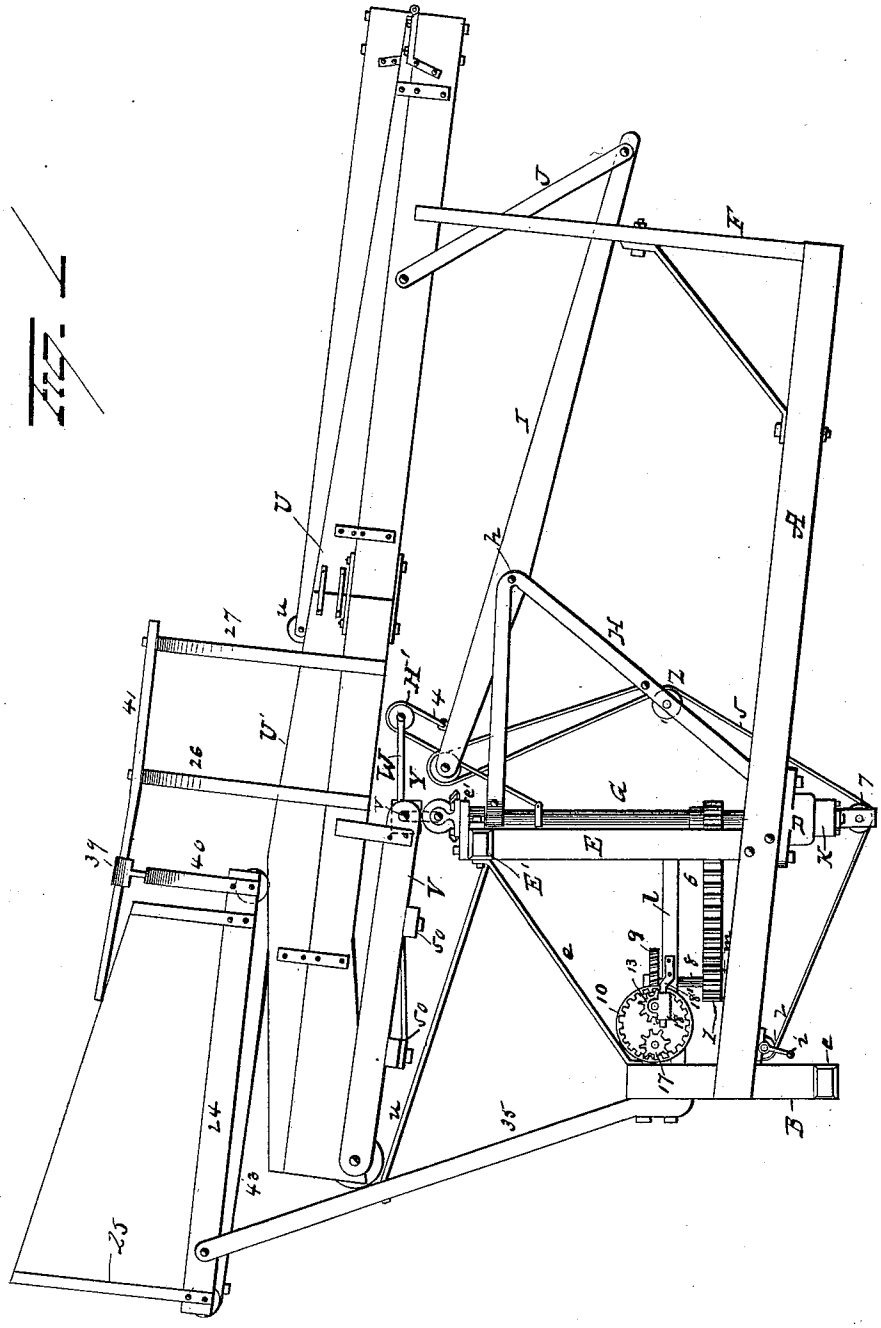
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H. M. COFFEE.

STRAW STACKER.

No. 402,807. Patented May 7, 1889.



Witnesses,
G. F. Downing,
V. E. Hodges.

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(No Model.) 4 Sheets—Sheet 2.

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Fig. 4.

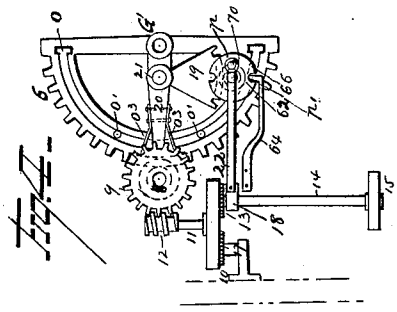


Fig. 5.

