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## EC721 New Devices for Distributing Cut Ensilage in a Trench Silo

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E.C. # 721

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August  
1937

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# 721

Extension  
Circular  
721

Nebraska  
COOPERATIVE EXTENSION WORK  
IN AGRICULTURE AND HOME ECONOMICS  
U. of N. Agr. College & U. S. Dept. of Agr. Cooperating  
W. H. Brokaw, Director, Lincoln

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# NEW DEVICES FOR DISTRIBUTING CUT ENSILAGE IN A TRENCH SILO

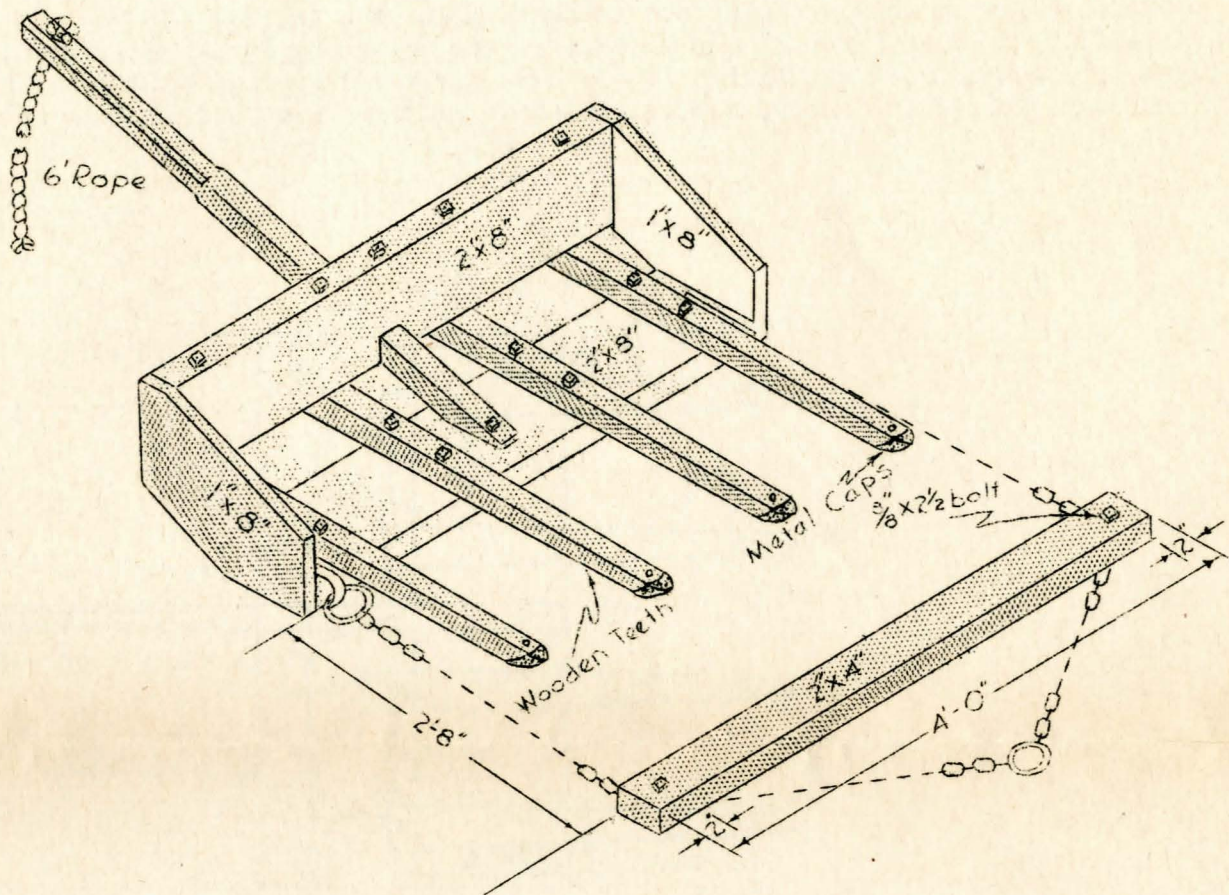
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Prepared by

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Assistant Extension Engineer.



