

.4S12 (Logging equipment)\*

## SMALL SAWMILL IMPROVEMENT PRACTICAL POINTERS TO FIELD AGENCIES

### SELF-LOADING AUTO TRUCK DEVICES

Self-loading truck devices are powered by installing a power take-off on the truck, and are often built locally. One provides for cross-hauling logs of standard lengths and is used with a semi-trailer (fig. 1) or a truck. Another employs a boom to load bolts and tie cuts crosswise of the bed of a truck, or small logs lengthwise (fig. 2).

#### Cross-haul Loading Device

The cross-haul loading device is made by mounting the rear axle of a passenger-car across the truck frame back of the cab as shown in figure 1, A. The brake mechanism of the wheel of the device, on the driver's side of the cab, is operated by a lever a. A drum b with a capacity of 60 feet of 3/8-inch preformed cable (drum core diameter 4 inches, drum length 8 inches, and drum end diameter 10 inches) is fastened to the opposite end of the rear axle. The cable extends back from the drum over two sheaves c.

The driven sprocket is fixed to the stub of the drive shaft of the passenger-car rear axle by cutting the shaft to 3/4-inch diameter and providing a 1/8-inch keyway. The driven sprocket has 31 teeth. A roller chain of 1-inch pitch connects to the drive sprocket a shown in figure 1, B. The drive sprocket is cast steel, has six teeth, and is fastened by a 1/8-inch key to the power take-off drive shaft c, cut to 3/4-inch diameter. Two bearings b support the shaft c, and a cross brace d must be added for attaching one bearing. In figure 1, B, e is the main drive shaft and g is the gear housing of the truck.

To operate, the driver throws the power take-off in gear by means of a lever in the cab. The cable is pulled off the spool as the loader takes the hook end over the middle bunk of the trailer, over the log and back under it, and fixes the hook to the truck frame. This gives a single-line cross haul, hence care must be taken in spotting the truck so that the middle bunk of the trailer is about opposite the center of gravity of the log. The driver gets out of the cab and applies the brake, thus stopping the braked wheel, whereupon the drum revolves and the log rolls up the skids.

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† Maintained at Madison, Wisconsin in cooperation with the University of Wisconsin

\*See outline in Small Sawmill Improvement Working Plan, March 1930, for explanation of indexing system proposed



## Boom-type Loading Device

Boom-type equipment is widely used in the Lake States in loading and unloading 100-inch bolts, tie cuts, and smaller logs. The boom may be either fixed or swinging.

### Fixed Boom

The less expensive installations have a power take-off and drum mechanism and have a wood frame and boom. The wood is of a high density species, such as oak, ash, or elm.

Figure 2 shows a fixed-boom loading device installed on a truck but does not show the power take-off mechanism which is similar to that shown in figure 1. In figure 2, two 4-inch by 5-inch uprights a extend 10 feet above the truck frame immediately behind the cab. A 4-inch by 6-inch cross member b is fixed between the uprights approximately 6 feet 8 inches above the frame. A 4-inch by 4-inch boom c, long enough to extend approximately half the truck bed length, is clevis-clamped to the midpoint of the cross member b. The union of the cross member and uprights is reinforced with angle iron. The bases of the uprights are clamped to the top of the truck frame and likewise are reinforced by angle iron and by a 2-inch by 4-inch brace d, one end being fastened about 2 feet above the base of the upright and the other fastened to the truck frame about 2 feet behind the uprights. Three-fourths-inch cable bracing e is placed as follows: from the outer end of the boom, back to each upright at the juncture of the cross member, from each end of the cross member diagonally to the bottom of the opposite upright, and from the outer end of the boom over the top of each upright, over the cab and hood to the car frame under the radiator. The power cable f is threaded through sheaves at the base and end of the boom.

### Swinging Boom

In this installation, the boom may pivot from the boom frame at one definite point, usually half across the truck (details not shown), or may pivot from any of several points across the truck (fig. 3) permitting both a greater reach laterally and a more positive pull when the boom is in a lateral position. This arrangement permits easy swinging of the load to or away from the truck.

