig. 7

Staunton, Va., Spectator, of July 25, 1839, is an editorial giving a favorable account of a public trial in that harvest on the farm of Mr. Joseph Smith, and stating that it was held in the presence of 200 persons. This was followed on August 11, in the same paper, by an advertisement of Mr. McCormick's containing the certificate of Abram Smith and eleven other gentlemen to the efficient working of the machine.

In 1840 the fingers were changed to double-closed ones. In the early months of that year the Richmond Enquirer contains a certificate of five gentlemen as to the operation of the machine at different times. As a result of these trials Mr. Abram Smith ordered a machine, as did also Richard Sampson, the "Farmer of Virginia," but both machines drew grass into the grooves on the under side of the fingers, and did not operate well. These machines had the same trouble that Hussey encountered when he sent his machines to Virginia four years later. In 1841 Smith's machine was improved by the substitution of a new sickle with reverse angle teeth cutting both ways, and it performed satisfactorily in that harvest. So successful was it in 1841 that Mr. McCormick advertised his machine in the spring of 1842 in the Richmond Enquirer. For the first time in the history of harvesting machinery his machine was warranted to do good work; to cut one and a half acres per hour, and to save a bushel of wheat to every acre.

"The undersigned . . . determined that this machine should get into use (if at all) upon its merits, and therefore upon his responsibility."

It is owing to this conservatism in the introduction of his machine, and in obtaining his patents, that much of his trouble in after years

arose. No one of his three great patents was taken out until long after he had fully and carefully experimented and put the machine, as patented, into public operation and use.

Fig. 8

In 1842 the cutting apparatus (Fig. 8) shown in the patent of 1845 was used. This year seven machines were sold and Wm. N. Peyton, who had one of them, wrote to the Southern Planter in August, 1842, as follows:

"It has been worked this harvest under every disadvantage . . . in consequence of the unprecedented weather we have had. . . . The reaper has cut all descriptions of wheat—green, ripe, rusted as badly as wheat could have it, lying and standing. . . . No weather has prevented the machine from working except when the ground was so soft as to mire the wheels."

General Corbin Braxton also furnished to the Farmers' Register an account of the operation of his machine:

"As soon as the first machine was put together we started it on a wet, damp day, in very heavy wheat not yet ripe . . . two mules were hitched, and to my astonishment it operated without stoppage or difficulty."

In 1843 Mr. McCormick sold twenty-nine reapers, and he had certificates like the above from twenty-seven of them. In 1844 fifty were sold and gave the best of satisfaction, and from the work of these machines in 1844 Mr. McCormick licensed five builders of his reaper at a license fee of \$20 per machine. Brown, in Cincinnati, was to build 100, Seymour & Morgan, at Brockport, N. Y., in the eastern territory, and Fitch, Backus & Co., of the same place, for the western territory, were licensed. Five counties were sold in Virginia, and the shops on the home farm were to continue building under license.

It was with much difficulty that Mr. McCormick moved from place to place over the country, making most of the journeys on horseback. He was without means, and dependent, largely, upon the assistance of others; but his reaper was successful, and the thousands of them that he sold, with the cutting apparatus of 1842, shows conclusively that his was a practical machine years before Hussey's cutting apparatus had been made a success. Attention is called to the fact that McCormick had a clear idea, in 1842, of cutting by a reciprocating blade that slid upon a curved support to hold the blade closely against a finger, thus giving a shear cut by a draw motion. Hussey for years, in fact, never in the machines he made himself, had a "draw cut." It is the "shear draw cut" that makes the modern cutting apparatus suc-

cessful. The drawing herewith (Fig. 9) shows in full lines Hussey's long-pointed knife, which formed an angle of but 18 degrees between its edge and the guard. Even in the mowing machine of to-day the angle is 35 degrees—almost twice as great—and in the harvester it is 55 degrees—three times as great. The line made in dots shows the mower section and that in dashes the harvester section that is in use at the present time. The most careful work in the making of harvesting machinery is the fitting of the knives so they will reciprocate through

the guards and, being beveled on but one side, will form with the guard a perfect "shear cut." Hussey's knife being beveled on both edges, long and straight, had not a shear cut because its edge did not strike the edge of the guard, nor had it a draw cut because of its deep pitch. It was therefore necessary to propel it with great speed to make it operate at all, with its chopping cut.