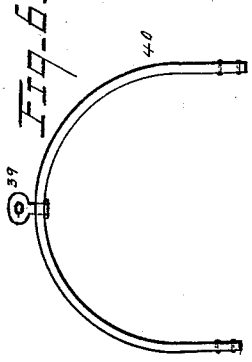
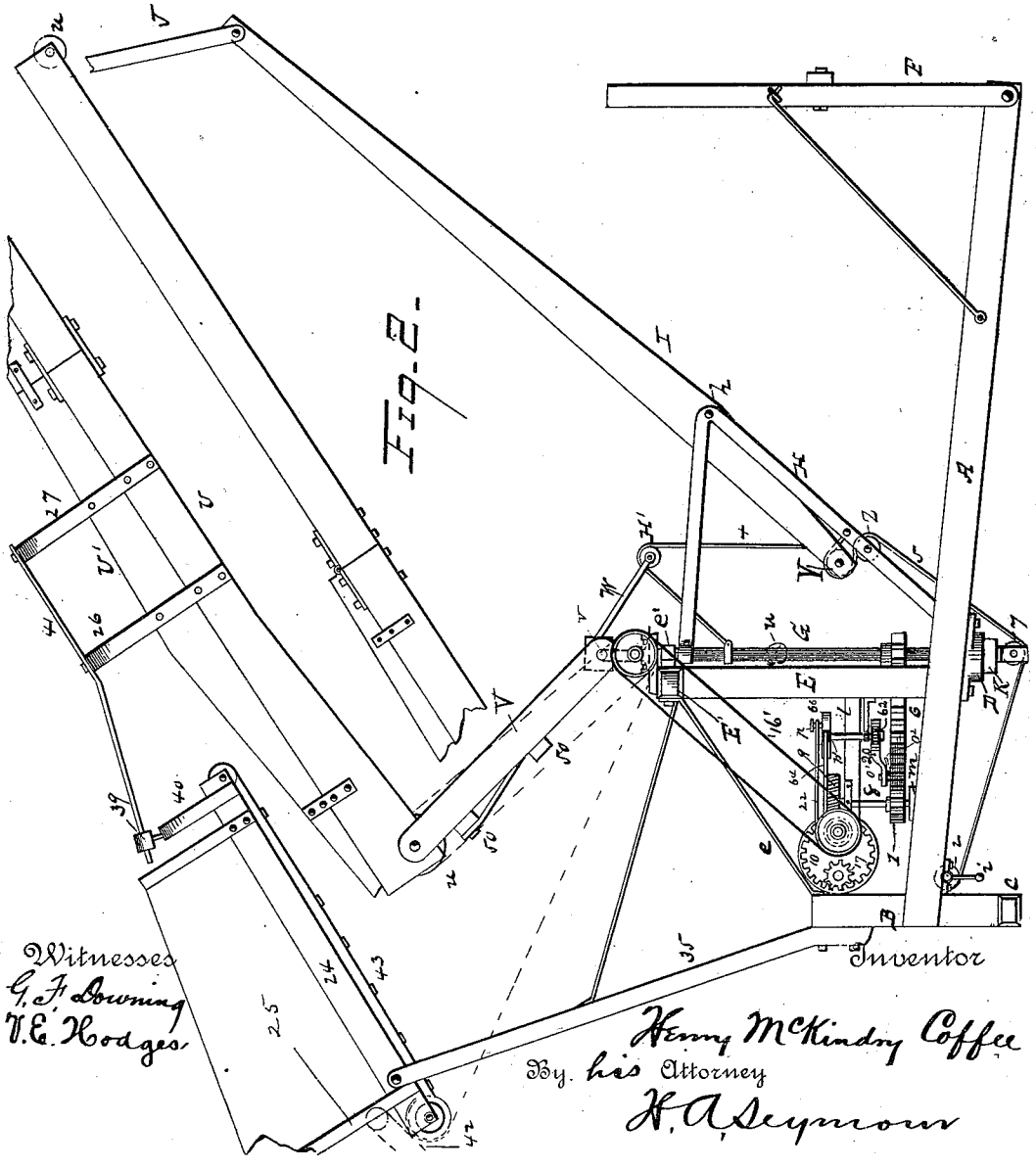


Fig. 2.



