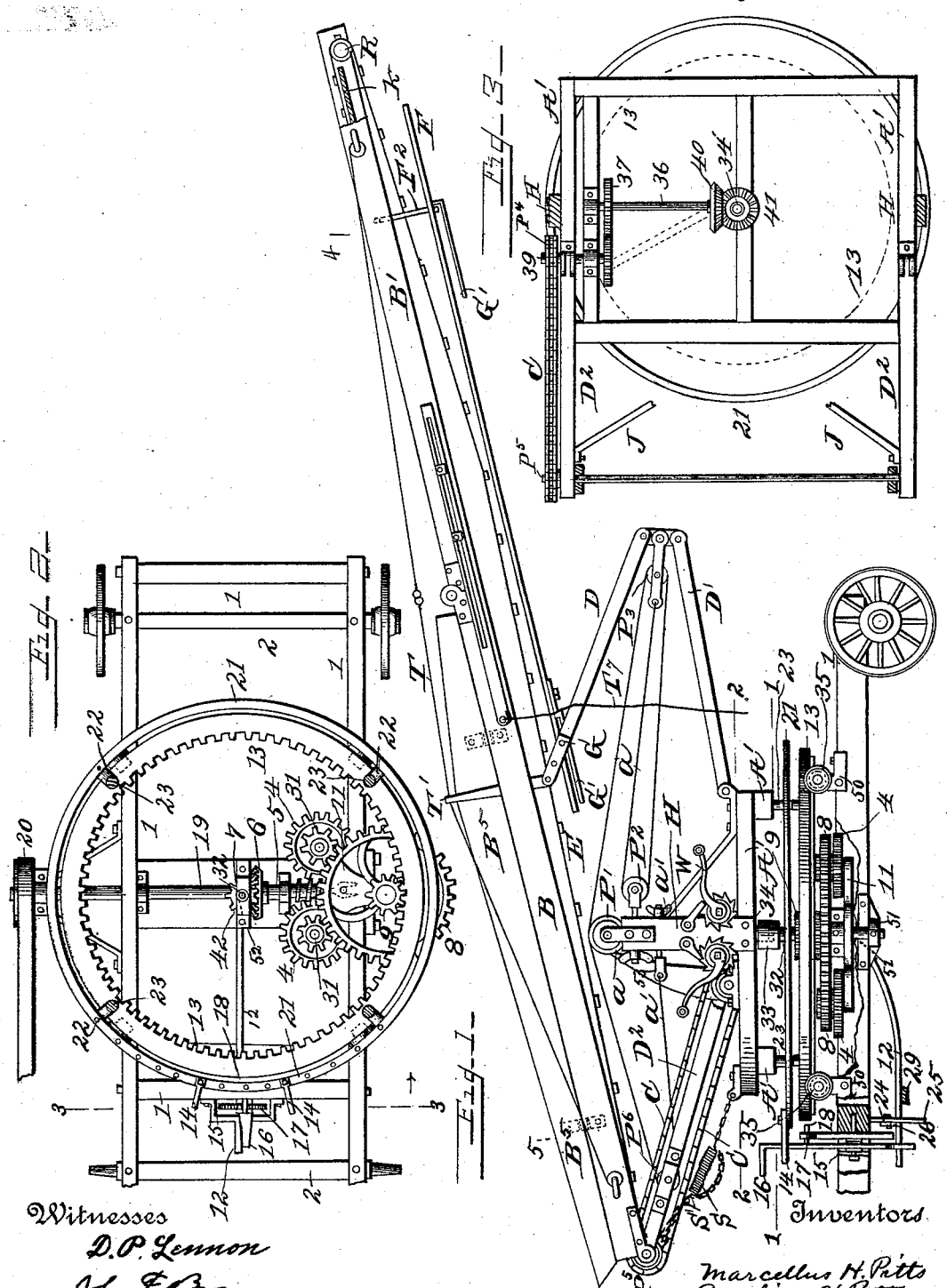
(No Model.) 2 Sheets—Sheet 1.

M. H. & A. V. PITTS.

AUTOMATIC SWINGING STRAW STACKER.

No. 455,355. Patented July 7, 1891.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

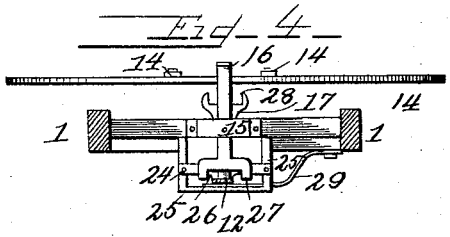

Fig. 5.