## NEW DEVICES FOR DISTRIBUTING CUT ENSILAGE IN A TRENCH SILO



A WOODEN ENSILAGE FORK

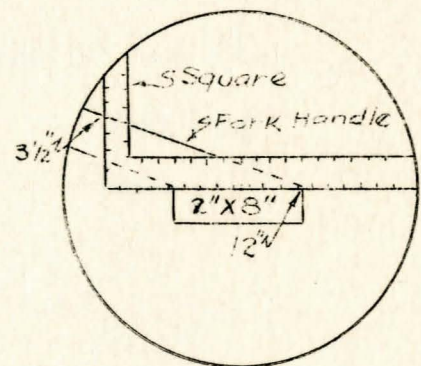
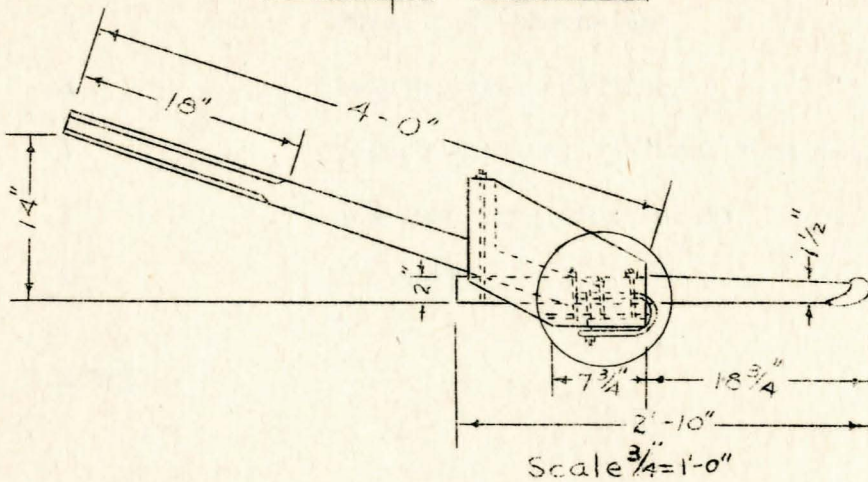
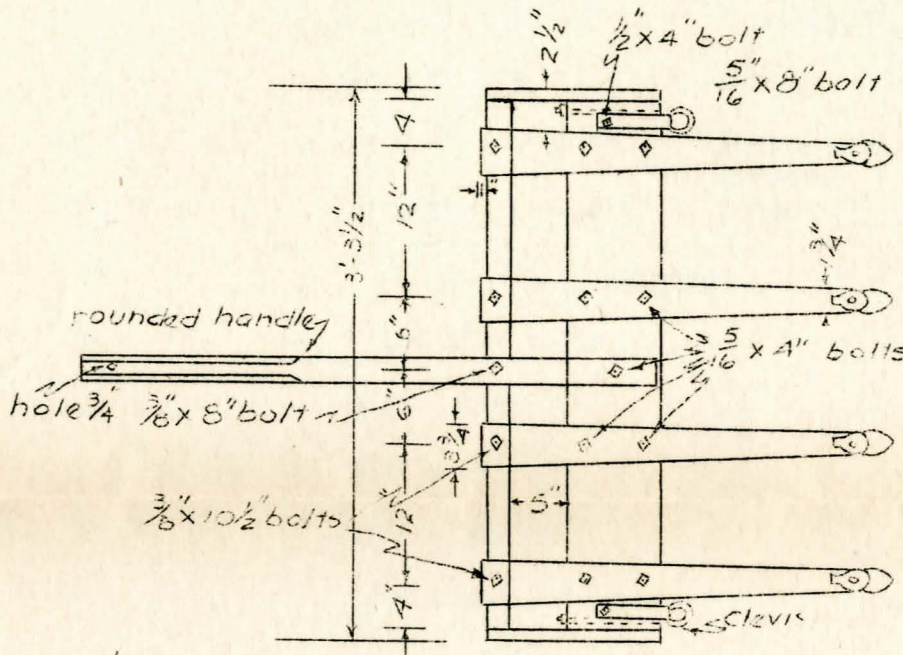
When a stationary ensilage cutter is used in filling trench silos, the trench is usually filled from one setting with the ensilage cutter located on one side and about the same distance from both ends of the trench.

