June 10, 1930. J. M. WOLF 1,762,459

HAY STACKER AND LOADER

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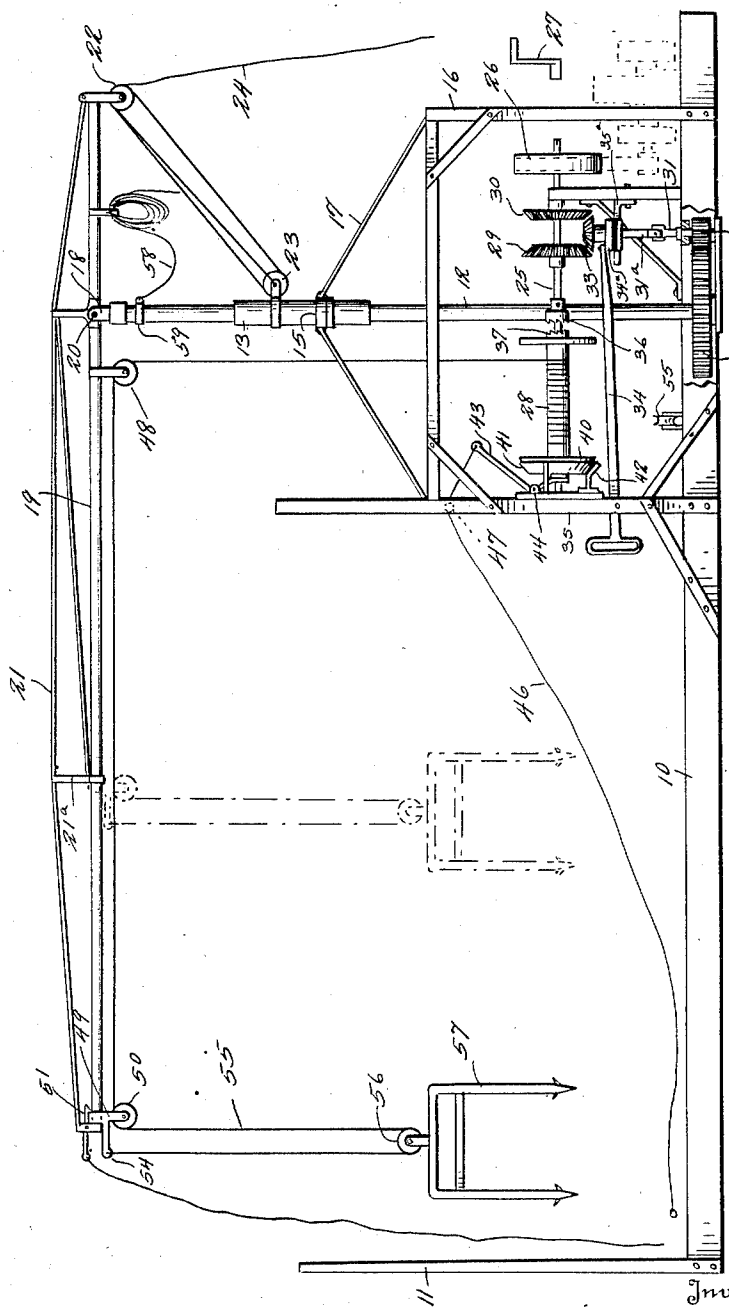


Fig. 1.