If tie cuts or logs are hauled, a crotch line-end hook combination is used; for bundles of bolts, the single cable and hook prevail. To operate, the power take-off mechanism is engaged and the power take-off gear box lever shifted from neutral to low, with the truck spotted conveniently for loading or unloading. For material

to be loaded crosswise of the truck bed, the truck is usually placed parallel to the bolts; for longer material, the long axis of the truck bed is parallel to the logs. The cable is pulled off the winch by the ground man. In loading pulpwood, about one-fourth cord to a sling is held by a single wrap. With tie cuts or logs, single sticks are gripped by end hooks. The ground man then manipulates the brake cables to elevate the load, and suspend it while it swings over the truck and is released onto the truck bed. The load is guided by a second man to its position on the truck.

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- A** LEGEND:
- a*-BRAKE LEVER
  - b*-DRUM FOR CABLE
  - c*-SHEAVES FOR CABLE
- B**
- a*-SPROCKET
  - b*-BEARINGS FOR POWER TAKE-OFF SHAFT
  - c*-POWER TAKE-OFF SHAFT
  - d*-SPECIAL METAL CROSS SUPPORT
  - e*-MAIN DRIVE SHAFT OF TRUCK
  - f*-SUPPORT OF MAIN DRIVE SHAFT
  - g*-GEAR HOUSING