In 1857 McCormick answered Hussey's suit by saying that he had used the vibrating knife, moving through fingers open on their lower sides, in 1831 and on to 1839. Judge McLean, in his decision, stated that Hussey's reissued patent was for a *scalloped blade* moving through open fingers; that McCormick's earlier machine had a straight blade with a serrated edge in open fingers, and therefore did not anticipate Hussey's invention.

In the attacks made upon McCormick's position as inventor of the reaper the writers go through all the early machines, none of which harvested grain; they pick out a side draft from one; a small cylinder, which they call a reel, from another; a long guard, which they term a divider, from another; a platform from a newspaper account of a machine that was never built; a reciprocating knife that would not reciprocate—and then say, "McCormick invented nothing—every device of his can be found in earlier patents." When, however, they measure Hussey they do not use the same yardstick with which they measure McCormick's invention. If they did they would find Hussey's open back-guard in McCormick's early machine and the scalloped reciprocating knife in Manning's patent of 1831. *Thus by the same rule with which they measured McCormick, Hussey invented nothing.* Judge McLean said, however, that it was well settled law that "Inventors of a combination are as much entitled to suppress every other combination of the same ingredients as any other class of inventors."

Summarizing on the cutting apparatus:

(a) McCormick was first (in 1831) to use a reciprocating knife driven by a crank and pitman with fixed fingers to prevent the grain from moving with the knife.

(b) Hussey made, in 1833, a reciprocating blade worked by a crank, the blade fitted with knives three inches wide and four and one-half inches long, beveled on both sides, with fingers having slots into which the knives drew trash and damp straw because of the "chopping cut," thus making the plan a failure.

(c) In 1842 McCormick made the improvement on his cutting apparatus, shown in his patent of 1845, serrating the blade first one way and then in the opposite direction; made large curved open supports for the blade to reciprocate in and spear-shaped fingers to hold the straw to the blade, thus making a "draw shear cut" that would not clog in damp grain. He thus obtained a successful cutting apparatus that enabled him to sell thousands of reapers."

(d) Hussey in 1846, first built and sold his improved cutting apparatus, shown in his patent of 1847, opening the rear of the upper member of the guard and keeping about one inch of the rear part of the knife flush with the bottom. It was somewhat better than his original plan, but still was not a success, as it lacked the "draw shear cut."

(e) In 1852 McCormick returned to his open finger and slightly scalloped his blade, thus making his "draw shear cut" principle more effective. Some builders of cutting apparatus, similar to Hussey's, shortened the blades and ceased beveling them on the under side, thus coming more closely to McCormick's "draw shear cut" and making the Hussey apparatus more effective.

(f) Hussey's attorneys, seeing that his reaper was a failure (the sale shortly dropping to ten a year), got the leading patent attorneys of the country to reissue his patents so as to cover a scalloped blade working in open fingers, and then for the first time, twenty-five years after the invention of the reaper by McCormick, did he have an improvement of value in harvesters. Upon this one minor feature (the work of attorneys) rests Obed Hussey's only shadow of a claim to the invention of the first successful reaper.

III.—TREATMENT ACCORDED MCCORMICK AND HUSSEY BY THE GOVERNMENT.

This subject has little, if any, bearing on the question of "who invented the reaper." The fact, however, that the Board of Commissioners for the Extension of Patents refused in 1848 to extend McCormick's patent of 1834 is mentioned in the Protest as a point against the novelty of McCormick's first machine.

The extension of Hussey's patent was also refused by the same Board, but mention of that fact was carefully omitted in the Protest. Hussey also applied to Congress for an extension and was refused,

although he kept his application pending eight years; and this also the Protest forgot to mention. McCormick applied to Congress for an extension of his patent of 1834, but was not successful. The two inventors thus stand, in regard to the extension of their first patents, in identically the same position.

Hussey asked the Patent Office for an extension of his patent in the fall of 1847, and was refused on a technicality. His patent then expired on the 31st day of December, 1847. McCormick, on the 19th day of January, 1848, asked the Committee on Patents for an extension of his patent, which would expire on the 21st day of June, 1848. The extension was refused on technical grounds. The following letter of Edmund Burke, Commissioner of Patents, says:

"Within ten or twelve days of the expiration of his patent, Hussey applied to me, as Commissioner of Patents, for an extension. I informed him that, inasmuch as the Act of Congress, prescribing the mode in which patents should be extended, required a reasonable notice to be given to the public, . . . and as there was not time to give the required notice in his case I advised Mr. Hussey . . . to petition Congress for an extension, which body had the power to grant it.