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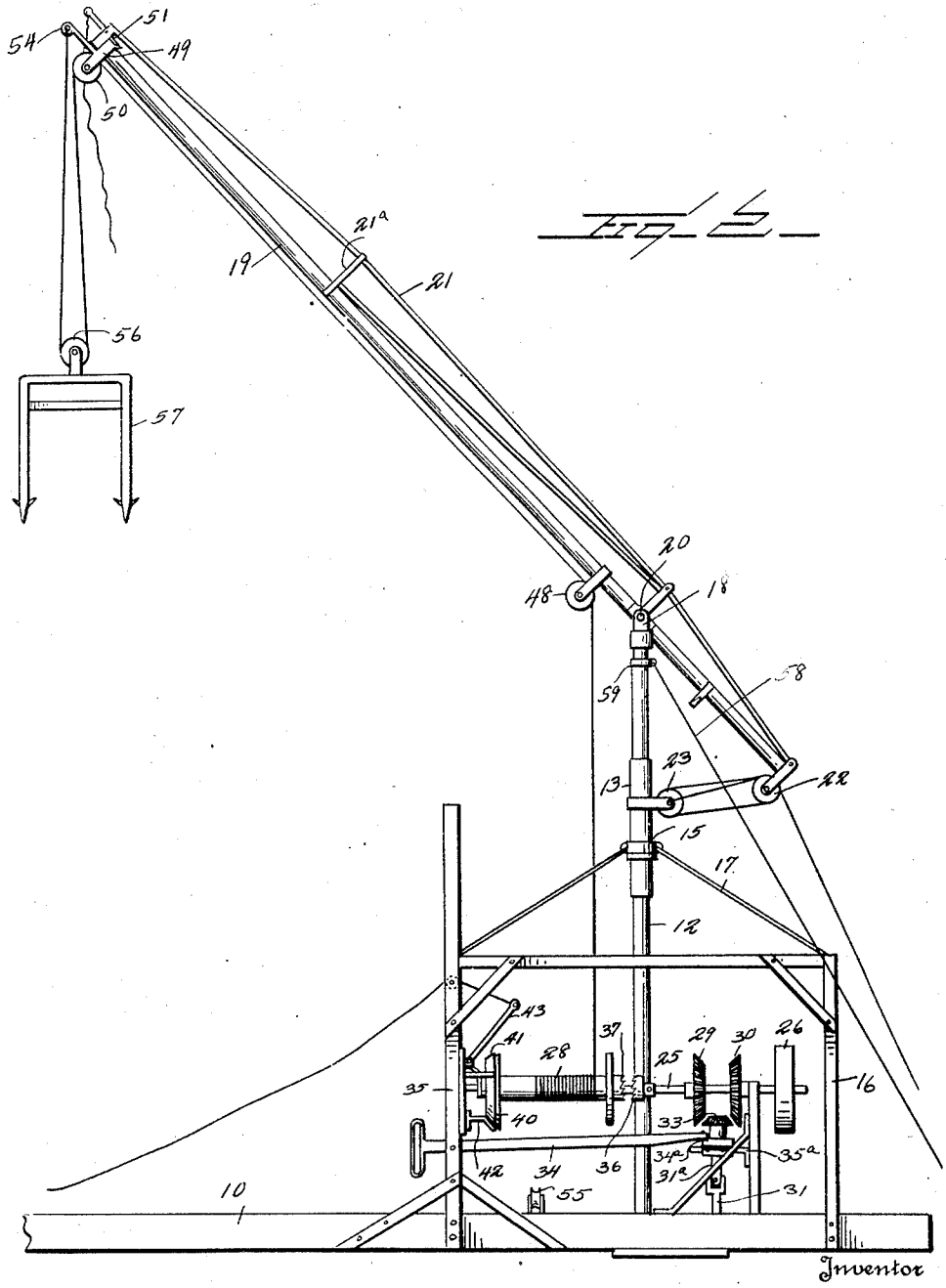
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Fig. 2



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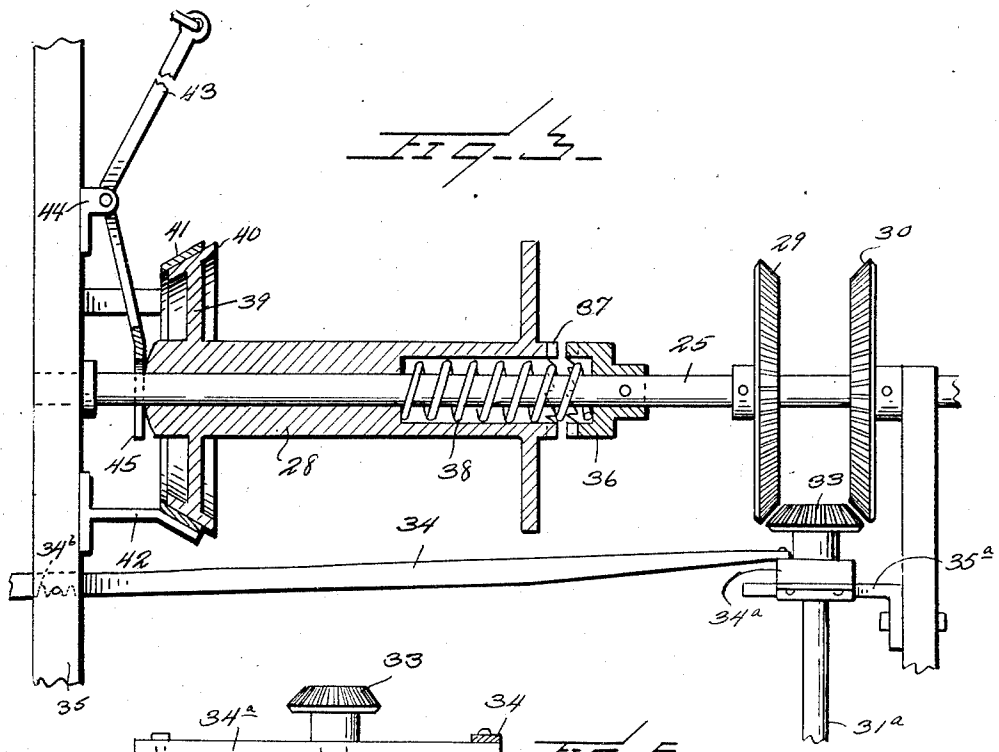


