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GENERAL DIRECTIONS FOR FITTING UP AND OPERATING HAY :: CARRIERS AND OTHER HAYING TOOLS.

The End Hoist.

One of the best and most economical ways of rigging a Hay Carrier is that shown in cut above. The hay is taken in at the end through a Hay Door, which permits the barn to be filled entirely full. The draft rope, after passing through the pulley E at the back end of the track (see dotted lines), passes to the eave immediately under a rafter, where it is not in the way, then out through the pulley C, which is hung in one of our Bracket Pulley Holders, and down through the pulley B, which is held by a hook screwed into the sill of the barn.

This plan requires the least amount of draft rope, and the horse can be worked close to the load and can be easily stopped should the fork miss its load or get caught on the rack. When our Hay Door is used it can be made as large as desired and still be opened or shut as easily and quickly as a forkfull of hay can be taken in.

When the barn is long each end should be fitted with a hay door, and by locating pulleys B, C, and E in the middle of the barn they will answer for both ends. The tracks from both ends should run within three or four feet of each other, leaving one rafter between them for the collar beam, to which pulley E

FIG. 2.

is attached. This collar beam should have a hook on each side for the pulley E, and also a stationary ladder from below. All that is necessary to change from one end to the other, is to move the carrier from one track to the other and change the pulley E to opposite sides of the collar beam.

End and Center Hoist Combined.

When not convenient to take the hay in at each end, our Carriers may be fitted to take it up in the center and also at one end, as shown in Fig. 2. The

track is here arranged to take the load up at A on the outside, and also at A1 and A2 on the inside. With our latest improved Carrier all that is necessary to change from one place to another is to pull on the check cord B or B1, and raise the stop so the Carrier can pass. After the first filling has settled, stops A1 and A2 can be drawn up and the Carrier run the entire length of the track. When rigged in this way the rope must be long enough to run the entire length of the barn.

A Simple Center Hoist.

FIG. 3.

Fig. 3 shows one of the simplest and cheapest Center Hoists that can be devised for a reversible Carrier. It requires only three knot pulleys, G, E, and F, and two Bracket Pulley Holders, one at G and one at E. The return rope (R) is operated by means of a weight (W). To reverse the Carrier, untie the weight and connect the free end of the draft

rope (D) to the return rope by a swivel rope hook. Now pull on the return rope (R) until the ropes have changed ends. Then disconnect the ends of the draft and return ropes. Change pulley (F) to the opposite end. Attach the weight to weight rope and the Hoisting Singletree to the draft rope, and you are ready for work.

Fitting Up Wood Tracks.

The track should be sized so the carrier will pass over it freely. Special directions accompany each carrier in regard to the proper size for the track, and how to fit the stops in it. Hard wood is probably the best, provided it is straight, but good pine will answer very well, and will be most generally used. When a large amount of heavy work is to be done with a wheel carrier, the top of the track on each edge where the wheels run should be plated with iron. Strips one-eighth or three-sixteenths by inch wide will do. They should be put on with wood screws, having their heads countersunk, and it would be still better if the pieces were welded together the length of the track.

Splicing the Track.

FIG. 4.

To splice the track, bevel the ends, lap them together and nail the points as shown in the cut. Put in two small bolts with heads *below* and burrs in the *middle* above so carrier will pass them. For three or four inch tracks make the bevel 12 to 15 inches long. For two-inch track make it 8 inches long and put on an inch piece below

to strengthen the splice, or if the carrier fits up too closely to the track for the inch piece, use a strap or plate of iron with holes punched in it for the bolts. The back end of the track should be pointed to facilitate putting on or taking off the carrier. Bore an inch hole through the side of a 4x4 track (a smaller hole in a smaller track) about four inches from the end, and put in a hard wood pin (made a little tapering to drive out easily) to keep the carrier from running off.

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FIG. 5.