Since the ensilage can be distributed over only a small area in the middle of the trench with a common blower distributing pipe, it is essential to have available some means of moving the ensilage to both ends. Likewise, when using a field cutter, it is important to keep the surface of the ensilage leveled as the loads are dumped from trucks and wagons. Implements such as slip scrapers, manure forks and "bulldozer" attachments on tractors have been used for this purpose. The use of these implements also serves as a satisfactory method of packing the ensilage. A practical piece of equipment for distributing ensilage in a trench is a wooden fork patterned after a slip scraper.



A team of horses or a tractor may be used in pulling the fork. When using a team, one man can operate the fork and drive the horses at the same time. When using a tractor, two men are needed. The fork-hitch as indicated in the diagram is for a team. In some cases, it might be necessary to change the hitch slightly for a tractor.

The wooden fork, when compared with similar implements, is easier to operate, hauls bigger loads and is simpler and less expensive to build. Parts of broken eveners and sweep rake teeth, ordinarily found around the farm, may be used in its construction. Detailed illustrations are indicated below.

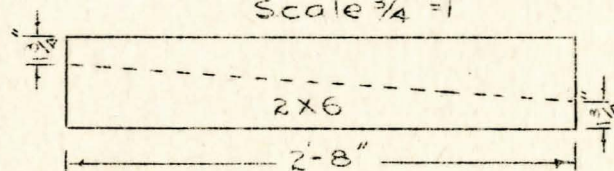


Layout detail for cutting  
fork handle.

Scale 1"=1'

Layout for cutting fork tooth from 2" x 6"

Scale  $\frac{3}{4}'' = 1'$





BILL OF MATERIAL FOR WOODEN ENSILAGE FORK

<u>Quantity</u>	<u>Item</u>	<u>Material</u>
2 pieces	2" x 6" - 2' - 8" long (teeth)	Yellow Pine
1 "	2" x 8" - 3' - 8" " back board	No. 1 Fir
1 "	2" x 8" - 3' - 8" " bottom	Red or White Oak
2 "	2" x 4" - 4' - 0" " handle & hitch	Yellow Pine
2 "	1" x 8" - 1' - 6" " spreader sides	White Pine
<u>Hardware</u>		
9	5/16" x 4" bolts	Machine bolt
2	5/16" x 8" "	" "
1	3/8" x 8" "	" "
4	3/8" x 10 $\frac{1}{2}$ " "	" "
2	3/8" x 2 $\frac{1}{2}$ " "	Machine or eye bolt
4	Sweep rake teeth-caps	
2	6-inch steel clevises	
1	$\frac{1}{4}$ -inch chain or 3/4-inch rope (Hitch)	10 feet long
1	3/4-inch rope (for handle)	6 feet long
8	8 d nails	common

18561r



# AN ENSILAGE DISTRIBUTING PLANK MOUNTED ON A FARM TRACTOR

A farm tractor is especially adaptable for packing ensilage in a trench silo because of its weight and the fact that it can be driven near the walls of the trench where it is important to pack the ensilage. To make the tractor more useful in the silo a device may be mounted on it for spreading the ensilage while the tractor is doing the packing. This may be accomplished in many ways, and one which the Agricultural Engineering Department found to be satisfactory is a bridge plank mounted on the drawbar or on the frame of the tractor.

In Figures 1 and 2 the plank is shown mounted on the drawbar, and in Figures 3 and 4 it is indicated under the tractor frame between the front and rear wheels.