Fig. 3

Fig. 6

Fig. 5

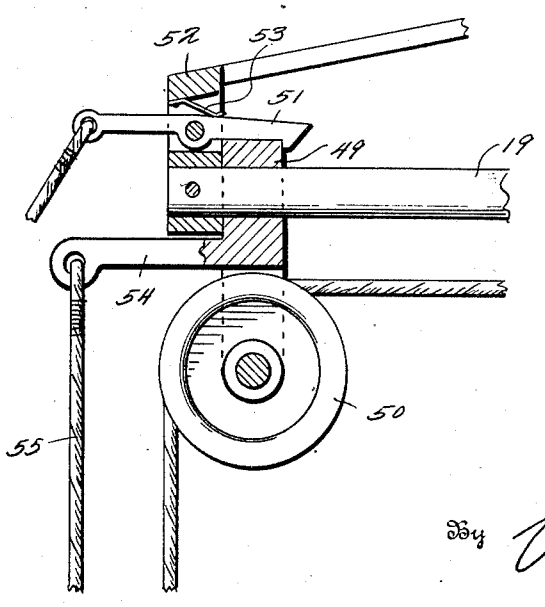
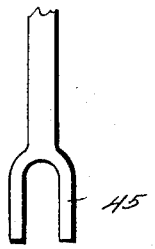


Fig. 4



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1,762,459

UNITED STATES PATENT OFFICE

JOHN M. WOLF, OF DEVILS LAKE, NORTH DAKOTA

HAY STACKER AND LOADER

Application filed January 19, 1929. Serial No. 333,645.

This invention relates to handling mechanism and particularly to means for stacking hay in bales and loading the hay, it being understood that the mechanism which I will hereinafter describe is adapted either for use in the open, in a barn, or on a wagon.

The general object of the invention is to provide a very simple, readily operated and cheaply constructed loader and stacker which may be operated either by motor or by hand power if desired and which is adjustable to different circumstances of operation.

A further object is to provide a mechanism of this character having very simple means whereby it may be controlled and the boom swung around in a circle and the bale raised or lowered as the circumstances of operation dictate.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a mechanism constructed in accordance with my invention showing the boom in a horizontal position;

Figure 2 is a like view to Figure 1 but showing the boom raised;

Figure 3 is a sectional view through the winding drum and illustrating an elevation of the gears for driving it;

Figure 4 is a fragmentary view of the controlling lever for the winding drum;

Figure 5 is a fragmentary sectional view of the pulley, carriage and latch;

Figure 6 is a transverse section through the bracket 35ª showing the sliding supporting bar and the shaft and beveled gear carried thereby in elevation.

Referring to Figures 1 and 2, 10 designates a rack of any suitable character such as a rack upon a wagon or a rack disposed upon the floor of a barn or in any other situation, this rack constituting in a sense the base of the machine. This rack may extend out in opposite directions to any extent required and carry the upright stakes 11 at intervals, or the rack may be relatively long and narrow as in the case of the ordinary hay rack.