When wood cleat Hangers are used cut the cleats 18 to 24 inches long from point to point for 4-inch rafters (the less pitch the roof has the longer the cleat should be), and from 22 to 30 inches from point to point for 6-inch rafters. Make the cleats $3\frac{1}{2}$ to 4 inches wide and $1\frac{1}{2}$ to 2 inches thick, tapering the ends down to inch so they can be nailed to the rafters with fencing nails, or they may be bolted on if preferred. Bore a 7-16 hole in center for the hook bolt, and on each side of this a hole an inch deep on the under side of cleat for the point of hook bolt to enter, so that the hook may be turned to either side necessary. Secure the wood cleats (or rafter irons) to every second or third rafter as will be required for strength, so that these hooks will be in a straight line, commencing on the third rafter from the end, and putting in an extra one or two where the hay is taken up or to strengthen a splice. Measure from one hook to another with a light pole and lay off mortises on the track to correspond.

Make mortises for links (see Fig. 6) $\frac{3}{4}$ wide, $2\frac{1}{2}$ long on the upper edge of track, 3 to $3\frac{1}{2}$ inches deep, and tapered to a point at bottom. Bore 5-16 holes for the pins to hold links in place about two inches from the top of track, so the pins will drive in *tight* and not work out in use. Put the links in track before raising, then hook them on to hooks of hangers and turn up the burrs securely.

On the rafter next to the back end of the track, place a collar (Fig. 6). beam $3\frac{1}{2}$ to $4\frac{1}{2}$ feet long (according to pitch of roof) for pulley (E) (see Fig. on 1st page.) This pulley should always be located independently of the track and so the rope will run close to the track but not rub on it.

The Extension.

FIG. 7.

Get a good solid piece of timber three to four inches square (or round), and four to six feet long for the extension piece (A). Nail, or both nail and bolt, the Extension Support (B), which we furnish, to the end pair of rafters, as shown in Fig. 7, setting it well up on the rafters, so the lower

edge of the Extension Support will be on a level with the lower edge of the track hanger cleats or rafter irons. If necessary it can be let up into the rafters to make it come level with the hangers. The cleat (C) is spiked to the end of the extension piece, and is also nailed to the second pair of rafters. The two bolt hooks which accompany the Extension Support are set in the extension piece, as shown, one at the end and the other between the rafters.

Always set the track hangers up into the comb of the roof as close as possible—just so the wheels of the Carrier will not strike against the rafters. When a sling is used, or extra heavy work is to be done, an extra support for the Extension, made of 2x6 and 2x8 scantling, 8 or 10 feet long, and put together in the form of a board eave trough and bolted on top of the roof, should be used.

The Pulley Hooks.

Fig. 8 (next page) shows the right and wrong way to put in Pulley Hooks, the upper figures being wrong and the lower ones being right. When a rope is passed around a pulley the "line of draft" is always half way between each line of the rope, as shown by the dotted lines in the cut. The hooks

FIG. 8.

one put in wrong.

should always be set as nearly straight with the "line of draft" as possible, and should be screwed well into the wood. The way to have them break or bend easily is to use a long hook, set it at right angle with the line of draft, and then screw it half way in. A small, short hook set right will stand more than a large, long

Passing the Rope Outside.

Fig. 9 shows two plans of passing the rope through the siding just under the eave. The first is the old style of putting a hook into the plate for the pulley X, and passing the rope through the siding below it to a pulley (Y) fastened to a stake set in the ground a few feet away from the barn. The other shows one of our Bracket Pulley Holders for the pulley C, and the pulley B held by a hook screwed into the sill of the barn. The latter holds the rope better out of the way than the former.

FIG. 9.

The Return of the Carrier.

There are three ways in which the Carrier can be returned to the load. 1st, by pulling on the trip rope, called Hand Return; 2nd, by using the return movement of the horse, called Self Return; and 3d, by the use of counterpoise weights, as shown in Fig. 10. When wheel Carriers are used in small or medium-sized barns with light ropes, Hand Return is all that is necessary; but in large barns with long, heavy ropes, something more is needed for easy work.

We furnish special directions to purchasers for the use of our Self Return, and in order that our patrons may have the choice of all methods, we herewith illustrate the leading plans of

Weight Returns.

FIG. 10.

The ends of the ropes having the arrow points are to be attached to the Carrier. Weight No. 1 is rigged with a single rope passing over a return pulley (A). When rigged this way the weight will rise and fall the same distance the Carrier travels. Weight No. 2 is rigged double draft, the weight rope passing over two return pulleys (B and C). It raises and falls only half the distance the Carrier travels. Weight No. 3 is rigged triple draft, and raises and falls only one-third the distance the Carrier travels. It requires the double pulley (D) and rope carrier pulley (E).