"During the same winter, and after Mr. Hussey had applied to me for an extension of his patent, Mr. McCormick made application in due form and in season for the extension of his patent. Due notice was given, and on the day appointed for a hearing, Mr. Hussey appeared and contested the extension of Mr. McCormick's patent. And on examination of the records of the Patent Office and a comparison of the two patents, it appeared they both covered one or more features substantially identical in principle, but not the same precise combinations; and inasmuch as Mr. Hussey's patent bore date before Mr. McCormick's, the Board decided that he was *prima facie* the inventor of the feature, or rather claim, which conflicted. But Mr. McCormick contended that he invented the part of the machine embraced in both patents one or two years before Hussey obtained his patent, and was, in fact, the first and original inventor; and he prayed for a continuance of the hearing until he could take testimony with due notice to Mr. Hussey. He complied with the orders of the Board; but on an examination of the testimony on the next day of hearing, it was found to have been informally taken, and therefore ruled out."

The minutes of the McCormick case before the Board of Extension are given:

"March 23, 1848, the Board met pursuant to adjournment, and

"Ordered, That the further hearing of this application be postponed to Wednesday, the 29th of March, and that the said McCormick

be directed to furnish satisfactory testimony that the invention of his machine was prior to the invention of a similar machine by Obed Hussey, and that he be directed to give due notice to the said Hussey of the time and place of taking of said testimony.

"March 29, 1848. The Board met agreeably to adjournment. Present: Jas. Buchanan, Edmund Burke and R. H. Gillett, and having examined the evidence adduced in the case, decided that said patent ought not to be extended.

"(Signed) JAMES BUCHANAN, Secretary of State.

"EDMUND BURKE, Commissioner of Patents.

"R. H. GILLETT, Solicitor of the Treasury."

As was common in extension cases, the Commissioner of Patents had previously asked the Examiner in the Patent Office to report on McCormick's patent, and this report, dated January 22, 1848, stated that:

"The cutting knife and mode of operating it, the fingers to guide the grain and the revolving rack for gathering the grain, were not new at the time of granting said letters patent. The knife, fingers and general arrangement and operation of the cutting apparatus, are found in the reaping machine of Obed Hussey, patented 31st of December, 1833. The revolving rack presents novelty chiefly in form, as its operation is similar to the revolving frame of James Ten Eyck, patented 2d November, 1825. Respectfully submitted,

"CHARLES G. PAGE, Examiner."

Page, the Examiner, who knew little about reaping machines, called McCormick's reel a "revolving rack." Ten Eyck, in 1825, took a patent on a reaper which proved a complete failure. It had revolving knives similar to those of lawn mowers. Page, noticing that the pictures resembled each other, mistook the drawing of this cutting apparatus for a reel, and cited it as an anticipation. He made a mistake, which merely emphasized his ignorance and lack of knowledge on the subject. This error of Page's alone was fatal to McCormick's application, for at that early day Buchanan and Gillett accepted Page's opinion that the gathering-reel and the cutting-cylinder were identical constructions having the same functions. Burke, the Commissioner of Patents, recognized the distinction, and was in favor of the extension. He signed the decision only because it was the custom for all to unite in the ruling of the majority. Viewing this matter in the light of fifty years' experience, it is easy to see how fatal Page's blunder was to the interests of McCormick's extension. The only other point in Page's report was the cutting apparatus of Hussey. Having invented his

reaper two years before Hussey, McCormick proceeded to obtain ex parte affidavits setting forth the invention and successful operation of his reaper in 1831. Hussey, however, wrote the following letter on February 21, 1848, to the Board of Extension:

"I wish hereby to interpose my objections to the extension of Cyrus H. McCormick's patent for his reaping machine by your honorable Board.

"My objections are these:

"(1) The machine has not proved a useful invention to the public.

"(2) Mr. McCormick has been rewarded by sales of patent rights and by the extensive sales of his machine, before the real merits of the machine were fully known.

"(3) It will be an injury to myself."

He then produced several letters in relation to the work of certain of the hundreds of reapers that McCormick's licensees had sold, and finally got back to the 1843 trial that was held between his and McCormick's machine in Virginia, in which he was defeated, as shown by the unanimous report of the judges. He says:

"Our machines came before the public simultaneously and got credit in widely different locations. They were first operated together in Richmond, Va., in 1843. An unfair trial was brought about in the same field, where a preference was given to McCormick's machine, which was accidental and should not have been given."

