H. P. HOFSTRAND.

LOADING APPARATUS.

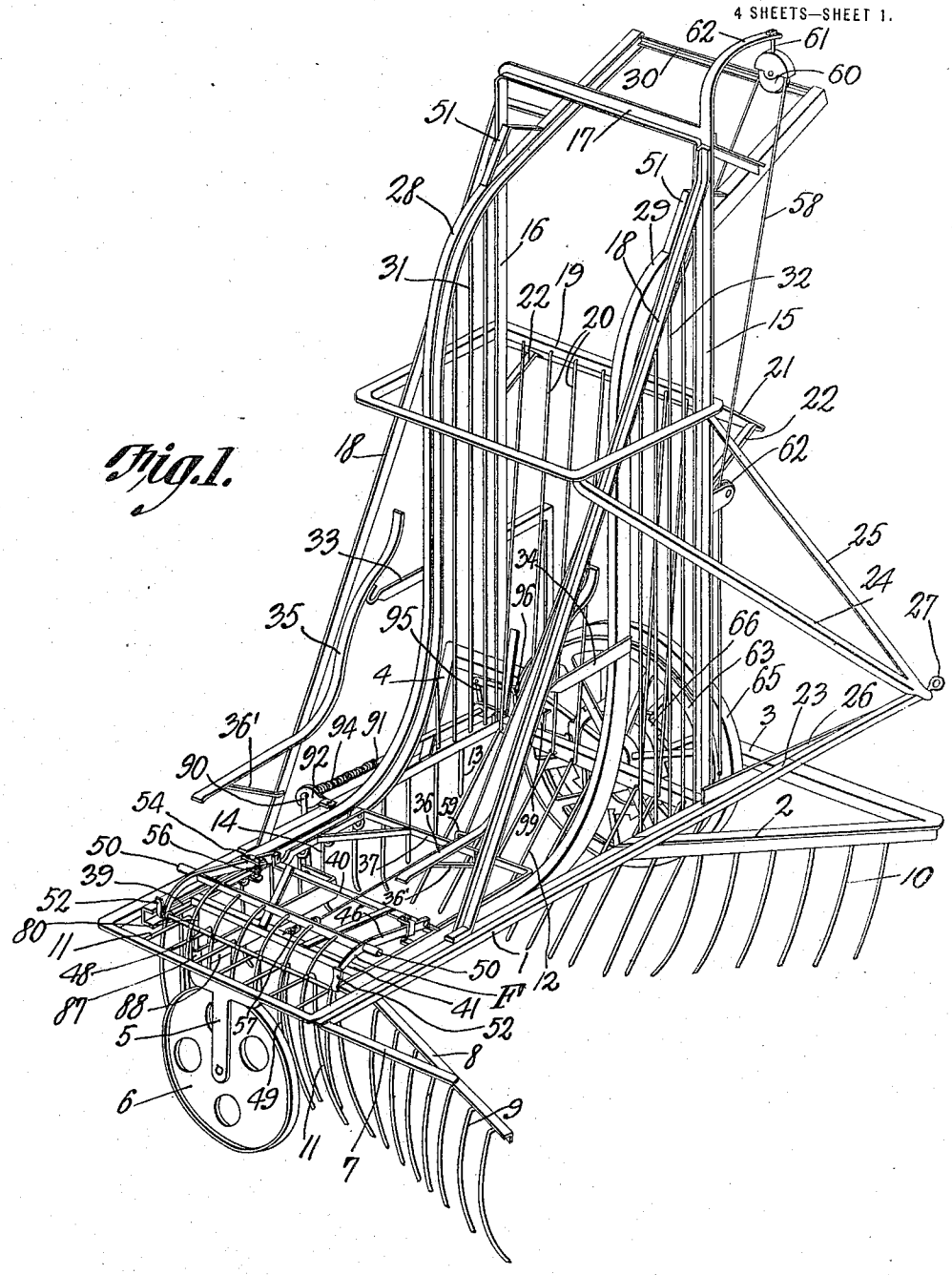
APPLICATION FILED JAN. 27, 1915.

1,170,638.

Patented Feb. 8, 1916.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

J. R. Lonergan

M. E. McCarthy

Henry P. Hofstrand Inventor

by C. A. Snow & Co.