The plan of No. 1 is suitable for high, short barns; No. 3 for long, low ones; and No. 2 for intermediate lengths and heights. Weight No. 2 should be twice as heavy as No. 1, and weight No. 3 three times as heavy, to have the same returning power on the carrier. Never use a weight heavier than is required to slowly return the carrier, and it will not hurt if it has to be assisted by a slight pull on the trip rope.

Guys for the Weights.

It sometimes happens that the weight cannot descend perpendicularly. In such cases the simplest plan is to use guys to run the weight to the side. No. 4 represents a single draft weight, No. 5 a double draft, and No. 6 a triple draft weight rigged to run on a guy. Weights rigged in this way will not have quite as much returning power as when they descend perpendicularly.

The price of the pulleys for the different kinds of returns shown in Fig. 10 are as follows: No. 1, 25 cents; No. 2, 50 cents; No. 3, \$1.25; No. 4, 50 cents; No. 5, \$1.00; and No. 6, \$1.50.

New Reversible Weight Return.

FIG. 11.

Fig. 11 shows a new plan of weight return for a reversible carrier, which is adapted to a barn having only one, or two or more drive-ways. Two half-inch or three-eighths ropes (X and X I) long enough to reach to the floor, are fastened to the rafters or to the purlin plate near where the pulleys I and F are hung. The end of one of these ropes is passed through the return pulley attached to the weight (W), and tied to the end of the return rope (R). As shown in cut, the weight is rigged double draft, which will generally be sufficient, but when necessary it can be rigged triple draft by making these ropes twice as long, passing them over return pulleys at the purlin plates or rafters, and down to the pulley at the weight, where the end is secured by means of a clevis.

The Carrier is reversed by disconnecting weight rope (X I) and return rope (R), then connecting the ends of the return and draft ropes together and pulling on the return rope until they have changed ends. Then disconnect return and draft ropes, pass the end of weight rope (X) through the pulley on the weight and tie it to the return rope. A pull on the check rope (B) will raise the stop and let the carrier pass. All of this can be done from the barn floor, and the carrier made to work from either side of the stop (A) without any climbing whatever. This is the most perfect reversible weight return that has been

invented and we give notice that we shall claim a patent on it. To prevent the weight from drawing the draft rope through the Carrier, tie a large knot on the end of weight rope X (or X1) so the weight pulley will stop against it.

Distributing the Hay.

FIG. 12.

FIG. 13.

In ordinary barns there is no trouble in getting the hay to the sides. All that is necessary is to keep the middle and back end of the mow full and roll the hay *down* to the sides. Where there is fifteen feet or more over the beams it is well to tie a short rope, fitted with one of our adjustable Rope Clamps, between the fork and fork pulley, and carry the hay as low as possible. It can then be swung sidewise before dropping.

In wide barns we have found it a good plan to fill up the middle part first, as shown in Fig 12. Then fix the top of the hay so that the load, in dropping, will slide to one of the unfilled sides. In very wide barns perhaps the best way is to put in two side tracks (T T.)

Fig. 13 is a representation of a Hay Distributer, by means of which the sides of the barn can be filled first. It is simply a light platform of boards suspended to the rafters by means of ropes (C C.) It can be easily and quickly reversed or raised and lowered or taken out of the way. The sling, however, distributes the hay much better than the fork.

Fitting the Rope to Louden's Patent Triple Eye.

FIG. 14.

Unravel the strands 5 or 6 inches, pass a strand through each separate division from *right to left* and then back under itself, as in Fig. 14. Then weave the strands as in splicing, or tie the threads of the strands across to each other if the rope is large and the pulley has to work close. In large ropes the ends of the strands can be whipped to make them smaller and enter the eyes more easily.

Adjusting the Rope Lock.

The heel of the lock should strike the rope about an inch above the center of pulley, and when the heel first strikes, the point should stand a full quarter inch off. The lock iron can be adjusted to its proper position by placing leathers in behind it, either at the heel or the point or all the way along.

FIG. 15.

A Good Hay Slide.

FIG. 16.