Mounted upon this rack and supported by means of a supplementary frame as will be later described, is a mast 12 preferably composed of metal piping and having a reinforced portion 13 which is preferably of double thickness. The piping is supported in any suitable bearing at its lower end and carries upon it the gear wheel 14 whereby the pipe may be rotated. The pipe is supported within a bearing collar 15 which extends around the thickened portion of the pipe and is disposed to extend downward through a frame 16 to which guy wires or rods 17 are connected which extend upward to the collar 15.

At its upper end the mast 12 is forked at 18 to receive within the fork the boom 19 which is pivoted to the fork at 20 so that the boom may be swung from a horizontal to an upwardly inclined position. The boom is also composed of metal pipe braced by the tensioned struts 21 which extend longitudinally of the boom and are under such tension as to resist bending strains. The boom projects out beyond the fork 18 at its rear end and carries upon it the pulley 22. Mounted upon the thickened portion 13 of the mast is a pulley 23 and over these pulleys passes the cable 24. By pulling upon this cable as shown in Figure 2, the boom may be raised and by slacking upon the cable the boom may be lowered.

Mounted upon the frame 16 in any suitable manner is a shaft 25 which at one end may carry the driving wheel 26 which as illustrated in dotted lines in Figure 1 may be connected to a motor or engine. This shaft 25 is also preferably formed at one end with means for receiving the crank 27 as shown in Figure 1 so that the shaft may be rotated by hand, where only one or two bales are to be lifted or the bales are light.

Loosely mounted upon the shaft 25 is the winding drum 28 shown in detail in Figure 3. The shaft 25 carries upon it the opposed beveled gear wheels 29 and 30 and for the purpose of driving the gear wheel 14 and thus rotating the mast there is provided a vertical shaft 31 which at its lower end carries a pinion 32 meshing with the gear wheel 14. This shaft 31 is preferably formed in two sections, the upper section 31ª being

shiftable laterally and carrying the beveled pinion 33.

By shifting the upper section 31[a] laterally the pinion may be carried into engagement either with the gear wheel 29 or gear wheel 30 and thus the pinion 32 may be driven in either direction to rotate the mast in either direction.

To shift the shaft section 31[a], I provide the controlling rod 34 pivoted to a lever 34[a] which supports the shaft section 31[a], this lever being shiftable over a guide 35[a]. The lever 34 extends through a frame element 35 which is provided with a pin as shown in Figure 3, the lever being provided with three notches 34[b] whereby the lever 34 may be held in a neutral position or engaged with either of the gears 29 or 30. The lever may be lifted in order to shift the shaft section to any desired position.

Mounted upon the shaft 25 and opposed to the inner end of the drum 29 is a clutch member 36. The adjacent end of the drum is formed with the clutch teeth 37. This clutch member 36 and the drum are recessed to enclose within them the compression spring 38 which urges the drum away from the clutch member 36. The opposite end of the drum 28 carries upon it the brake disk 39 having a rim 40 in the form of a frustrate cone. Associated with this end of the drum is a fixed brake band 41 supported upon the brackets 42 from the frame member 35 and the spring 38 normally forces this brake wheel against the brake band 41 and holds the drum from rotation. The drum may be shifted into engagement with the clutch member 36 and thereby caused to rotate with the shaft 25 by means of the angular lever 43 pivotally mounted upon the bracket 44, this lever 43 being formed at its lower end and shown in Figure 4 as at 45 to embrace the shaft 25 and bearing against the rounded end of the drum 28.

A cable 46 is attached to the upper end of the lever 43 and passes over the pulley 47 and extends to any desired point so that the shifting of the drum into or out of engagement with the shaft 25 may be accomplished from a distance.

Carried upon the boom 19 relatively close to the fork 18 is a pulley 48 and slidingly mounted upon the boom 19 as shown in Figure 5 is a carriage 49 supporting the pulley 50. This carriage is normally held at the outer end of the boom by means of a latch 51 pivoted within a block 52 carried upon the end of the boom and urged by a spring 53 into engagement with the carriage 49 to hold the carriage at the outer end of the boom. This carriage is provided with an outwardly projecting arm 54 and hoisting cable 55 is attached to the extremity of this arm 54, which constitutes the extremity of the boom and extends down around a pulley 56 mounted upon a hay fork 57. The cable then extends upward over the pulley 50 and thence over the pulley 48 and down to the drum 28. The hay fork 57 may be of any suitable construction but is shown in the form of a U-shaped member having its ends harpoon shape so that it may be inserted into a bale or into a mass of hay.