Attorneys

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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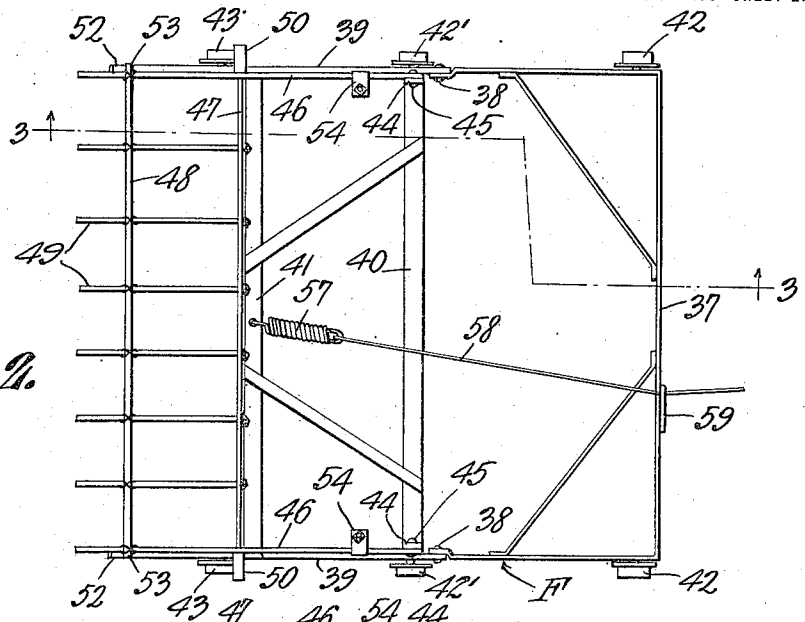


Fig. 2.

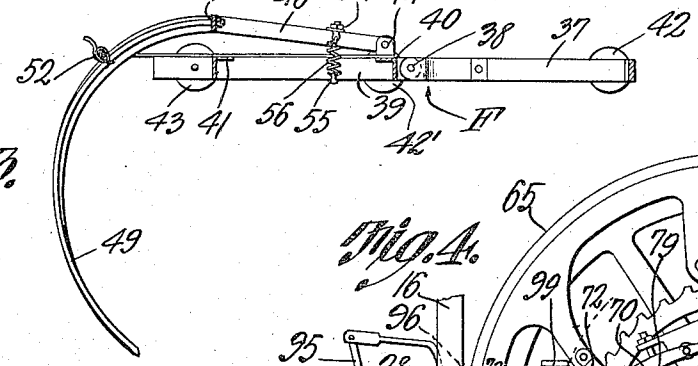


Fig. 3.

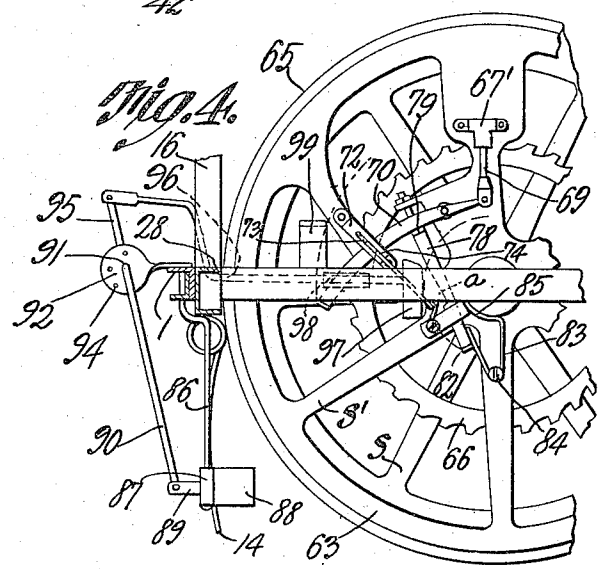


Fig. 4.

Witnesses

J. R. Lowes

M. E. McCarthy

Henry P. Hofstrand Inventor

by C. A. Snow & Co.