It will be remembered, from the quotations already given, that Hussey had challenged McCormick for this trial several months before the harvest of 1843. The letter further says:

"By the false position in which Mr. McCormick's machine was then placed he made extensive sales of his patent rights, which filled the country with machines which are now going out of use. I need not say that this state of things has had a disastrous effect on my interests, as well as on the interests of the farmers of the country, which has been fully developed since that time, and it is believed that a further extension of McCormick's patent will serve to perpetuate in some degree the evil effects on farmers, while it may operate to retard the just reward which the subscriber claims for having produced the best reaping machine which was ever offered to the world, which reward he feels himself kept out of, in a great measure, by the false position his machine was placed in by the award of the public committee, which has since been fully acknowledged to be wrong.

"(Signed) OBED HUSSEY."

What a mixture of inconsistency and selfishness this letter shows! McCormick had "filled the country with machines." How shallow,

therefore, his first objection, that it had "not proved a useful invention to the public." Would farmers have made "extensive" purchases of reapers in the 40's, "before they knew the real merits of the machines"?

Fifteen hundred McCormick machines were made that year, nearly as many machines as Hussey built and sold during the thirty years of his business career. Hussey sold and was paid for only ten machines that year; yet he writes to the Extension Board that McCormick's machines "are going out of use." Hussey followed this letter by another one, two days later, dated Washington, February 23, 1848. The letter is as follows:

"I learned very recently that one of the strongest points upon which Mr. McCormick rests his claim for the extension of his patent is that he is ostensibly the inventor of the reaping machine. Our machines being so different it never occurred to me that such an opinion could be entertained by any one, and up to the 21st inst., the day on which I became aware of that first, I had made no preparation to combat it. I understand also that the Examiner in the Patent Office has given it as his opinion that our machines are similar. It is natural for me to infer that this opinion was obtained to aid your Honorable Board in deciding justly for all parties. The supposition that such evidence may be concluded sufficient in the present case, in the absence of more positive evidence, has given me no little concern. Our machines are different in principle, so far as regards these points which either of us can justly claim to be the inventor of. I will admit that our machines in some respects are similar, but those points of similarity are public property and not the invention of either of us. . . . I trust that before your Honorable Board shall decide in McCormick's favor, on the ground that our machines are similar, you will permit me to lay before you evidence to substantiate what I have here asserted. . . . I have made little money by my patent. One county is the extent of territory which I have sold. My desire has been to confine the manufacture, as much as possible, within my own control, until I could give to the world a good reaping machine, which I have done just at the expiration of my patent. With great respect.
 "(Signed) OBED HUSSEY."

This letter could never have been written if Mr. Hussey, in 1848, had known himself to be the inventor of the reaper. He says that the knowledge that the Examiner in the Patent Office had "given it as his opinion that our machines are similar has given me no little concern." Of course it did when he knew full well that McCormick's machine was built two years before his and any extension of McCor-

mick's patent would cover his use of a knife reciprocating through fixed fingers driven by a crank. In the spring of 1834 McCormick gave Hussey public notice, by a letter in the *Mechanics' Magazine*, that his machine had been invented and used in 1831, and that he claimed "the principle of cutting by a toothed instrument receiving motion from a crank in combination with iron fingers." The Examiner's statement that the machines were similar in the cutting apparatus left Hussey no escape unless he could show that "our machines are different in principle." Hussey's egotism is apparent by his statement that "McCormick's machine fails . . . while mine is taking its place." Nothing short of an hallucination could assume that his ten machines were "taking the place" of McCormick's 1,500. The admission in the letter that not until 1848 could he "give to the world a good reaping machine" would excite sympathy did it not tell so conclusively against the claim of the perfection of his machine before that date.

From the order of the Extension Board it will be seen that on March 23, 1848, the Board directed Mr. McCormick to furnish "satisfactory testimony," and gave him until Wednesday, the 29th of March, six days, in which to obtain it. His testimony, already filed, was in the form of affidavits, and the order directed "that due notice be given to the said Hussey of the time and place of taking said depositions." McCormick was thus allowed in the month of March, when the roads were almost impassable, six days in which to go from Washington to Steele's Tavern, Rockbridge County, Va., a journey that took three days even when the roads were good. The going and coming would have consumed all the time allotted by the Board. McCormick, however, had anticipated this dog-in-the-manger attitude of Hussey, who had just failed to obtain his own extension. Some days before he had notified Hussey to be present at the taking of depositions. These depositions were taken at Steele's Tavern on the 17th and 18th days of March, 1848, before a Justice of the Peace, by whom they were to be sealed and forwarded to Washington. The Justice, as shown by the postmark of the letters, did not mail them until March 23rd, and they did not reach Washington until the afternoon of March 29th—too late to be considered by the Board of Commissioners. The evidence which the Board states they did consider consisted, therefore, in the affidavits