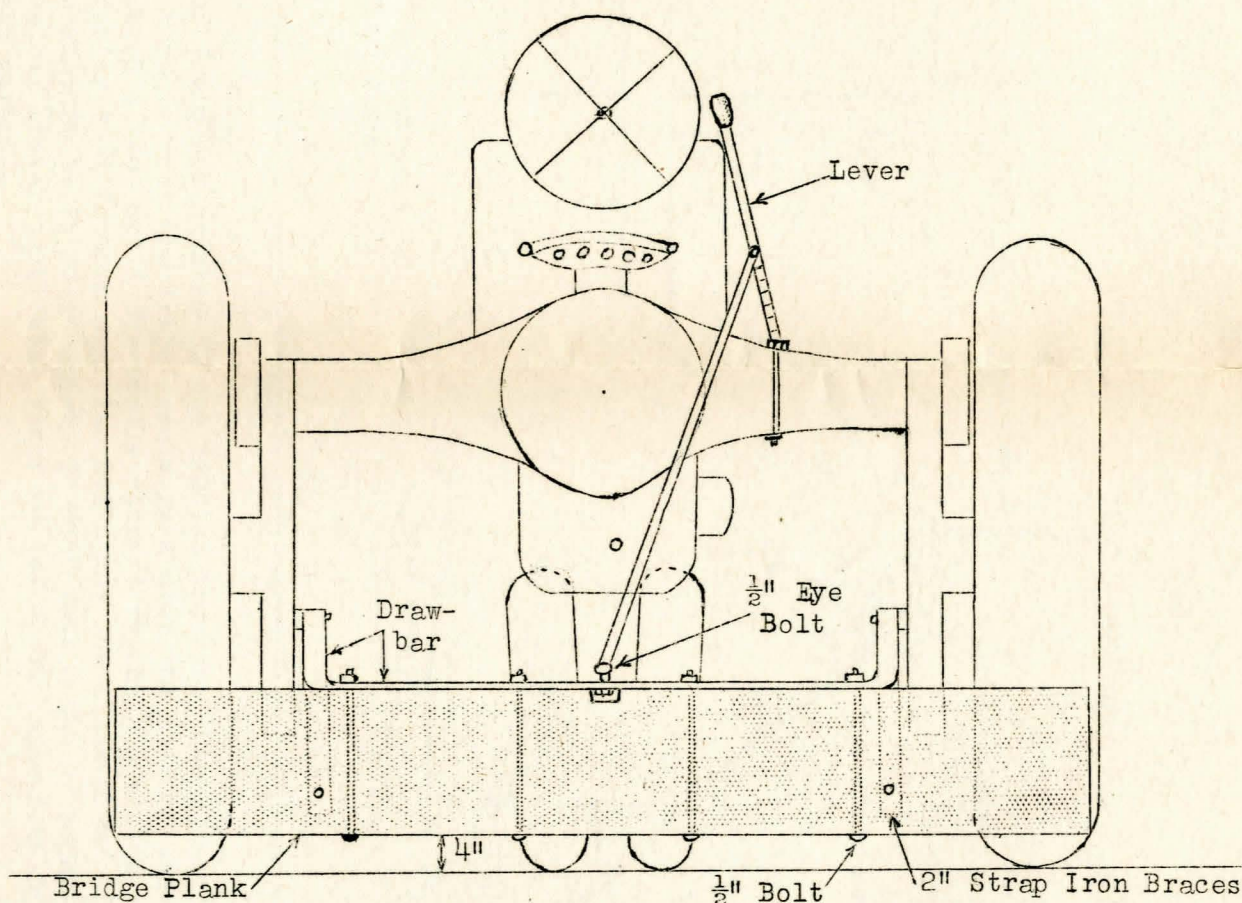


Fig. 1. A rear view of a tractor with a bridge plank bolted to the drawbar. Notice that the length of the plank is approximately equal to the full width of the tractor. The plank is mounted and braced to work in both directions of tractor travel.