Attorneys

H. P. HOFSTRAND.

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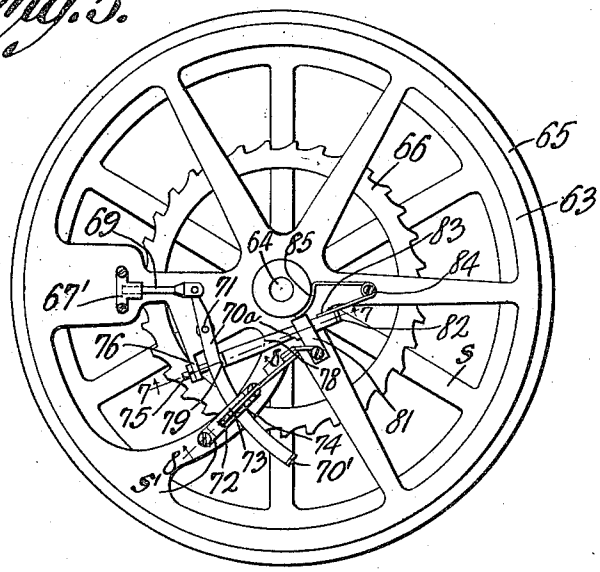
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4 SHEETS—SHEET 3.

Fig. 5.



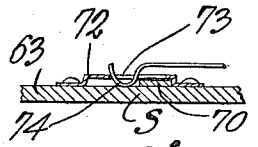


Fig. 7.

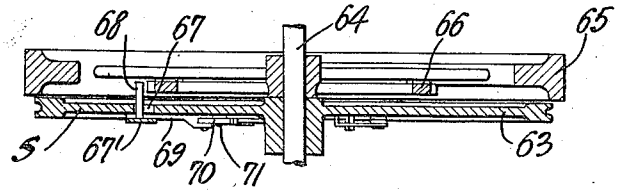


Fig. 6.

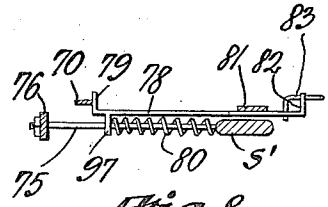


Fig. 8.

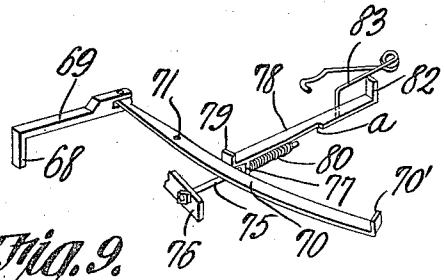


Fig. 9.

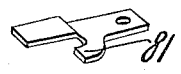


Fig. 10.

Witnesses

J. R. Towers

M. E. McCarthy.

Henry P. Hofstrand Inventor

by C. A. Snow & Co.

Attorneys

H. P. HOFSTRAND.

LOADING APPARATUS.

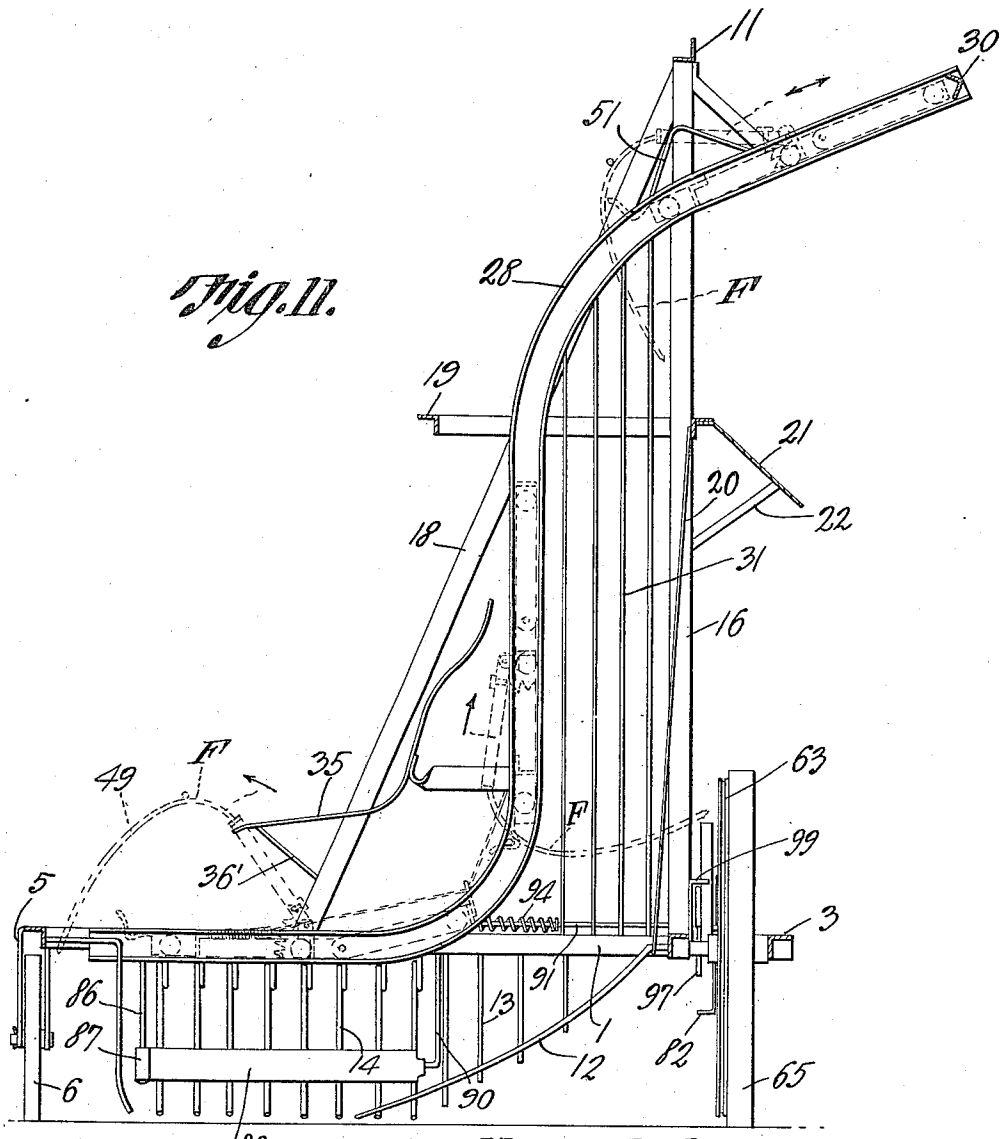
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4 SHEETS—SHEET 4.