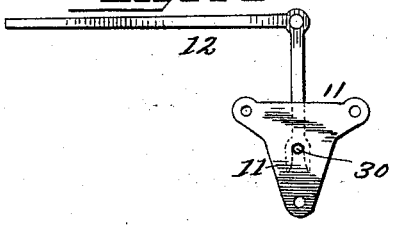

Fig. 6.

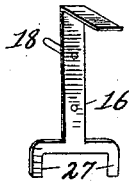

Fig. 7.

Fig. 8.

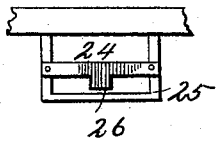

Fig. 9.

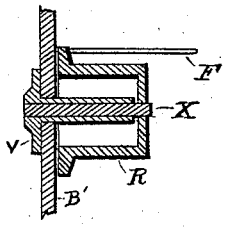

Fig. 10.

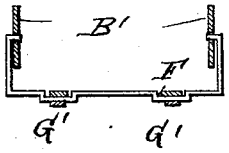

Fig. 11.

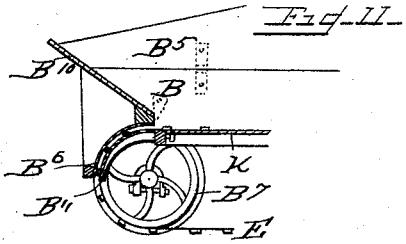

Fig. 12.

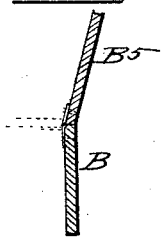

Fig. 13.

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UNITED STATES PATENT OFFICE.

MARCELLUS H. PITTS AND AURELIUS V. PITTS, OF MARSEILLES, ILLINOIS.

AUTOMATIC SWINGING STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 455,355, dated July 7, 1891.

Application filed September 13, 1890. Serial No. 364,925. (No model.)

To all whom it may concern:

Be it known that we, MARCELLUS H. PITTS and AURELIUS V. PITTS, citizens of the United States of America, residing at Marseilles, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Automatic Swinging Straw-Stackers, of which the following is a specification, reference being had therein to the accompanying drawings and the letters and figures of reference thereon, forming a part of this specification, in which—

Figure 1 is a side elevation of the straw-stacker complete. Fig. 2 is a horizontal section taken on line 1 of Fig. 1, looking down. Fig. 3 is a horizontal section taken on line 2 of Fig. 1, looking down. Fig. 4 is a front view of the shifting device, taken on line 3 of Fig. 2, looking in the direction of the arrow. Fig. 5 is a plan of the bell-crank of the shifter and of the oscillating plate for bearing the worm-wheel. Figs. 6, 7, and 8 are detail views of the several parts of the shifting mechanism. Fig. 9 is a longitudinal section of one of the flanged pulleys at the outer end of the carrier-frame, showing its construction and manner of attachment to said frame. Fig. 10 is a cross-section of Fig. 1, taken on line 4, looking toward the rear of the machine. Fig. 11 is a detail view of the inner end of the carrier-frame. Fig. 12 is a cross-section of one side of the carrier-frame and of a side board hinged thereto, taken on line 5 of Fig. 1, looking toward the rear end of the machine; and Fig. 13 is a cross-section of the floor of the carrier-frame, showing its parts grooved to receive a tongue for rendering it tight between joints.

This invention relates to certain improvements in automatic swinging straw-stackers, which improvements are fully set forth and explained in the following specification and claims.

Referring to the drawings, 1 represents the main bed-frame provided with axles 2, having traveling wheels, as shown, to render the machine portable. The two side beams of the main frame support on them about centrally the annular gear-wheel 13 through the medium of the flanged friction-rollers 35, properly boxed to standards 50, secured to said frame, as shown in Figs. 1 and 2, so that said annular gear-wheel may rotate on said friction-rollers. Said gear-wheel meshes with the pinion 9, the shaft of which stands at its lower end in a step-box 51, secured to the side of the main frame. The shaft of said pinion 9 has secured to it immediately below said pinion the gear-wheel 8, which said shaft and pinion turn on said shaft.