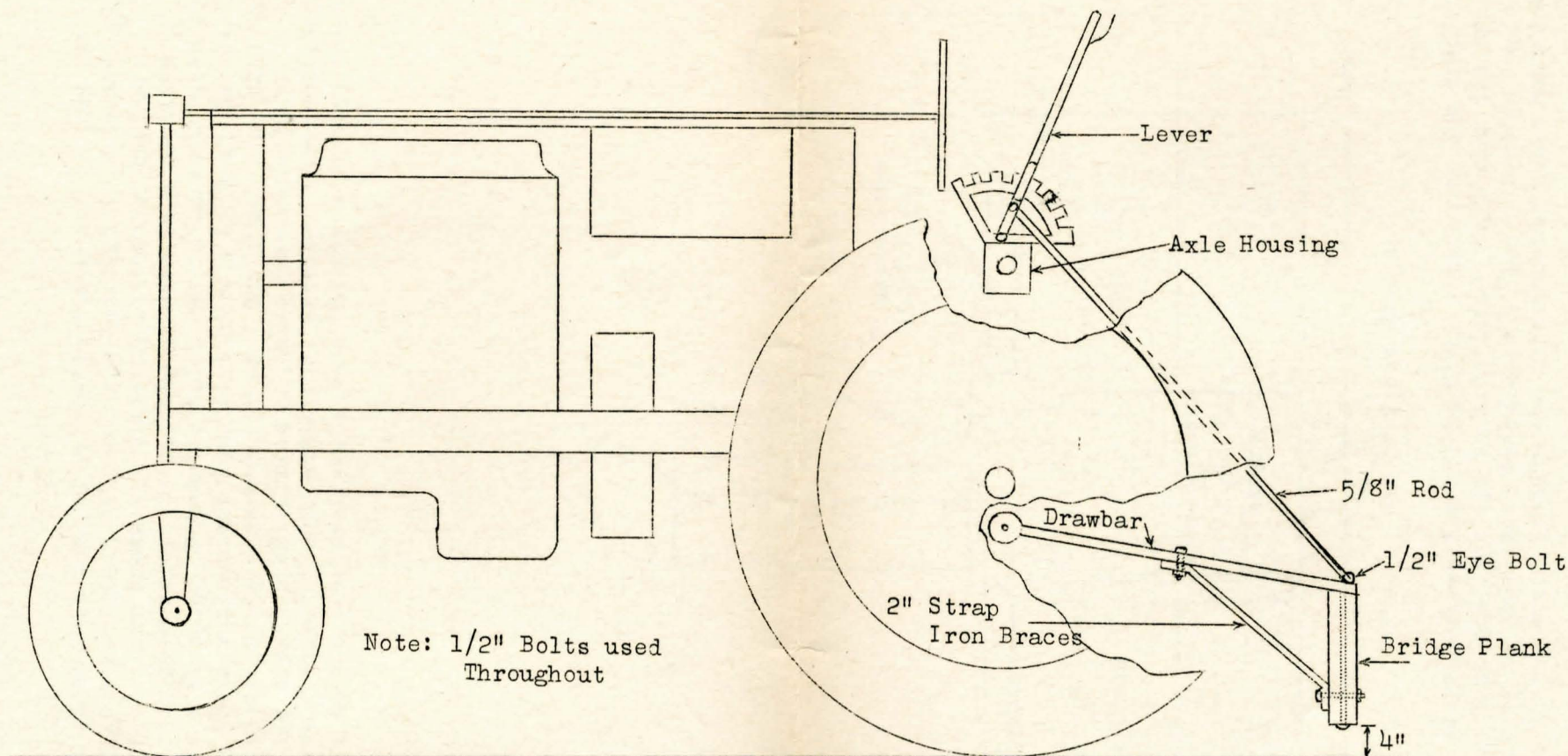


Fig. 2. A side view of the plank mounted on the tractor drawbar. One slight disadvantage of having the plank mounted in rear is that the drive wheels pass over the pile of ensilage first, holding the plank too high to catch a load until the wheels start down the other side of the pile. It is possible to change the drawbar to a forward position and mount the plank ahead of the drive wheels. With either of these mountings it is advantageous to have some means of adjusting the height of the plank. An old style (angled) lister cultivator lever bolted to the axle housing of the tractor will be satisfactory for this purpose.



Either steel wheels and lugs or pneumatic tires may be used satisfactorily on tractors put to use in packing and districuting ensilage in a trench silo. Each type of wheel has about the same amount of traction in the cut ensilage. With either type, however, it is not a hard matter to get the tractor in a position in the ensilage where the wheels will spin. Pneumatic tires may be driven closer to the trench walls without damaging them; while steel lugs will have a tendency to cut into the side walls when operated under the same conditions. The steel lugs chop up the ground at the ends of the trench when turning and also have a tendency to carry dirt into the ensilage. Very little, if any, additional packing is accomplished by the penetration of the lugs as the tractor travels back and forth through the trench.