Fig. II.



Witnesses

J. R. Tomlin

M. E. McCarthy

Henry P. Hofstrand Inventor

by Cashow & Co.

Attorneys

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY P. HOFSTRAND, OF ST. LOUIS PARK, MINNESOTA.

LOADING APPARATUS.

1,170,638. Specification of Letters Patent. Patented Feb. 8, 1916.

Application filed January 27, 1915. Serial No. 4,754.

To all whom it may concern:

Be it known that I, HENRY P. HOFSTRAND, a citizen of the United States, residing at St. Louis Park, in the county of Hennepin and State of Minnesota, have invented a new and useful Loading Apparatus, of which the following is a specification.

The present invention relates to improvements in a loading apparatus.

One object of the present invention is the provision of an apparatus adapted to be connected or run alongside of a hayrack or other vehicle, so that the hay upon the ground may be gathered and automatically loaded onto the hayrack or vehicle as the present apparatus is moved in consonance with the hayrack or vehicle.

A further object of the invention is the provision of an apparatus of this character which as it is moved along will gather up the loose material, such as grain, oats, rye, flax and loose mown hay, the material being automatically elevated and discharged into a wagon or other receptacle moved along with the apparatus.

A still further object of the present invention is the provision of a gathering mechanism and a fork or elevator adapted to be moved into and out of the same, said fork or elevator being elevated automatically due to the filling of the gathering mechanism and after being elevated and dumped being released and returned to initial position.

A still further object of the present invention, is the provision of a loading apparatus of this character, in which a predetermined amount of material gathered operates a trip device which connects the hay fork or elevator with an actuating mechanism to elevate the fork or elevator, the fork or elevator then being discharged and released to return to initial position.

With the foregoing and other objects in view which appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—Figure 1 is a perspective view of the complete loading apparatus, showing the fork or elevator in its lowermost or initial position. Fig. 2 is a top plan view of the fork or elevator and its carriage. Fig. 3 is a section taken on line 3—3 of Fig. 2. Fig. 4 is an enlarged detail view of the actuating mechanism. Fig. 5 is a side elevation of the winding drum elevating wheel and the tractor wheel showing the relative position of the parts. Fig. 6 is a sectional view of the parts illustrated in Fig. 5. Fig. 7 is an enlarged section taken on line 7—7 of Fig. 5. Fig. 8 is an enlarged section taken on line 8—8 of Fig. 5. Fig. 9 is a perspective view of the lock and its controlling mechanism. Fig. 10 is a detail perspective view of the keeper of the lock. Fig. 11 is a front view of the loader showing the relative positions of the fork.