11 is a triangular-shaped oscillating plate boxed at its outer end on the shaft of pinion 9 and supports on its inner end the two worm-wheels 4 4, journaled on studs secured in said plate. Said worm-wheels bear on their upper sides the integral pinions 31, both of which mesh with the gear-wheel 8. 19 is the drive-shaft properly boxed on a central cross-beam of the main frame and has on its inner end a worm 10 for alternately meshing with the worm-wheels 4. Said shaft is provided on its outer end with a pulley, to which drive-belt 20 is applied, and as it rotates drives alternately the worm-wheels 4 and from them, through the medium of gear-wheel 8 and pinion 9, drives the annular gear-wheel 13 alternately in either direction.

The plate 11, with its worm-wheels, is caused to oscillate laterally, so as to cause the worm-wheels to alternately mesh with worm 10, by means of the bell-crank 12, having a fork on the outer end of one of its arms forked over a depending pin 30, secured to the under side of said plate 11. Said bell-crank is pivoted at its angle below the lower end of vertical shaft 32 at 52, and its opposite arm extends toward the forward end of the machine to project through depending frame 25, secured to a cross-bar of the main frame, as shown in Figs. 1, 2, and 4, and be held upward against the under side of the notched cross-bar 24 of said frame by means of a spring 29. The outer end of the said arm of said bell-crank extends between the forks 27 of the oscillating lever 16, which is pivoted at about its center to said cross-bar of the main frame in such manner that it may be oscillated from side to side by means of being engaged on either side near its upper end by the horizontally-extending arms 14, detachably connected to the annular rail 21, which is secured to the upper side of said annular gear to radial arms 22 of the posts 23, as shown in Figs. 1 and 2.

17 is an oscillating lever pivoted on the same pin with lever 16 and arranged to be

immediately behind it. The upper end of lever 17 is provided with forks 28, similar to those on the lower end of lever 16, which forks 28 fork over an extending pin 18 on the rear side of lever 16, so that when lever 16 oscillates it will, through the medium of said pin, oscillate lever 17 with it. The lower end of lever 17 is designed to bear on the upper side of the extending arm of bell-crank 12, as shown in Figs. 1 and 4, and is for the purpose of depressing said arm, so that when the forks 27 of lever 16 move said bell-crank laterally it will be carried over the extending stop 26 of the cross-bar 24 of frame 25. Unless said bell-crank is moved by the lever 16 said stop will prevent said bell-crank from moving laterally from any other cause.

A′ is a frame that is supported by the annular gear 13 by means of the posts 23. These posts 23 have horizontally-extending arms 22, which support an annular rail 21, arranged a little above said gear. Said rail has adjustably secured to it the horizontally-extending arms 14 for alternately engaging and oscillating levers 16, and thus, through the medium of said bell-crank and the oscillating plate 11, shift the worm-wheels 4 and cause them to alternately rotate the annular gear 13, with the structure it supports, in opposite directions, so that the rear end of the carrier may be caused to swing from side to side and carry and deliver straw on the top of a stack which will be semicircular in form on account of the swinging of the carrier. The said rail 21 is provided with a series of holes for attaching the arms 14 thereto at any required distance apart for regulating the distance the carrier is to swing. If they are placed near together, they will engage the shifting mechanism earlier and cause the oscillation of the carrier to be less, and conversely if they are placed farther apart.

The frame A′ supports the carrier-frame B through the medium of the arms D, D′, and D^2. The inner ends of arms D^2 are pivoted to the upper side of said frame and at their outer extending ends of the inner end of the carrier-frame. The arms D D′ are connected by a toggle-joint and connect the rear end of said frame with the carrier-frame near the outer end of its inner section B. Said toggle-arms are operated to elevate and lower the outer end of the carrier-frame from a windlass W′, through the medium of the rope or chain *a*, having one end attached to the joint of said toggle and passing from thence over the pulleys P^2 P^3 P′ to said windlass. The arms D^2 are operated to elevate and lower the inner end of the carrier-frame by means of the rope or chain *a*′. Said rope or chain has one end attached to the windlass W and passes from thence over double pulley P′, a pulley P^6 on the arms D^2 near their outer ends, and from thence to a fastening 53 on the post H, secured to said frame A′, said fastening having a thumb-nut to adjust it and the rope to which it fastens. Said posts are attached, respectively at their lower ends to the sides of frame A′, and are for the purpose of supporting the said windlasses and the pulleys P′ P^2 and to form a fastening for said ropes or chains *a*′. The inner end of arms D^2 are pivoted to frame A′ near its central part, and are connected at their outer extending ends with the outer side of said frame by means of chains S′, for the purpose of preventing the carrier-frame from being carried over too far when said arms are raised. A coil-spring S is attached to said chain S′, as shown in Fig. 1, for the purpose of giving a yielding tension to said chain when said arms are raised in such position as to bring said chain taut, and thus not injure the machine, when the movement of the outer ends of said arms is arrested by said chain.