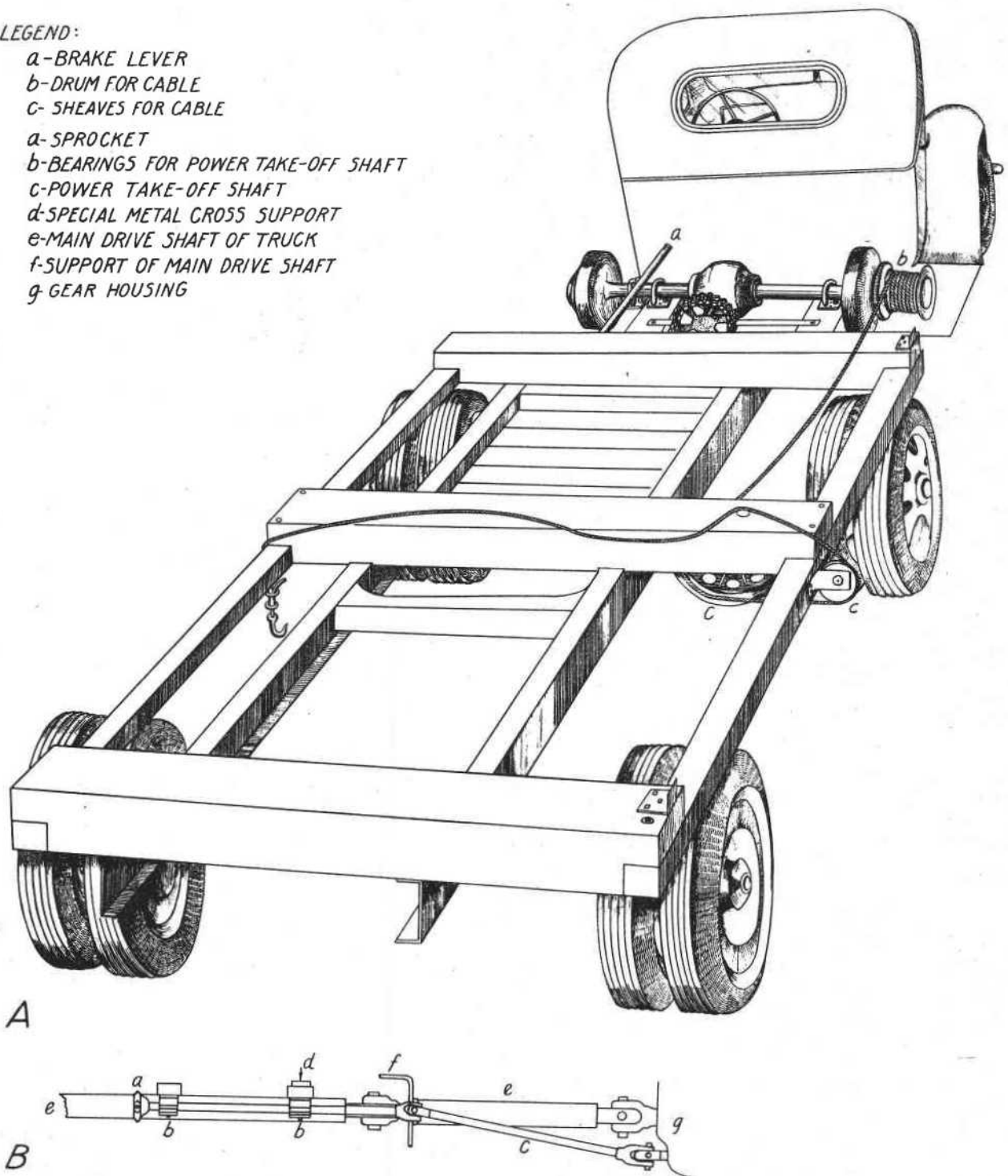
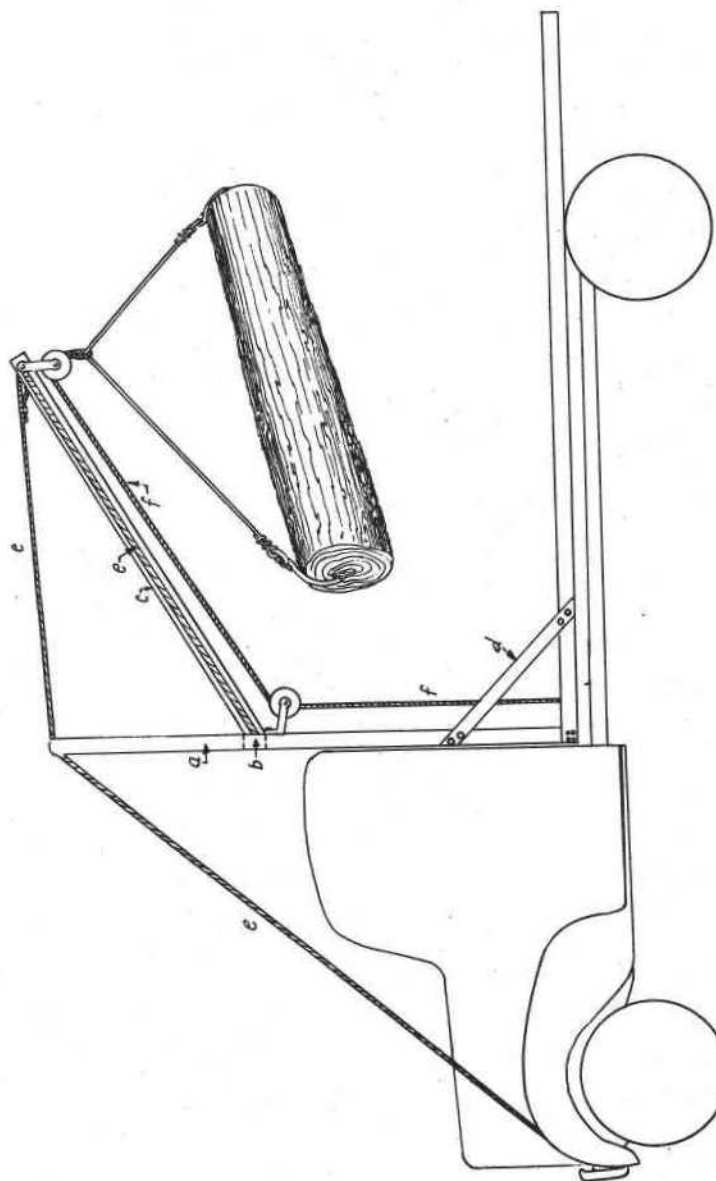
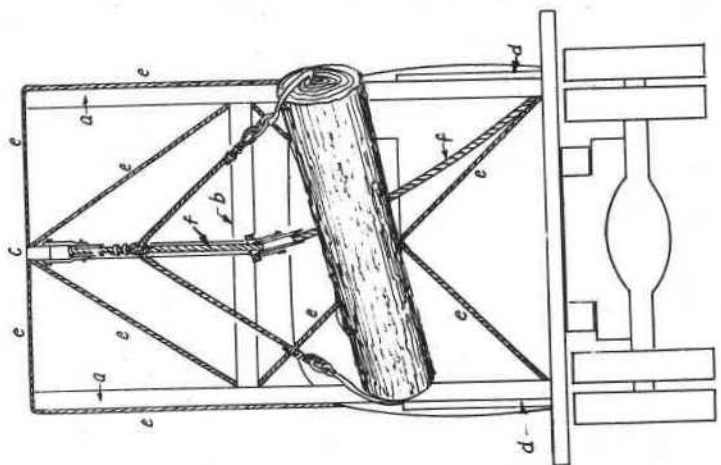