Referring to the drawings, the numeral 1 designates a rectangular frame, which is adapted to be carried in a plane parallel to the surface of the ground traversed, the same having connected at the forward portion thereof, the brace 2 which operably coöperates to support the plate or strip 3 which is braced at its opposite end by the brace 4. The strip 3 is of greater length than the width of the frame 1 and is disposed in parallel to one short end thereof, the purpose of which will presently appear.

In order to support the right hand side of the frame 1 a bracket 5 is attached thereto and depends therefrom, and a ground wheel 6 is journaled in said bracket.

A bracing and supporting rod 7 is carried by one forward corner of the frame 1 and is attached to the oblique strip 8 which carries the depending guiding teeth 9 which coöperate with the guiding teeth 10 attached to the brace 2 to direct the cut material upon the surface traversed into the receptacle portion which consists of the depending side teeth 11 and 12, attached to the frame 1 and the rear teeth 13 and the resilient teeth 14 attached to the frame, the purpose of which will presently appear.

Connected to and upstanding from the left hand corners of the frame 1, are the standards 15 and 16, whose upper ends are connected together by a yoke or bridging member 17, the standards 15 and 16 and the parts of the frame 1 being constructed of angle irons, or any such material that will make the frame rigid. Connected to the upper ends of the standards 15 and 16, are the braces 18, the lower ends of which are connected to the front and rear cross-pieces of the frame 1 intermediate of the sides of

the said frame. Surrounding the standards 15 and 16 and also the braces 18 intermediate of the ends thereof, is a rectangular frame 19, there being attached to the left hand side thereof and to the left hand side of the frame 1, the vertical strands 20 of wire, which provide a means with the teeth 12 to prevent the material, during the elevation of the elevator F, from falling from the elevator until the elevator is completely raised. Attached to the braces 18 and to the front and rear cross pieces of the frame 1 are the vertical strands 31 and 32 which prevent the falling of the material to the front or rear of the machine during the elevation of the elevator F.

In order to guide the material away from the present apparatus into a vehicle, to form a stack of the material, an inclined chute 21 is attached to the outer or left hand side of the frame 19 and is supported by the braces or brackets 22 attached to the standards 15 and 16.

In order to provide a means for attaching the present machine to a hayrack or other vehicle for receiving the material, four converging bars 23, 24, 25 and 26 are connected to the frames 1 and 19, and are connected together at a single point for the attachment of the eye bolt member which constitutes a means for attaching the material to the body of a hayrack or vehicle so that the machine will be pulled with the chute 21 overhanging the hayrack or wagon to deliver the material thereinto.

Attached to the standards 15 and 16 and braces 18 and also at their lower ends within the frame 1, are the two guideways or tracks 28 and 29, bent on compound curves, the same being so constructed as to permit of the passage of the elevator F through and above the frame 9 and slightly beyond the standards 15 and 16 above the chute 21, the upper inclined free ends of the guides or tracks 28 and 29 being reinforced and held together by means of the yoke 30.

Attached to the outer sides of the respective tracks 28 and 29 are the two brackets 33 and 34 which carry the fork controlling cams or bars 35 and 36, the purpose of which will presently appear. The lower ends of these cams, as clearly illustrated in Fig. 1 are braced by the brackets 36′ which are connected to and supported from the lower ends of the braces 18.

The tracks 28 and 29 are curved channel irons, being substantially U-shaped in cross section, thus providing means for the proper guiding reception of the six rollers 42, 42′ and 43, which are arranged in pairs and carried respectively by the hinged or pivoted sections 37 and 39 of the elevator frame.

The elevator frame, as clearly shown in Figs. 2 and 3, is composed of two sections 37 and 39 which are pivotally connected together as at 38, so that the frame having the six rollers or wheels 42, 42′ and 43 may flex due to the curvature of the respective tracks 28 and 29. The rear section 39 is reinforced by the transverse strips 40 and 41. Two upstanding apertured lugs 44 are carried by the ends of the strip 40 to receive the pivots 45 which connect the side members or bars 46 of the fork 49 and the sections 39. The free ends of the bars 46 are curved downwardly to constitute material engaging prongs, while connecting the said members together and bracing them against tonsional movement, are the two parallel cross rods 47 and 48, there being attached to both of these rods intermediate of the bars 46, the prongs or fingers 49 which cooperate with the bars 46 to constitute the depending material engaging and carrying fork carried by the elevator frame. By this construction it will be seen that the material engaging fork is hingedly connected as at 45 to the sectional carrying frame of the elevator so that the fork may be swung upwardly as shown in Fig. 11, and thus move the fork out of the way when the elevator is lowered over the collecting receptacle, it being essential that the fork be elevated and not pass through the carrying receptacle upon the lowering movement of the elevator. In order to accomplish this, there are attached to the bars 46 and outstanding lugs 50, which when the elevator is moved upwardly from out of the collecting hopper, move under the cams 35—36. When the elevator is completely raised the lugs 50 ride onto upstanding cams 51 carried upon the upper portions of the tracks 28 and 29 adjacent the junction of the standards 15 and 16 therewith, at which point, the fork is given a sudden upward jerk so as to release the material so that it drops into the chute 21. When the elevator moves downwardly, the projecting ends 50 ride onto the cams 35—36, so as to swing the fork upwardly in order that it can pass over the receptacle to finally swing to depending position at the right hand side of the receptacle between the teeth 11.