The carrier-frame B is provided with an extension-section B′, the two parts being hinged together in the ordinary manner, and is provided with an ordinary slat-belt E. Said belt is supported in its part beneath the floor of the carrier by means of the bars F, supported at their upper ends on a bail F^2, suspended from the upper section B′ of the carrier-frame in depression formed in said bail to prevent their lateral movement and are supported at their lower inner ends on a shaft G, passing through arms D of the toggle, as shown in Fig. 1. Said arms are provided on their under sides with the hooks G′ for securing them in their proper positions on their supports and for furnishing means for detaching them when desired. These bars furnish a support for the carrier-belt in its part below the carrier-frame for the purpose specified. The floor K of the carrier-frame is provided on its inner lower end with the curved extension B^{11}, taking the form of the flanged wheels B^7, carrying the conveyer-belt E, and arranged between them on a line with their tread bearing the belt E, so that said belt may be in contact with and run on said curved portion, as shown in Fig. 11. A curved shield B^6 is arranged to cover said curved projection, and is placed at sufficient distance therefrom to permit the carrier-belt to pass between them. An end board B^{10} extends from the upper edge of said shield B^6 and at an angle of about forty-five degrees with the floor K to form a conductor to carry the straw to the carrier-belt.

The object of having the curved floor or projection B^{11} and the shield B^6 and the carrier-belt passing between them is to prevent fine material, dirt, chaff, grain, &c., from falling off that end of the carrier frame and belt and not be carried rearward with the straw, as is the case where that end of the carrier-belt is exposed.

The lower section B of the carrier-frame is provided with side boards B^5, hinged thereto in such manner as when standing to flare outward, as shown in Fig. 12, and adapted to fold over between the sides of the carrier-frame when the machine is not in use.

The two sections B and B′ of the carrier-frame are connected by a truss-rod T, having its central part resting on supports T′, secured, respectively, to the sides of the section B, and is provided with a hinge-joint in its part opposite the hinge connecting the two sections of the carrier-frame, so that section B′ may fold over on section B, the joint or hinge in the truss-rod permitting such folding. The side of the folding section B′ of the carrier-frame is provided with a slotted lever T^6, secured to the sides of said sections by means of bolts passing through the slot in said lever in such manner that said lever may have end adjustment on said bolts, so that its outer end may be adjustably extended beyond the hinge connecting the two sections of the carrier-frame, in order to increase or decrease the leverage of the said lever. The outer end of said lever is provided with a depending rope T^7. By pulling down on said rope the section B′ may be folded over on section B without the necessity of climbing upon some object in order to lift and fold over said section. By holding onto said rope the said section is prevented from falling heavily on section B. By moving said lever endwise the leverage may be increased or decreased, according to the strength of the operator.

In order to provide the outer end of the carrier-frame with durable pulleys for carrying the carrier-belt, and so that a long shaft extending across the carrier-frame may be dispensed with and prevent straw winding upon a shaft at that end, such pulleys are used as is shown in Fig. 9. The pulley R is flanged on its outer end and thimble-shaped, and is secured to the short shaft X, which passes to the outer side of the carrier-frame through the long box V, having flanges on its outer end, by means of which it is bolted to the side of the carrier-frame. The shaft or spindle X turns in the box V, and is held from passing out of said box by means of the carrier-belt F being in contact with the flanges of the pulley. By this construction no shaft passing across the machine is used and little or no chance is given for straw to wind on the pulley or its shaft. Its bearing is protected from dust and dirt, so it will need less oiling, and it is rendered easy to be removed for repairs or for being replaced by another in case of necessity, and lessens the weight at that end of the carrier-frame.

The floor K of the carrier-frame has the sections of which it is composed grooved for the reception of a dowel-strip K′, as shown in Fig. 13, for closing the space between its sections in case they shrink, for the purpose of preventing straw and material from entering said cracks and clogging the carrier-belt.

The carrier-belt is driven from drive-shaft 19. Said shaft has secured on it at about its center the miter-gear 6, which meshes with miter-gear 42 on the vertical shaft 32. (See Figs. 2 and 3.) The upper end of shaft 34 is provided with bevel-gear 41, which meshes with bevel-gear 40 on horizontal shaft 36. The opposite end of shaft 36 has secured on it the gear-wheel 37, which meshes with gear 38. The shaft 39 of gear 38 has secured on its opposite end the sprocket-wheel P^4, which is connected by means of sprocket-chain C with sprocket-wheel P^5 on the shaft carrying the inner end of the carrier-belt, thus, through the medium of said parts, connecting drive-shaft 19 with the carrier-belt.