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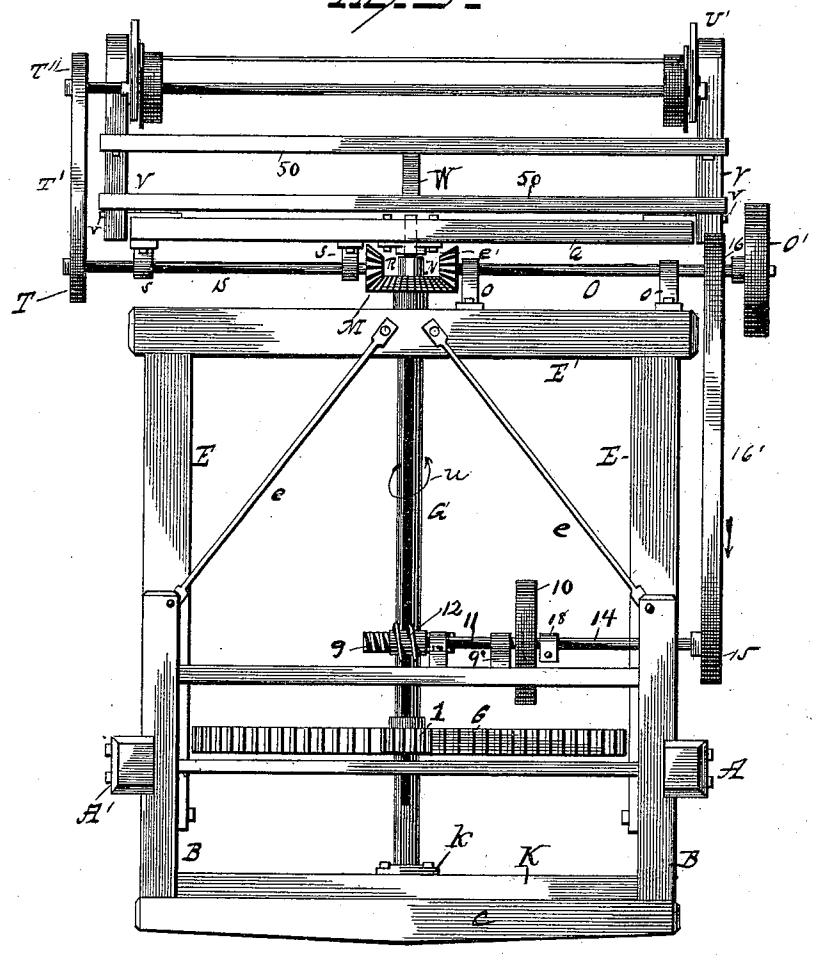
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Fig. 3.



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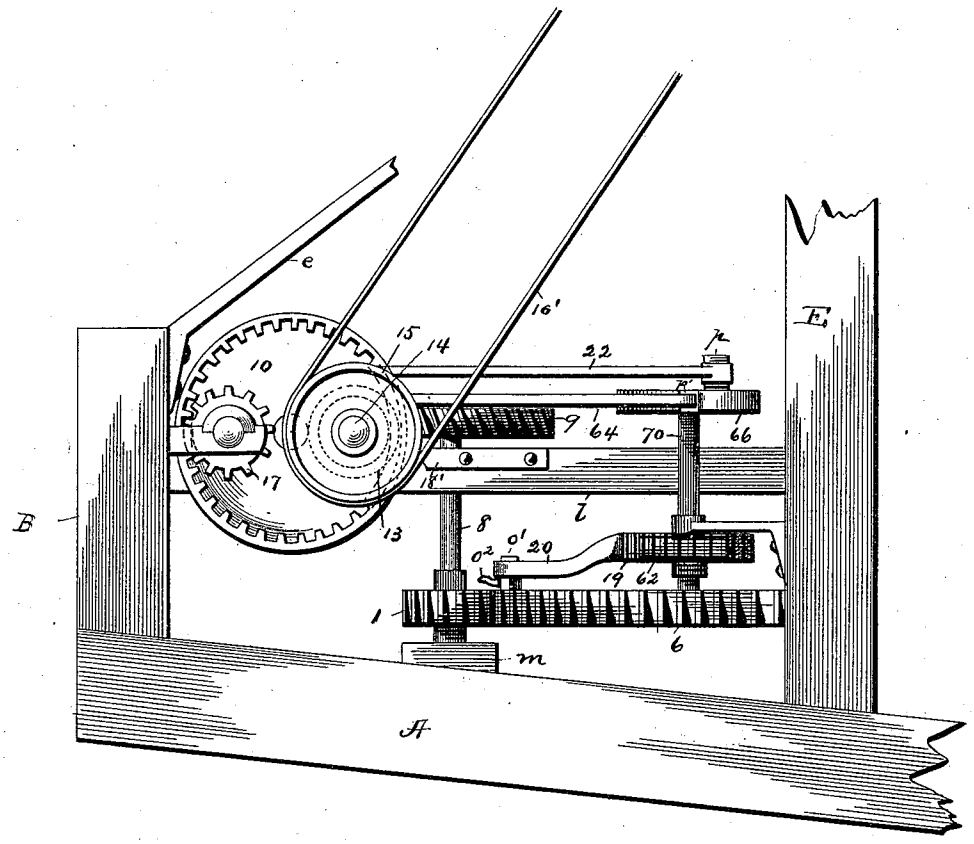
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Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY M. COFFEE, OF BUNKER HILL, ILLINOIS.

STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 402,807, dated May 7, 1889.

Application filed June 30, 1888. Serial No. 278,606. (No model.)

To all whom it may concern:

Be it known that I, HENRY MCKINDRY COFFEE, of Bunker Hill, in the county of Macoupin and State of Illinois, have invented certain new and useful Improvements in Straw-Stackers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in straw-stackers.

The object is to provide a machine adapted for use with ordinary thrashing-machines, and at the same time one which shall be light, comparatively simple, and inexpensive, with its mechanical parts reduced to a minimum, and a machine that may be folded to occupy a small space during transportation.

A further object is to provide a novel means of raising or lowering the carrier to suit the height of the stack without in any way interfering with the progress of the machine.

A further object is to provide means for automatically swinging the stacking-elevator back and forth and regulating its length of sweep to suit the size of the stack being built; and a still further object is to provide a self-adjusting device for conveying the straw from the thrasher to the stacker, and one which at the same time will prevent the straw from blowing and falling around the stacker, and in fact practically guard the whole machinery of the stacker against being covered and clogged with straw, chaff, and dust.

With these objects in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the stacker in position for transportation, with the stacking-elevator folded. Fig. 2 is a similar view showing the stacking-elevator extended and elevated, the parts being in operative position, and showing the mechanism for automatically reversing the swing of the stacking-elevator. Fig. 3 is a front elevation of the machine with the straw-transferring attachment removed. Fig. 4 is a detailed view of the mechanism for regulating the length of sweep of the stacking-elevator. Fig. 5 is an enlarged fragmentary view of the reversing mechanism shown in Fig. 2; and Fig. 6 is a detached view of bow 40, with the connected swivel-block 39.

A A′ represent the main side sills of the machine, extending parallel with each other and inclining slightly downward toward the rear end of the frame. To the forward end of these sills the front standards, B, are secured, and to the rear end arms F are braced. This frame is supported on bolsters C. Blocks D are affixed to the lower faces of the sills, and to these cross-piece K is bolted. A pair of uprights, E, project vertically from the sills A A′, and across their top is the cross-piece E′. Braces *e* extend from this cross-piece to the standards B.

Stepped in a box, *k*, on the cross-piece K, midway between the uprights E, is a rocking shaft, G, the upper end of which is journaled in a box, *e′*, projecting rearwardly from cross-piece E′. To this shaft a brace, H, is rigidly secured near the upper and lower ends, thus forming in effect a crane of great strength, to the outer end, *h*, of which is pivoted a lever, I.

U represents a straw-stacking elevator formed in two sections hinged together. Rollers *u* are journaled in the opposite ends of these sections, upon which an ordinary endless-belt conveyer is carried. The side-boards U′ are fastened to the upper edge of the elevator to guard against the straw dropping over the sides. The rear end of the elevator is supported by arm J, pivoted to the end of lever I. To the upper end of rocking shaft G cross-piece Q is rigidly secured, and to the outer ends of this piece the arms V are pivoted on pintles *v*, said arms also being pivoted at their upper ends to the forward end of the elevator.

An arm, W, is rigidly secured to cross-strips 50, connecting arms V, and this arm W projects rearwardly and is provided at its end with a sheave, H′. A cable, 4, secured at one end to shaft G, is passed over sheave H′, and its opposite end is secured to lever I, near the forward end of the latter. A sheave, Y, is also journaled in the forward end of lever I, as is also one, Z, in the lower limb of brace H. Swivel-sheave 7 depends from cross-piece

K, and a winding-drum, 2, having a crank, *i*, thereon, is supported beneath sill A. A cable, 5, is securely fastened at one end to the lower limb of brace H, and from this point passed over sheave Y, then downward beneath sheave Z, then under swivel-sheave 7, and finally to drum 2, where its end is secured. At this stage the parts are in the position shown in Fig. 1, the folded elevator being held against lateral movement by arms F. Now, by winding or unwinding the cable 5 on drum 2 the stacking-elevator is raised or lowered. The result of the operation is this: The winding of the cable draws the shorter or forward end of lever I downward, thus carrying with it the rear end of arm W, raising the forward end of elevator, as shown in Fig. 2, and the longer or rear end of lever I upward, projecting the rear end of elevator upward, these parts all operating simultaneously. It will be observed that cable 4 is always the same length.