In order to provide means for bracing the mast if desired against extra strain, I provide the guy rope or cable 58 engaged with the upper end of the mast by means of the ring 59 through which the cable passes, this cable being adapted to be brought down and have its lower end pegged to the ground. This cable is to be used as shown in Figure 2 when the boom is disposed at such an elevation that excessive strain comes upon the mast.

The operation of this mechanism will be obvious. When it is desired to raise or lower the hay fork and the hay or other bale engaged therewith, the operator pulls upon the cable 46 which forces the drum laterally into engagement with the clutch member 36 and causes the rotation of the drum under power. When the hay fork has been elevated to the desired extent the operator releases the cable 46 and the drum shifts in the reverse direction and its brake rim 40 comes in contact with the brake band 41 and holds the drum in this position. The operator by now pulling upon the rod 34, which may have a cable or auxiliary rod extending outward any desired distance, can rotate the mast under power to carry the boom to any desired position and then the hay fork may be raised or lowered by the means heretofore described. While I contemplate that the mechanism shall be operated by power, it is obvious that where the bales are light or there are few of them, it may be operated by hand.

The cable 24 may be hauled in to any desired extent to lift the boom to any desired angle and then fastened or the cable may be hauled down or slackened as desired to more or less constantly change the angle of the boom if found necessary. This device is particularly adapted to be used in connection with the hay baler shown in my Patent No. 1,691,885 granted on the 13th day of November 1928.

I do not wish to be limited to its use as it is obvious that it may be used in other situations. The mechanism is very convenient, is simple, may be readily erected, may be made comparatively light and is so readily controlled that it is particularly convenient.

For high work, the carriage 49 may be disposed at the extreme end of the boom as illustrated in Figures 1 and 2 but for relatively low work, the carriage may be released from its engagement with the latch

51 and the carriage will then slide backward to the strut 21ª as shown in dotted lines in Figure 1 and will then operate precisely as before. Thus the device may be used for placing the bales in smaller circles than where the carriage is disposed at the outer end of the boom.

I claim:—

1. A hay loader of the character described comprising a base, a frame mounted on the base, a mast vertically mounted on the base and rotatable therein, a drive shaft rotatably mounted on the frame, a pair of opposed beveled gears spacedly mounted on said drive shaft, a drum loosely mounted on said shaft, clutch means for said drum, brake means carried by the frame and adapted to engage said drum, yieldable means for holding said drum into engagement with said brake means, and out of engagement with said clutch, and means engaging said gears for rotating said mast on said base.

2. A hay stacker and loader of the character described comprising a base, a frame upstanding from said base, a mast rotatably mounted on said base, a boom secured to said mast, a drive shaft mounted on said frame, a drum loosely mounted on said drive shaft, clutch means carried by said shaft and adapted to engage said drum at one end thereof, brake means mounted on said frame and adapted to engage said drum at the opposite end thereof, yieldable means adapted to hold said drum out of engagement with said clutch means, said yieldable means being adapted to hold said drum into engagement with said brake means, manually operated means for moving said drum into engagement with said clutch, a forward gear and a reverse gear carried by said drive shaft and manually operated selective means carried to said mast whereby to selectively rotate said mast in the desired direction.

3. A hay stacker and loader of the character described comprising a base, a frame mounted on the base, a mast rotatably mounted on the base and supported by said frame, a boom secured to said mast, a drive shaft rotatably mounted on the frame, a drum loosely mounted on said drive shaft, clutch means carried by said drive shaft and engaging one end of said drum, yieldable means engaging said drum and adapted to hold said drum out of engagement with said clutch means, brake means mounted on said frame and spacedly positioned about said drive shaft, said brake means engaging the opposite end of said drum when the drum is out of engagement with said clutch means, manual means for moving said drum on said drive shaft against the tension of said yieldable means, a pair of opposed beveled gears spacedly mounted on said drive shaft adjacent said clutch means, a gear secured to said mast and adapted for rotation therewith, a vertically disposed shaft mounted on the base, a second gear secured to said vertical shaft and engaging said first gear, a pinion secured to said vertical shaft and adapted for engagement with a selected beveled gear on said drive shaft whereby to rotate said mast in a predetermined direction on said base.

In testimony whereof I hereunto affix my signature.

JOHN M. WOLF.