In order to lock the fork in its lowered position, so that the tendency of the material during the elevation of the elevator when engaging the strands 20 will not release the fork, the resilient springs 52 are carried by the rear terminals of the elevator frame to frictionally engage the projecting ends 53 of the rod 48, whereby to normally hold the fork in place, until released by the cams 51. The cams 51 release the fork by a quick jerky action so that the material is shaken from the fork to drop upon the chute 21.

In order to return the fork to its normal position and to assist in holding the same in

engagement with the resilient springs or catches 52, the two oppositely disposed apertured lugs 54 are carried upon the bars 46 and are connected by retractile springs 56, with lugs 55 of the section 39 of the carrying frame of the elevator.

In order to properly operate the present mechanism, so that the elevator will be moved up and down along the guides 28 and 29, a spring 57 of limited extension, is connected to the tranverse bar 41 of the fork, and has attached thereto, one terminal of the cable 58, which extends through the hook 59 carried by the section 37 of the elevator frame, thus insuring the proper pull upon the frame so as not to pull the ends 53 of the rod 48 out of the catches 52. The cable 58 is passed upwardly over the pulley 60 in the sheave 61, hung from the bracket 62 at the upper end of the standard 15, and the cable extends downwardly from the pulley 60 to the guide pulley 62 carried by the standard 15, the other end of the cable being connected to the periphery of the large drum or pulley 63.

The drum 63 constitutes a means for permitting the proper pulling and releasing of the cable 58, so that the fork will be properly elevated and lowered in the present apparatus. The drum is in the form of a spoked wheel, and is journaled upon the short shaft 64, which is connected to the left side of the frame 1 and to the parallel strip 3, the drum 63 and the tractor wheel 65 being journaled upon said shaft between the frame 11 and strip 3, as clearly illustrated in Fig. 1.

Fixed to and carried by the traction wheel 65 upon the inner face thereof adjacent to the drum 63, is a large ratchet wheel 66, while formed in one spoke of the drum 63 is a radial slot 67 in which is slidably mounted the dog or pawl 68, to be moved into and out of engagement with the teeth of the ratchet wheel 66, so that the drum 63 may be operably connected to and disconnected from the traction wheel 65. The sliding bar 69 carries the outstanding dog 68 which is held toward the traction wheel 65 by means of the guiding stop 67′.

A lever 70 is pivoted at 71 upon a portion of the drum 63 and has one end pivotally connected to the bar 69, while the opposite end is outturned as at 70′ and constitutes a means as will presently appear, for releasing the dog 68 from the ratchet wheel 66. Carried upon the outer face of the spoke s', of the drum 63 is a guiding strap 72, which has a slot 73 for the projection therethrough of a spring latch 74, the lever 70 being disposed for sliding movement between the strap 72 and respective spokes and in the path of the catch 74 as clearly illustrated in Fig. 7. By this means, the lever 70 is held against accidental displacement in either extreme position with the dog 68 engaged with or released from the ratchet wheel.

In order to provide a means for operating the lever 70 so as to move the dog into engagement with the ratchet wheel 66 at the proper time, as will later appear, a rod 75 is connected to the lug 76 and spoke s', of the drum, as clearly illustrated in Fig. 8, and has slidably mounted thereon the apertured lug 77 of the lever throwing bar 78 having an outturned end 79 disposed to engage the lever 70. Mounted upon the rod 75 between the spoke s' and the apertured lug 77 is a spring 80, which normally exerts a tension upon the lug 77 to move the bar 78 toward the lug 76.