If desired, shafts 34 and 39 may be connected direct by means of a shaft and universal couplings, as indicated by the broken lines in Fig. 3, and the gears 37 and 38 be dispensed with. The lower end of shaft 34 and the upper end of shaft 32 are connected by a coupling 33, as shown in Fig. 1, for the purpose of preventing said shafts from being injured by oscillations of the machine and to render it easy to detach the shifting mechanism from the remainder of the machine, if necessary.

In operation the machine is set at the rear of a separator, so that the straw will fall on the forward or inner end of the carrier-frame B on the belt E, which carries the straw rearward and delivers it on the top of the stack. As the stack grows the height and position of the outer end of the carrier-frame B′ are regulated by means of the cord-and-windlass mechanism while the machine is in operation. The arms 14 on the annular gear-wheel 13 are set so as to cause the shifting mechanism to automatically swing or oscillate the carrier-frame, through the medium of the shifting mechanism hereinbefore described, the proper distance to make the stack the length required.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows, to wit:

1. In the swinging straw-stacker shown and described, the combination of the bars F, having the hooks G′, carrier-frame B B′, and the supports G F^2 for said bars, substantially as and for the purpose set forth.

2. In the swinging straw-stacker shown and described, the combination, with the carrier-frame B and the floor K, of the curved extension B^{11} of said floor, shield B^6, flanged pulleys B^8, the carrier-belt E, arranged to run on said shield, and curved extension-floor B^{11}, substantially as and for the purpose set forth.

3. In the swinging straw-stacker shown and described, the combination, with the carrier-frame B′, of the flanged pulley R, having the shaft X secured thereto, and the box V, secured to the sides of said frame, substantially as and for the purpose set forth.

4. In the swinging straw-stacker shown and described, the combination of the carrier-frame B B′, jointed truss-rod T, bar or lever T^6, having the longitudinal slot for adjustably attaching it to the carrier-frame B′,

and the cord T^7, secured to the outer end of said bar, substantially as and for the purpose set forth.

5. In the swinging straw-stacker shown and described, the combination, with the main frame 1, of the annular gear 13, flanged friction-rollers 35, the frame A′, mounted on said gear-wheel, the rail 21, having arms 14, arms D^2, toggle-arms D D′, chains S′, having the spring S, the carrier-frame B B′ and its belt E, the cord-and-windlass mechanism, and the shifting mechanism, substantially as and for the purpose set forth.

6. In the swinging straw-stacker shown and described, the combination of the annular gear-wheel 13, gear 8, having pinion 9, worm-wheels 4, having pinions 31, worm 10, drive-shaft 19, bell-crank 12, oscillating plate 11, levers 16 and 17, frame 25, having stop 26, spring 29, rail 21, and arms 14, substantially as and for the purpose set forth.

7. In the swinging straw-stacker shown and described, the combination of the annular gear-wheel 13, rail 21, having adjustable arms 14, lever 16, having the forks 27 and pin 18, lever 17, having the forks 28, frames 15 and 25, bar 24, having stop 26, bell-crank 12, and the worm and worm-wheel mechanism for rotating said annular gear alternately in opposite directions, substantially as and for the purpose set forth.

8. In the swinging straw-stacker shown and described, the combination of drive-shaft 19, having bevel-gear 6, shaft 32, bevel-gear 42, shaft 34, coupling 33 for detachably connecting said shafts, bevel-gears 40 and 41, shaft 36, gears 37 and 38, shaft 39, sprocket-wheels P^4 and P^5, and sprocket-chains C, substantially as and for the purpose set forth.

9. In the swinging straw-stacker shown and described, the combination, with the annular gear 13, of gear-wheel 8, having pinion 9, worm-wheels 4, having pinions 31, worm 10, shaft 19, oscillating plate 11, having pin 30, bell-crank 12, having a fork for engaging said pin, and the means for operating said bell-crank, substantially as and for the purpose set forth.

10. In the swinging straw-stacker shown and described, the combination of the oscillating annular gear 21, frame A′, having the posts H H, arms D^2, toggle D D′, cords *a a′*, pulleys $P' P^2 P^3 P^6$, windlass W W′, chain S′, having the coil-spring S, and carrier-frame B B′, substantially as and for the purpose set forth.

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