Figure 1.--Cross-haul loading device mounted on truck frame.



- LEGEND:
- a — 4" BY 5" UPRIGHTS
  - b — 4" BY 6" CROSS MEMBER
  - c — 4" BY 4" BOOM
  - d — 2" BY 4" BRACES
  - e —  $\frac{1}{2}$ " CABLE BRACING
  - f —  $\frac{3}{8}$ " PREFORMED POWER CABLE

Figure 2.--A, Fixed-boom loading device mounted on truck frame; B, shaft details between power take-off and sprocket.

LEGEND FOR FIGURE 3

- a - Tie rod  $3/4$  inch by 7- $1/2$  feet welded to the top of boom d and pipe b.
- b - 3- $1/2$ -inch standard pipe extending 1 foot above cross fitting.
- c - Chain. U-bolt connection limits arc of travel of boom.
- d - Boom, 3- $1/2$ -inch standard pipe 8 feet long.
- e -  $3/8$ -inch preformed cable for hoist.
- f - Iron bar  $1/2$  inch by 4 inches by 3 feet 3 inches welded to up-rights i-i and plates g-g. Top of bar is 4 inches below top of upright. Seven holes are drilled as shown for sheave hook.
- g -  $3/8$ -inch metal plate welded to upright i and to top member n.
- h - Chain, limits arc of travel of boom.
- i - Derrick frame upright made of 3- $1/2$ -inch standard pipe in two sections to allow demounting. Top of truck frame to top of ferrule j is 6 feet. Top of ferrule j to top of upright is 2 feet. Total height must not exceed state highway regulations.
- j - Ferrule made of 4-inch standard pipe 1 foot long, welded to upper end of lower section of upright. (The top of j cannot exceed the height of the garage door where the truck is housed.)
- k -  $3/8$ -inch plate welded to frame upright and bolted to truck frame with three  $3/4$ -inch bolts.
- l - U-bolt support of housing in front of gear-shift box. The support is bolted to an angle-iron strap attached to the cross member of the truck frame.
- m - Gear-shift box.
- n - Steel plate  $1/2$  inch by 6 inches by 2 feet 10 inches welded to plates g and to cross braces, so that the angle between the up-rights i-i and plate n is approximately  $100^\circ$ . Nine holes are spaced at approximately 4-inch intervals drilled to take the  $1-1/4$ -inch stem zz.
- o - Steel plate  $1/2$  inch by 2 inches welded to n and to g to reinforce n and provide additional bearing for zz.
- p - Iron braces  $1/2$  inch by  $1-3/4$  inches welded to up-rights.
- q - Brake cable,  $3/16$  inch preformed, extending from brake lever through sheave attached to truck frame, thence over sheave near top of derrick frame with the free end extending as required to be within reach of loader.
- r - Idler roll for hoist cable.
- s - 2-inch by 2-inch angle-iron supports for power take-off equipment.
- t - Metal plate supporting rear-axle housing.
- u -  $3/4$ -inch U-bolt supporting rear-axle housing.
- v - Hubs and brake equipment of rear axle.
- w - Lever arm for brake operation.
- x - Drum for hoist cable. Core 5 inches in diameter by 6 inches long.
- y - Cross for 4-inch pipe.
- z - Steel plate welded to cross.
- zz - Steel stem  $1-1/4$  inches in diameter passing through and welded to z and welded to the top of the cross y so as to center d at right angles to the long axis of d.