The bar 78 is provided with the shoulder a, and with the outstanding end 82, the bar 78 being guided so that the shoulder a will engage a catch 81 attached to a spoke of the drum 63, so that when the lever 70 has its end 70′ engaged by the fixed projection 99 carried by the frame 1 in the path of the end 70′, the lever 70 will be swung so that the dog 68 will be moved out of engagement with the ratchet wheel 66, thus permitting the traction wheel 65 to rotate without operating the drum 63 and to release the drum 63 so that the elevator will gravitate to normal lowered position.

The shoulder a of the bar 78 is adapted to be held against the catch 81 by one terminal of a spring 83, which is connected to the pin 84 of the drum 63, the other terminal 85 engaging the hub of the drum 63 as illustrated in Fig. 5.

In order to provide a means for automatically releasing the bar 78, and consequently moving the lever 70 so as to place the dog 68 in engagement with the ratchet wheel 66, the fork being in its lowermost position within the receptacle of the present apparatus, the construction as shown in Figs. 1 and 4 is employed. This comprises a depending arm 86, connected to and carried by the rear cross piece of the frame 1 between a pair of the resilient teeth 13 of the receptacle. This arm has connected to the lower end, the sleeve 87 of the material actuated plate or lever 88, said plate 88 being so disposed as to be abutted by the material as it crowds into the receptacle, the pressure of the material during the crowding thereof moving the lower or free end 89 of the plate 88 to the rear, so as to rock a shaft 91 having a depending arm 90 connected to the end 89 of the plate 88. The shaft 90 has a second arm to which is pivoted a rod 96 slidably held by the frame 1 and having a cam 97, adapted to be moved against the end 82 of the bar 78, the end 82 being normally arranged in the path of the cam 97, whereby when the rock shaft 91 is operated, to move the cam 97 against the

end 82, the bar 78 will be moved to release its shoulder *a* from the catch 81, and the spring 80 then moves the bar 78 so that the end 79 thereof swings the lever 70. The lever 70 being swung will move the dog 68 into engagement with one of the teeth of the ratchet wheel 66, thus connecting the drum 63 with the tractor wheel 65 for rotation therewith.

The shaft 91 is journaled in the lugs 92 and 93 carried by the rear cross piece of the frame 1 and a spring 94 is mounted upon the shaft and engages the lug 92 so as to normally hold the free end of the material actuated plate 88 forward with the cam 97 retracted out of the path of the end or lug 82. A sleeve 98 is carried upon a portion of the frame 1, to guide the rod 96 which carries the cam 97.

From the foregoing description taken in connection with the drawings, the operation of the present loading apparatus is readily understood but briefly stated it is as follows: Assuming the parts to be in the position as shown in Fig. 1, and the present apparatus being drawn over the ground so that material collected within the receptacle formed by the depending prongs 9, 10, 11, 12, 13 and 14, the prongs 46 and 49 of the fork being disposed to the right of the receptacle out of the path of the material, the material will crowd to the rear toward the plate 88. When the drum 63 is at rest so that the lug 82 is in the path of the cam 97, it is apparent that as soon as the material has crowded into the receptacle sufficiently to move the plate 88 to the rear to rock the shaft 91 and consequently push the cam 97 in engagement with the bar 78, the shoulder *a* will be released from the catch 81 so that the spring 80 will cause the bar 78 to be moved to swing the lever 70, which in turn brings the dog 68 into engagement with one of the teeth of the ratchet wheel 66. The traction wheel 65 due to the engagement thereof with the ground will be rotated so as to rotate the ratchet wheel 66 therewith. Thus, the drum 63 will be connected to the traction wheel 65 for rotation therewith, and the cable 58 will therefore be wound upon the drum, so that the elevator and its fork will be pulled upwardly, the rollers 42, 42′ and 43 moving within the tracks 28—29. Since the springs 56 and the catches 52 hold the fork in depressed position, relative to the elevator frame, the fork cannot swing upwardly away from the elevator frame and the fork will therefore move through the gathering portion or receptacle of the apparatus to engage the material accumulated therein and to move the material upwardly with the fork along the strands 20. The strands 31 and 32 hold the material within the fork at the rear and front, respectively. As the projecting lugs 50 ride onto the cams 51, the fork will be given an upward movement away from the elevator frame, releasing the projecting ends 53 of the rod 48 from the catches 52, and jerking the fork prongs upwardly from the material which is thus dumped upon the inclined chute 21 to be thus guided away from the present apparatus in the vehicle or receptacle or onto the ground in a stack. Simultaneously with the dumping operation, the drum 63 will have rotated a sufficient distance to bring the end 70′ of the lever 70 into engagement with the fixed releasing projection 99 of the frame 1 so that the lever will be moved to release the dog 68 from the ratchet wheel 66 and at the same time to reset the spring actuated bar 78, the spring catch 73 engaging the lever 70, as shown in Fig. 7, and thus locking the same against accidental displacement. The drum 63 therefore is released to rotate in a reverse direction due to the gravitation of the fork and unwinding of the cable 58. As the fork descends, the projecting lugs 50 will ride onto the upper ends of the cams 35 and 36, so that the prongs will be raised and not released until the elevator is again in normal or initial position, at which time the lugs 50 pass off of the lower ends of the cams 35 and 36 and the fork is released so that its springs 56, pull it downwardly into proper position as shown in Fig. 3, so that the projecting ends 53 will engage the resilient catches 52 to be held in such position. In the meantime, the loading apparatus has been moved along the ground so that a certain amount of material will be within the receiving apparatus, the parts now being reset so as to assume the proper position for permitting a similar operation of the present device.