which McCormick had filed and which were to be replaced by the evidence that did not reach Washington in time. But Senator Brown of Louisiana, referring afterwards to the matter in the United States Senate, stated that although these affidavits were examined they were not deemed entitled to consideration because they lacked the certificate of the Governor of the State, showing the appointment and authority of the Justice of the Peace. All this goes to show that the Board's decision was based on Page's opinion. On the first point in that opinion—Ten Eyck's anticipation of the reel—Page made a mistake. On the second point—Hussey's priority as to the cutting apparatus—the facts conclusively prove Page was in error on this also.

This regular testimony was afterwards submitted to the Committee on Patents of the United States Senate, at the time McCormick asked Congress to extend his patent. Senator Fessenden of Maine, the chairman, one of the keenest lawyers of his day, reported to the Senate for the committee:

"The testimony was taken in compliance with the order of the Board, and by the proof submitted on the part of the said McCormick, it appeared that he invented his machine and first practically and publicly tested its operation in the harvest of 1831. That no proof on the part of the said Hussey appears to have been submitted to said Board as to the date of his said invention, but from the exhibits referred to your Committee, it appears that his machine was first constructed and operated in 1833."

Could McCormick have known the tremendous odds against him, he would have hesitated before starting on his trip from Steele's Tavern to Washington, to apply for his extension, in the winter of 1847-48. Single-handed and alone, he undertook to obtain justice. At that time extensions were granted by a Board. It did not take many years for the Secretary of State and Solicitor for the Treasury to be dropped from this Board. Brown, of Cincinnati; Seymour & Morgan and Fitch, Backus & Co., of Brockport; Hite, of Virginia; Rugg, of Illinois; Easterly, of Wisconsin; Moore & Hascall, of Michigan; Hussey, of Maryland; Minturn & Allen, of Ohio, besides the proprietors of every wagon and blacksmith shop in the country that wanted to build reapers, appealed, through their senators and representatives, by petitions and word of mouth, to prevent the extension of McCormick's patent. His licensees were tired of paying \$30 royalty fee for each machine, and saw a way to stop paying it by defeating the extension.

Buchanan and Gillett were politicians. Buchanan was already, as Secretary of State, trimming his sails for the Presidential nomination. Gillett was from New York, and so great was the political pressure brought to bear upon him that he could not be impartial. Burke, the Commissioner of Patents, and the one who from his position knew something of the justice of McCormick's claim, favored the extension, but the other two opposed it. The injustice of the refusal to grant this extension was commented on in the United States Senate by such lawyers as Fessenden and Seward. Other senators (also skilled lawyers) who opposed the extension in the Senate, unhesitatingly declared that in this refusal the Board of Extension clearly exceeded its powers.

Hussey and McCormick at once appealed to Congress for extensions. McCormick, especially, had no chance in Congress. His patent was recognized as covering the essential elements of all successful reaping machines, and so strong was the pressure on the part of those who wished to copy it, that the Legislatures of the States of New York, Michigan, Indiana, Tennessee and Ohio passed resolutions instructing their representatives in Congress to oppose his extension. Scarcely a week passed, during the pendency of McCormick's bill, without long remonstrances, signed by hundreds of names. They came from all the wheat-growing states. The grounds of the remonstrances were that McCormick's patent would cover every reaping machine made, and thus levy a tribute upon the farmers of all the grain-growing states. The further ground was stated that McCormick had already made large profits, and it was therefore unjust to give him such a monopoly. The effect of these long remonstrances upon the politicians is clearly shown by the course of Senator Douglas. He said:

"My objection is not to Mr. McCormick. He is a gentleman for whom I have the highest respect. I think he has rendered a great service to his country by his invention. . . . I would do anything that I could do properly to serve him, as he has served his country; but, his patent having expired, and the right to manufacture and use the machine having vested in the public, I know of no authority to divest that right and put it back in him."