Get ten good straight-grained fencing boards, 16 feet long, and a piece of scantling 2x6 and 8 feet long for front piece. Cut two of the boards in two for cleats. Put together as shown in cut, with clinched nails, leaving six inches of space between the bottom boards. This will make the slide $7\frac{1}{2}$ feet wide and 16 feet long. The boards being close together will ride on the stubble and will draw easier than where runners are used, as they will cut into the ground.

Some prefer half the number of boards and a cleat only at each end, claiming the slide will run easier when the boards are free to accommodate themselves to the inequalities of the ground. One wagon sling is sufficient for a slide and will take the load at one draft.

How to Splice a Rope.

FIG. 17.

First unravel 16 to 20 inches of the ends to be spliced, (or more if the ropes are over three-quarter inch diameter) and butt them closely together as shown in Fig. 17, seeing that the strands of one end come in spaces between the strands of the other, and only one in a place. Now unravel strand No. 4 about a foot further back and wrap strand No. 1 (of the other end) in its place as shown in Fig. 18. Do likewise with strands No. 3 and No. 5, taking care that No. 2 and 6 do not get unraveled and out of shape.

[NOTE.—A new beginner might do well to tie No. 2 and 6 in their place with a small cord before working No. 1 and 4, or No. 3 and 5. The corresponding strands of each end (No. 1 and 4, 2 and 6, and 3 and 5) will now come together in three separate places about a foot apart instead of coming together all at one place, as shown in Fig. 18, and the weaving of them together (if none of the threads are cut out) can make the rope only *one-fourth* larger instead of *twice as large* had they been all spliced at one place as they are shown in Fig. 17. This *separating of the strands* so they can be spliced in three separate places is the main secret in splicing a rope so it will run through the pulleys.]

FIG. 18.

To proceed with the splicing, pass strand No. 1 over and across No. 4 and then *under* the strand next to it. Now do the same thing with No. 5 and 3, and 6 and 2, taking care to draw all the ends so they have an even tension. All that remains to complete the job is to work all the ends over and under each alternate strand as far as desired, always crossing the strand from right to left. After tucking in the first three ends to start the splice, it is well to untwist and flatten the ends to make the splice smooth, and a few of the threads may be cut out to keep from enlarging the rope.

Hints on the Use and Care of Ropes.

It is a good plan to stretch a rope by tying one end to a post and hitching a horse to the other and pulling on it before putting in the pulleys. This evens up the tension of the strands and helps to take out kinks. To limber up a new rope hitch a horse to one end and drag it over a dry, clean grass lot a few minutes. Boiling may be resorted to when the rope is very stiff. It sometimes helps a kinky rope to take it out and turn it end for end. The twist always runs to the back end of the rope, hence the importance of having a free working swivel at this end to let out the twist.

Never get a rope larger than necessary for the work required. A heavy rope is heavy to handle, and unless the pulleys are large in proportion it will not wear as long, or at least no longer, than a lighter one. Be sure that the rope does not rub on any sharp corners. We do not recommend dipping ropes in linseed oil that have to be run through pulleys. It makes them too stiff when the oil gets dry. However, a very little oil or tallow on an old dry rope helps to make it pliable and prevents the strands from wearing each other in passing the pulleys.

Be careful not to hang or lay rope away in a damp place, or where water will drop on it and keep it wet. This will make it rotten.

In taking rope out of the coil always draw from the center, and if it kinks in drawing out at one end of the coil pass the rope through the middle and draw from the other end.

To get the exact size of a rope take a square-jawed monkey wrench and set it so it will just slip over the rope. Then measure the distance the jaws are apart.

Sundry Cautions.

⚠ Never stand *directly* under the fork, nor the return weight when one is used. It is an unsafe position.

Passing the trip rope through a small pulley located overhead will help to keep a heavy fork from coming down too fast.

Don't pull very hard on the trip cord when standing on the edge of a load. If it should break you would be liable to turn a somersault to the ground.

⚠ Don't let the children play with the ropes or pulleys. It is the easiest thing imaginable to get their hands drawn into the pulleys and crippled for life.

If you have never used a hay carrier or fork, remember that it may require a little time and experience to get everything to working right. With nearly all kinds of machinery one-half is in the operator, and he cannot expect to work to the best advantage until he becomes well acquainted with his machine.

For any additional directions, address—

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