By connecting the cable 58 to the fork, it is evident that when the cams 51 release the same from engagement with the catches 52, the pull of the cable 58 is placed upon the fork so as to pull the same upwardly and thus assist in the delivery of the material therefrom.

By means of the L-shaped hook 59, the proper pull of the cable from the frame section 37 to the fork is afforded so that there is no tendency to release the fork at the initial starting of the elevator from the position shown in Fig. 1 until the final dumping of the material.

When the elevator reaches dumping position, the cable 58 moves from under the hook 59, due to the fact that the pulley 60 is located at one side of the elevator guiding means, while the hook 59 is located between the sides of the elevator. Thus, the cable 58 is released from the hook 59 so that the pull of the cable is applied to the fork to assist in swinging the same upwardly. When the elevator gravitates, the cord 58 again moves under the hook 59.

What is claimed is:

1. In a loading apparatus, an elevator embodying a frame and a fork hinged thereto and having downwardly projecting prongs, a pair of guides for guiding said frame movement up and down, the elevator frame and fork having coöperable means whereby the fork is frictionally held in lowered position, cam means carried by the guides adjacent their upper ends, the fork being raised by said cam means when the elevator is raised, means for actuating the elevator, and cam means coöperable with the fork when the elevator is lowered, to raise the fork until the elevator returns to normal lowered position.

2. In a loading apparatus, an elevator embodying a frame and a fork hinged thereto and having downwardly projecting prongs, means for guiding said elevator frame for movement up and down, a cable attached to said fork to pull the elevator upwardly, and means carried by the elevator frame for normally engaging said cable when the elevator is lowered and to release the cable when the elevator is raised whereby the pull of the cable is applied to the fork for raising it.

3. In a loading apparatus, an elevator embodying a frame and a fork hinged thereto and having downwardly projecting prongs, means for guiding the elevator frame upwardly and downwardly, a pulley adjacent the upper end of said means at one side thereof, a cable passed over said pulley and attached to said fork for pulling the elevator upwardly, and a hook carried by the elevator frame and engageable with the said cable when the elevator is lowered, and disengageable from said cable when the elevator is raised.

4. In a loading apparatus, an elevator embodying a frame and a fork hinged thereto and having downwardly projecting prongs, means for guiding the elevator frame for movement upwardly and downwardly, spring means connecting the elevator frame and fork for normally swinging the fork downwardly, the elevator frame and fork having coöperable means for normally holding the fork in lowered position, cam means for raising the fork when the elevator is moved to its upper position, means for raising the fork during the downward movement of the elevator, a cable connected to the fork for pulling the elevator upwardly, and means carried by the elevator frame engageable with said cable when the elevator is lowered and arranged to release said cable when the elevator is pulled to its upper position.

5. In a loading apparatus, an elevator, a drum, a cable connecting said drum and elevator for raising the latter, a rotatable ratchet wheel, a dog carried by the drum and engageable with the ratchet wheel, means carried by the drum for normally holding the dog released, means carried by the drum tending to move the dog into engagement with the ratchet wheel, means adjacent the drum for releasing the first mentioned means, and means for resetting the dog after the drum has made one revolution to move the elevator to raised position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HENRY P. HOFSTRAND.

Witnesses:
C. C. WOLFORD,
C. JOHNSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."