Hussey was also an applicant before Congress at the same time, and urged his claim on the ground of his poverty and his failure to receive proper compensation. Certain senators made pitiful pleas in his behalf, but they were unsuccessful. The stories of his poverty were

admissions of the failure of his machine, as is shown by this quotation from a speech of Senator Jones, of Tennessee:

"If Mr. Hussey's was such an excellent machine as is now represented, why, in the name of God, did he not make some money out of it in fourteen years? The patent was granted in 1833—twenty-three years ago, and if it was this great machine which my friend says it was, is it not a little strange, that he is now so poor as to be represented as worthy of the consideration of the Senate, on the grounds that he has made nothing out of it?"

It was shortly after his defeat in Congress that Hussey subsidized the long list of patent lawyers heretofore spoken of. They took up his patent of 1847 and reissued it into a successful patent—his first and only success in his long experience with reapers.

In 1859 McCormick made application to the Commissioner of Patents for the extension of his patent of 1845; and in 1860 he made application for an extension of his patent of 1847. These extensions were opposed by every builder of reapers in America. Every local reaper agent throughout the country had blanks sent him which he was urged to present to the farmers for their signatures, protesting against the extensions. The letter of Lee & Fisher shows the combination that was arrayed against McCormick. So powerful was the political pull possessed by these opponents that a bill was passed in the Congress of the United States extending the protestants' time for the taking of testimony sixty days, thus carrying the consideration of the extension to a new Commissioner of Patents, who had been instructed by his own state, Indiana, to refuse the extension. James Buchanan, as one of his last official acts, signed this bill. The political pressure was so great upon Commissioner Holloway that he refused the extension, but stated that:

"Cyrus Hall McCormick is an inventor whose fame, while he is yet living, had spread around the world. His genius has done honor to his own country, and has been the admiration of foreign nations, and he will live in the grateful recollection of mankind as long as the reaping machine is employed in gathering the harvest."

Summarizing on the treatment of McCormick and Hussey by the Government:

(a) Both Hussey and McCormick applied to the Board for an extension of their patents of 1833 and 1834. Both were refused on technicalities.

(b) McCormick was ordered to take testimony showing the priority of his reaper over Hussey's. This testimony was not considered, as it did not reach Washington in time. Hussey, however, attended this testimony and filed a brief in which he admitted the priority of McCormick's machine.

(c) Hussey and McCormick applied to the Congress of the United States for an extension of their patents of 1833 and 1834. Both were refused.

(d) McCormick applied to the Commissioner of Patents for an extension of his patents of 1845 and 1847 and Hussey applied for an extension of his patent of 1847. McCormick's extensions were refused, because of political manipulations and large profits that he had made upon his machine, but with an encomium upon his position as inventor that was worth more than any patent extension. Hussey having made no profit from manufacturing his machine, was allowed an extension of his patent of '47, he making oath to the fact that his machine built in accordance with his patent of 1833 was a failure.

(e) Hussey admitted that the scalloped sickle was old, and the double guard was old, and that his invention consisted only in the combination of the two old elements—the old scalloped sickle and the old double guard.

I submit that the showing made by these two inventors while endeavoring to extend their patents clearly proves McCormick the inventor of the reaper.

IV.—HUSSEY'S VIEW OF HIS AND MCCORMICK'S MACHINES.

The Protest contains the following quotations from the brief filed by Hussey before the Board of Extension:

"I believe that I have established in this review of the evidence taken in Augusta County, Va., and by the books referred to, the following points:

"(1) That C. H. McCormick is not the inventor of the arrangement by which the horses draw the machine.

"(2) That he is not the inventor of the platform.

"(3) That he is not the inventor of the movement of the cutter by means of a crank.

"(4) That he is not the inventor of the double knives, even if it were satisfactorily proved that he used them prior to the date of my patent, which is questionable.

"(5) Proves the abandonment of the double knives by C. H. McCormick, which abandonment makes it public by the patent laws, even if he were not the bona fide inventor of the same.

"In the above five points are contained all the material points in which our machines are said to be similar. OBED HUSSEY."

This quotation, carefully selected and shrewdly placed, as it is in the Protest, is misleading. It conveys the idea that Hussey, and not McCormick, is the inventor of these essential features.

The following is quoted from the same brief:

"Several witnesses testified to the following particulars in the McCormick machine, which appeared to conflict with mine:

"(1) The horses draw the machine and walk beside the grain.

"(2) The cutter is moved by connection with a crank.
the wheat falls on the platform.

"(4) The fingers were at one time double (that is, one part of the finger was above and the other part below the edge of the sickle or cutter).

"(5) The witness testified that C. H. McCormick abandoned the double finger in 1842 or 1843.