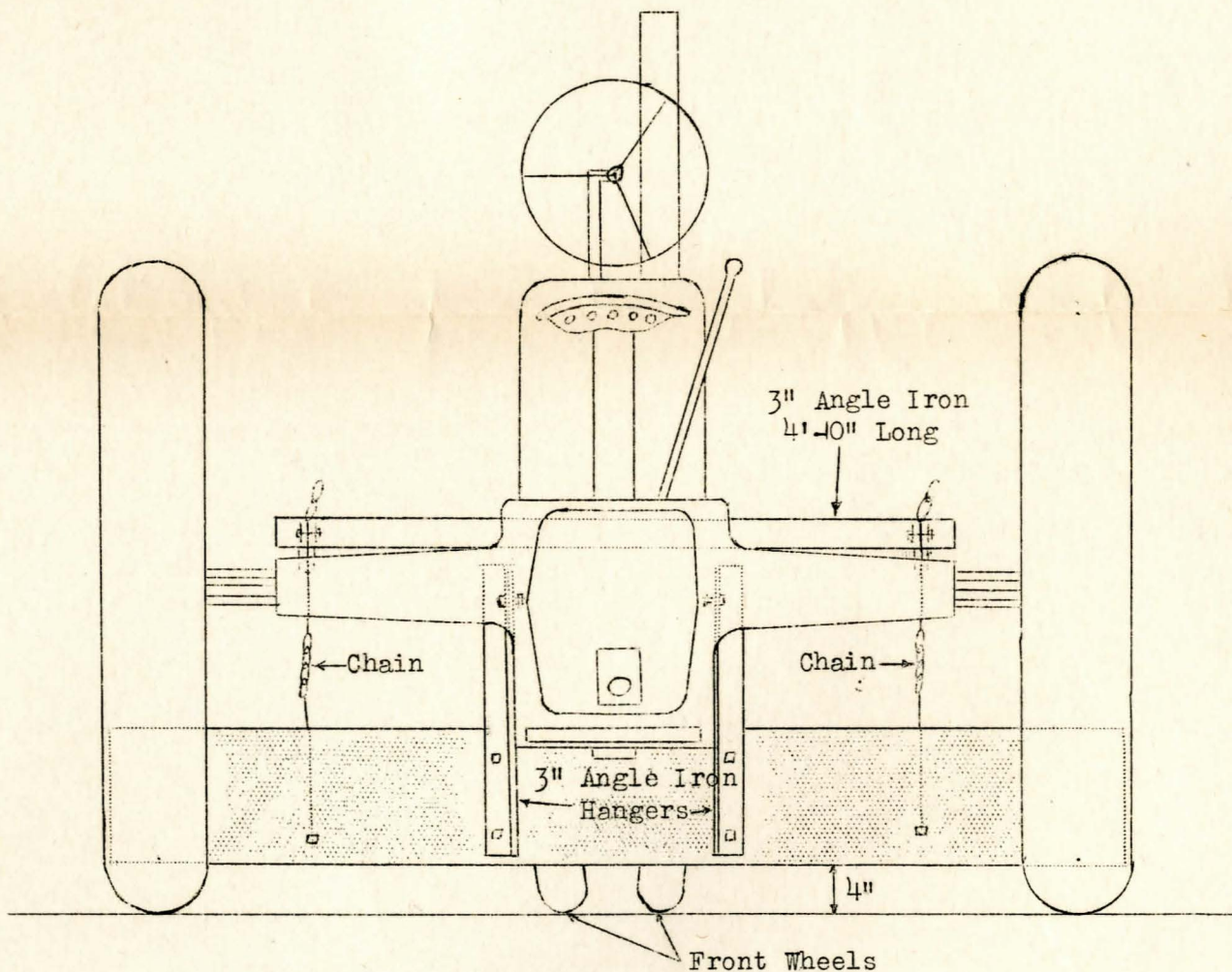


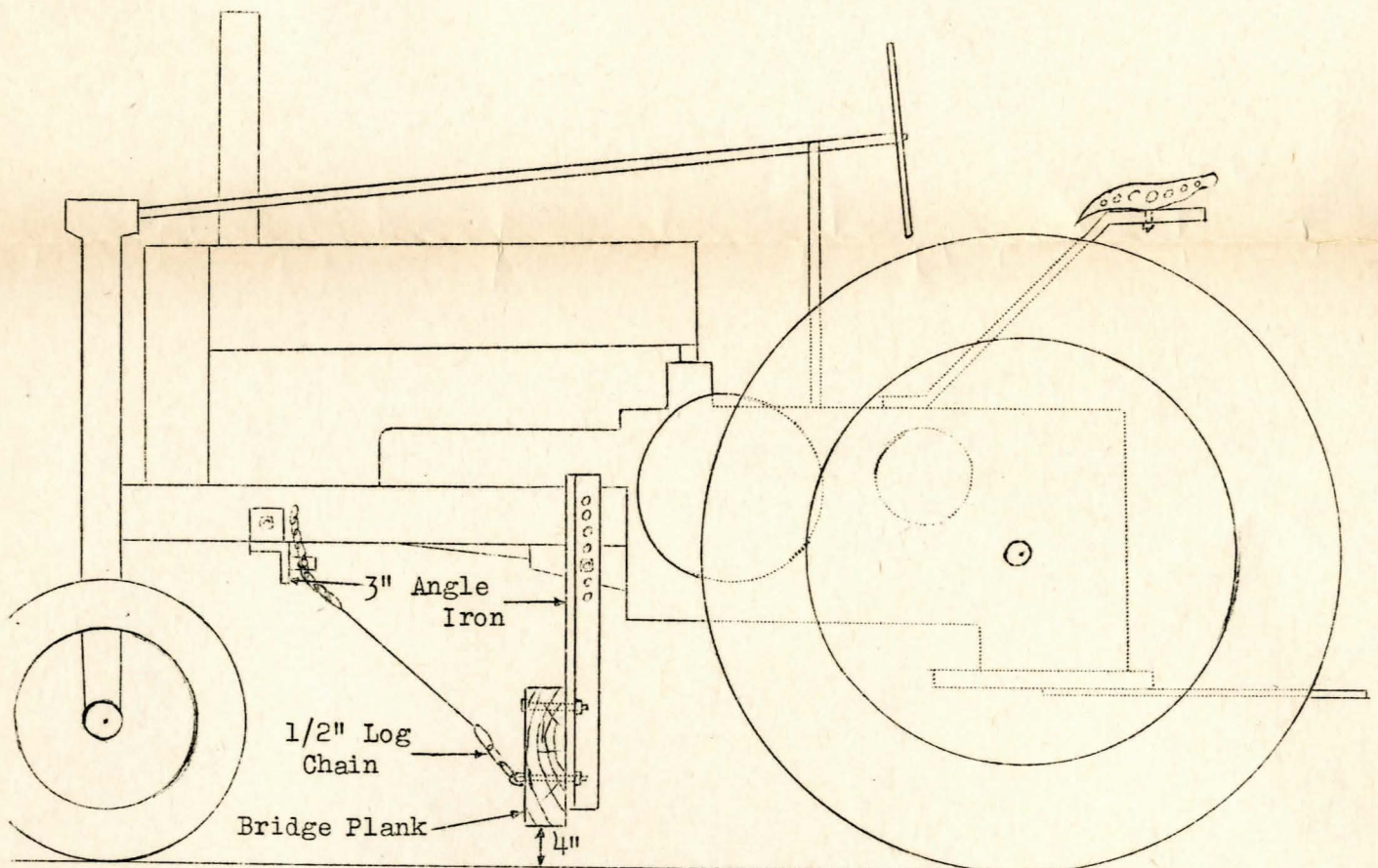
Fig. 3. This diagram shows the bridge plank mounted on the tractor frame. The plank is attached so that ensilage can be distributed only when the tractor is traveling forward. This is to facilitate backing away from a load in case the tractor gets stuck. It is important to have the distributing plank extend the full width of the tractor.



When using a tractor in packing and spreading the ensilage in a trench silo, it is important to begin using the tractor when the filling is started and to operate it continuously throughout the filling period. If the ensilage is permitted to pile up too high in one place, it is sometimes difficult to drive the tractor over the pile and much more difficult to spread the ensilage because of limited traction. Do not attempt to drive a tractor through a trench silo about two-thirds full of ensilage that has not been packed. The ensilage is too loose to provide sufficient traction for the tractor to move under its own power.

When a stationary cutter is used in filling a trench, the tractor must pass under the blower pipe through a stream of ensilage each time it crosses the trench. If the radiator is not protected with a shield or box screen it will soon become covered with ensilage, thus stopping the circulation of air through it. When using a radiator shield, it is important to have approximately the same area of openings in the shield as the exposed area of the radiator to properly cool the tractor motor.

It has been suggested by some that a device similar to a regular tractor bulldozer might prove more satisfactory for distributing ensilage than those indicated in the circular. Such a contrivance is entirely possible, but probably not as simple to construct.



Note: 1/2" Bolts Used Throughout

Fig. 4. This is a side view of the plank mounted on the tractor frame. The plank is hinged from the tractor by a bolt through one end of each angle iron. The log chains hold the plank from swinging backward and the angle of the plank is controlled by shortening or lengthening the chains. The height of the plank may be adjusted by a series of bolt holes drilled in each 3-inch angle iron hanger, as indicated.