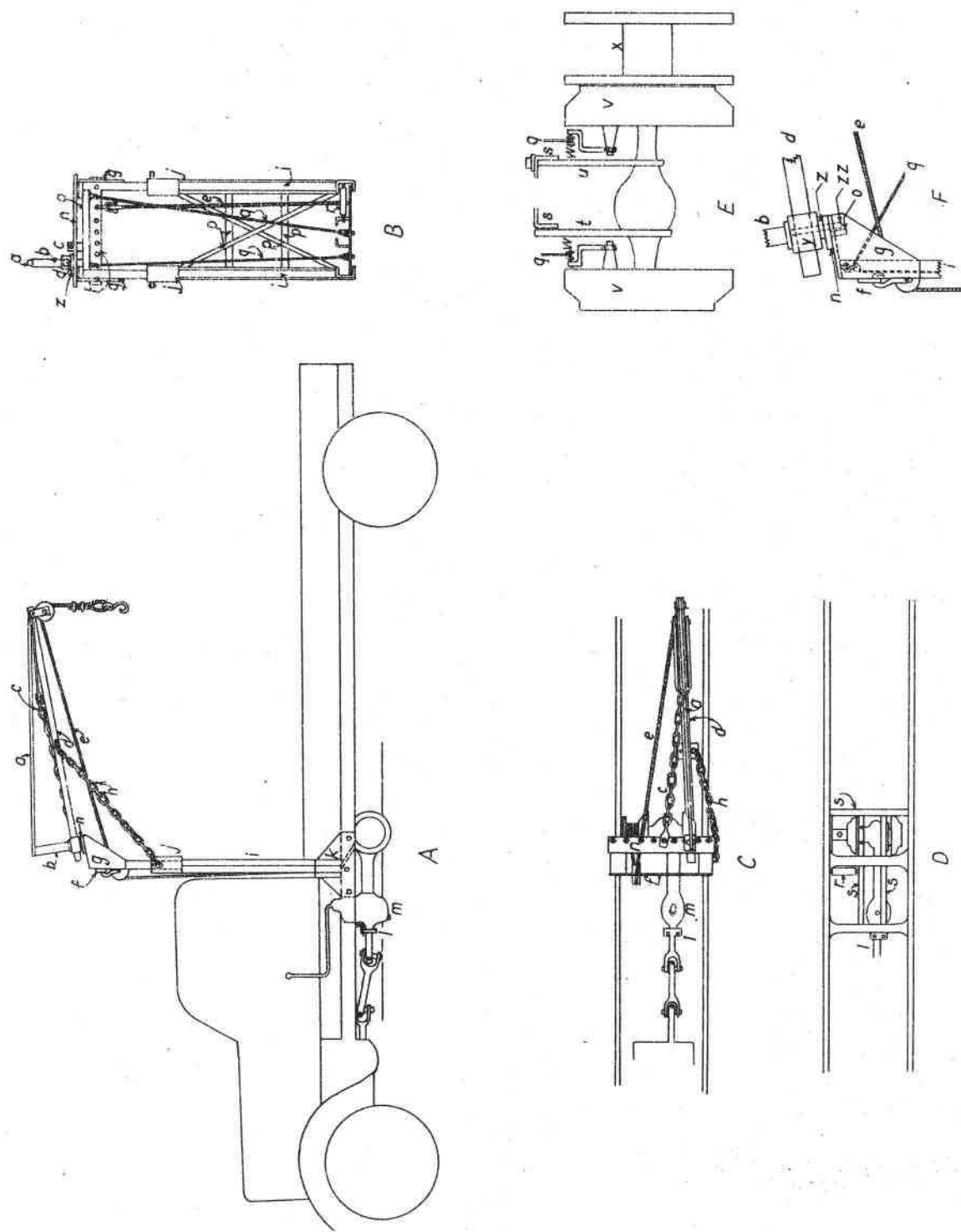


Figure 3.--Details of swinging-boom loading device mounted on truck frame: A, side elevation; B, end elevation; C, top elevation with cab removed; D, top view of details of attachment of power take-off and drum equipment to truck frame; E, end view of details of installed passenger-car rear axle and drum; F, side view of the details of frame upright and boom base.