"I will now proceed to show by the references that the four points testified to are not the invention of McCormick.

"First Point.—The horses draw the machine. For this I refer to Rees' New Cyclopaedia, where a machine is described, invented by Mr. Plunket; also to the Edinburgh Cyclopaedia, where a reaper is described, invented by Mr. Gladstone, both of which embrace this point.

"Second Point.—The cutter is moved by a crank. I refer to Loudon's Encyclopedia of Agriculture, where the reaper is described invented by Mr. Bell, describing this point.

"Third Point.—I refer to the same work on the adjoining page.

"Fourth Point.—Double fingers. I refer to the Edinburgh Encyclopedia now in the library of the Patent Office, where a reaping machine is described invented by Mr. Gladstone, and improved by Mr. Scott, which is illustrated in plates 478 and 479, in which revolving blades pass through fingers which support the straw against the edge of the blade. Fig. 5, plate 479, shows the blades, some of which are represented entering the space, some leaving it, and some with their points in the space.

"The witness further testified that McCormick's reaper has a draw sickle blade, and a reel for the blade, which by its revolutions in the heads of the wheat is designed to draw the wheat back to be cut and to deposit the same on the platform when cut. I have nothing to do with the sickle and reel here described. They make no part of my reaper. I leave them to Mr. McCormick, while I wish to place in contrast my own cutter, which is composed of a row of blades of a lancet point shape and arranged on a rod side by side. I do not claim to be the inventor of such blades. I claim them in combination with, and

vibrating through or into double fingers, a combination which I believe to be substantially my own invention, and entirely different from McCormick's, and on which my machine entirely depends for its efficiency as a reaper. None of these latter points, either combined or separate, are found in McCormick's reaper, he having abandoned the double fingers four or five years ago."

The reason for Hussey's tactics is plain. He had been defeated in his application for extension. He knew that McCormick was in a position where he could control the building of all reapers with a knife, reciprocated by a crank with fixed fingers to prevent the grain moving with the knife. Hussey's only hope, therefore, was to destroy McCormick's patent by seeking to anticipate it in old publications of machines which had never been built, or if built had never operated. The only way he could do this was to pick out a feature here and there from the old pictures. He took a crank from one, a side draft from another and the double fingers from another. This plan led him into trouble with his own machines, as his lancet-point knives were old and his double fingers were old. To meet this difficulty, he set up, for himself, the claim of a combination. He did not minimize his own invention. Manning's patent shows the lancet-shaped knives, and McCormick had the double fingers in 1831. But he did minimize McCormick's. *In none of the machines to which he referred nor in any machine made before McCormick's is there a reciprocating knife driven by a crank working in combination with a reel; in none is there a divider; in none is there a reel working in combination with a divider; in none is there a reciprocating knife driven by a crank, with fixed fingers to prevent the straw from moving with the knife; in none is there a platform to receive the grain, so attached to the machine that a bundle can be raked from it to the side, out of the way of the machine, in the next round of the field; in none is there a machine mounted upon two wheels, the major part of the weight resting upon the main wheel, thus giving sufficient traction to operate the machine; in none is there a side draft on a machine, wherein the major part of the weight rests upon one wheel, and that wheel located behind the team. These features are McCormick's invention, and neither Bell, Scott, Gladstone, Plunket, nor any of the dreamers and builders of unsuccessful reapers before McCormick, contains these features. Place these essential elements in the scale on one side and allow Hussey the only combination*

which he claims to have invented, and let the result determine the question of the invention of the reaping machine.

Summarizing on Hussey's idea of his and McCormick's machines:

(a) Hussey admitted McCormick to be the first, and therefore picked out of his own machine a minor feature not in McCormick's, and magnified this feature.

(b) All features common to the two machines he called old and minimized their value.

(c) His one feature, which the Protest has magnified into a mighty reaping machine, has on investigation shrunk to a shrivelled combination of two old elements, both of which have been used before for the same purpose as Hussey used them.

(d) McCormick's machine, however, proves Hussey's minimizing statements wrong, as it contains the essential elements of the reaping machine which were original with McCormick, and without which no successful reaper can be made even to this day.

It is submitted that by Hussey's own statements McCormick is the inventor.

V.—IN CONCLUSION.

It is too soon to expect an unbiased judgment of McCormick's invention. The antagonisms engendered by an energetic business career of forty years are too strong; the defeats that have been suffered by the rival reaper builders at every great Exposition that has ever been held are still too fresh in memory; the failure of the more than 800 different concerns that have undertaken to build harvesting machines in the past fifty years and that have succumbed to the competition of the McCormick has left enemies; in all these cases time is needed to modify their animosities and cause them to forget their jealousies. Many years may therefore elapse before the credit and honor that belongs to the successful invention of the reaper will be willingly paid, by the competing reaper builders, to Cyrus H. McCormick, the man who invented the first practical reaping machine. Disinterested observers of the course of events, however, have placed on record their opinions, and the judgment of some of these men of clear and unbiased mind will carry more weight than pages written by rival builders of reapers.

"In agriculture, it (McCormick's reaper) is, in my view, as important a labor-saving device as the spinning jenny and power-loom in manufacture. It is one of those great and valuable inventions which commence a new era in the progress of improvement, and whose beneficial influence is felt in all coming time."—(From the report of Edmund Burke, Commissioner of Patents, 1848.)

"The McCormick reaper is the most valuable article contributed to this exhibition, and for its originality and value and its perfect work in the field, it is awarded the Council Medal."—(Extract from the report of the Council of Juries, First World's Fair, London, 1851.)

"The McCormick reaper is the type after which all others are made, and it is, as well, the one which worked the best in all the trials. On the McCormick invention all other grain cutting machines are based, and not one of the imitations equals the original."—(Report of the Juries of the Paris International Exposition, 1855, awarding to the McCormick reaper the Grand Gold Medal.)

In 1863 a great International Exposition was held at Hamburg. The McCormick reaper obtained the Grand Prize, and the jury stated that "McCormick was the inventor of the features that gave value to the reaping machine." On his way home he stopped in England, and the editor of the North British Agriculturist attacked the position of the Hamburg jury, urging that Bell was the inventor of the reaper. Mr. McCormick answered him in several communications, through his own columns, and the following quotation from the Mark Lane Express, the leading agricultural paper of England, under date of October 26, 1863, will show the outcome of this controversy:

"While the editor of the North British Agriculturist shows much zeal for his countryman's (Rev. Patrick Bell) machine, we must say we think the facts and arguments of Mr. McCormick are presented with a clearness and force which seem unanswerable in establishing that he was the first to invent the leading features of the successful reaping machine of the present day; that he continued regularly the improvement and prosecution of the same to the perfection of the machine, and that this, in the slightly varied language of the different scientific juries of the various great international expositions of the world, constitutes the invention of the reaping machine."

As an expert opinion, the following is of great value:

"While there have been many valuable improvements in detail, it may be truthfully said, that to dispense with Cyrus H. McCormick's invention would be to wipe every reaper out of existence."

"The original machine of Mr. McCormick embraces the following features: The serrated, reciprocating blade, operating in fingers or supports to the grain being cut. The platform for receiving the cut

grain deposited thereon by the reel and from which it was raked to the side in gavels ready to bind. A divider to separate the grain to be cut from that left standing." (Knight's New Mechanical Dictionary, by Edward H. Knight, A. M., L.L. D., in charge of the classifications and publications of the United States Patent Office.)

Professor Roberts, of Cornell University, perhaps the best-known agriculturist in America, and who takes great interest in farm implements, writing in Johnson's Universal Encyclopedia on the reaping machine, states:

"In 1831 the machine of Cyrus H. McCormick was invented and successfully operated. This machine for the first time was an organized instrument, containing practical devices that have been incorporated in every successful reaper made since. As built and tested in the fall of 1831 it contained the reciprocating knife moving through fixed fingers to sever the grain, the platform which received the grain, the reel to hold the grain for the knife, and to incline it upon the platform, and the divider projecting ahead of the knife to separate the grain to be cut from that left standing. The horses traveled ahead of the machine, and beside the standing grain. It was mounted upon two wheels, and the motion to move the operating parts was derived from the outer wheel."

While in Paris in 1878 Mr. McCormick was elected a member of the French Academy of Science, as "having done more for the cause of agriculture than any other living man."

In the article written for the Mechanics' Magazine of May, 1834, Mr. McCormick asserted his claim to the invention of the reaping machine. Throughout his life he defended his position whenever attacked by his rivals in business. At different times Ogle, Bell, Randall and others have been put forward as the inventor. The latest name is that of Hussey. Having shown thus fully what Hussey did, it will be interesting to learn who will next be named inventor by the rival manufacturers of reapers.

R. B. SWIFT,

Chicago, April 10, 1897.

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