Right in this connection it is well to explain the transferring attachment, as its self-acting operation is dependent upon and regulated by the position assumed by the stacking-elevator. This attachment consists of a frame, 24, pivoted at its forward end on bracket-arms 35, and having a sliding swivel-connection through the pivoted slide-block 39 on bow 40, secured to the attachment's rear end. Bows 26 27 are secured to the elevator, and a rod, 41, is removably bolted to the top of these bows. The forward end of this rod extends loosely through block 39 and has a sliding connection therewith. The attachment 24 has a wind-sheet, 25, stretched across its forward end, and may have canvas sides. Canvas may, besides, be stretched over the bows 26 27, all these being to prevent the straw and dust being caught by the wind and blown over the working machinery. Within is an endless belt, 43, carried on suitable rollers. An elevator, 42, carries the straw to this transferring attachment. Figs. 1 and 2 show two different positions taken by this attachment, and by an examination of these figures it will be observed that the attachment is absolutely self-acting, of course depending on the movement of the elevator. As the elevator is lowered, Fig. 1, the block 39 slides down or back on rod 41, and the attachment tilts downward at its rear end, while, on the other hand, when the elevater is raised, Fig. 2, the block 39 slides in an opposite direction on rod 41 and is tilted upward—in other words, the elevating-belts of the attachment and of the stacking-elevator always being approximately parallel whatever the positions assumed.

To return to the more essential and indispensable mechanism of my invention, a bevel-pinion, M, is loosely mounted on the rocking shaft G, a short distance below the cross-piece Q, and from this point a pair of shafts, S and O, extends in opposite directions transversely of the machine. Keyed to the adjacent ends of these shafts are the bevel-pinions R and N, respectively. The shaft S is revolubly supported in boxes *s*, depending from the cross-piece Q. A pulley, T, is fixed on the outer end of this shaft, and an endless belt, T′, extends therefrom over pulley T″, which drives the endless-belt conveyer in the stacking-elevator. The other shaft, O, is the main driving-shaft. It is journaled in boxes *o* on cross-piece E′, and a driving-drum, O′, is keyed on its outer end. Back of pulley O′ a similar one, 16, is keyed, and a belt, 16′, passed over this pulley and also a pulley, 15, communicates motion to the latter. Through this medium motion is given to the swinging gear now to be described.

The numeral 6 represents a toothed half-wheel or segment. This is keyed to the rocking shaft G a short distance above the sills A A′. In the arm *l* and cross-piece *m* a short shaft, 8, is journaled, and keyed to this shaft is a pinion, 1, meshed with the segment 6. A worm-wheel, 9, is keyed to the upper end of the shaft 8. Transverse shaft 11 is revolubly supported in journal-boxes on cross-piece 9′. Worm-wheel 12 is keyed on one end of this shaft in engagement with worm-wheel 9, and to the opposite end of shaft 11 an internal toothed gear-wheel, 10, is keyed. Meshed with the teeth of this wheel is a gear-wheel, 17, revolubly supported on a suitable shaft, 17′. A shaft, 14, on which the previously-mentioned pulley 15 is keyed, and through which motion is communicated to the shaft, is in alignment with this shaft 11. On the opposite end of this shaft a gear-wheel, 13, is keyed. The teeth of this wheel are adapted to alternately mesh with the teeth of wheel 17 or the internal teeth of wheel 10 to change the motion of the laterally-swinging stacking-elevator either to the right or left. The position of this wheel 13 is automatically shifted by peculiar mechanism now to be described. The inner end of shaft 14 is revolubly supported in a sliding journal-box, 18. This box is pivotally and slidingly supported on the end of rod 18′, where it is automatically shifted by the following mechanism: The segment 6 is provided on its upper face near the periphery with an undercut groove, *o*, in which the heads of bolts *o′* are inserted. The bolts may be slid around to any point in the groove and then secured by tail-nuts o^2, so that their ends project upwardly above the face of the segment a short distance. The position of these bolts is determined by the length of sweep desired for the stacking-elevator. The nearer they are together of course the shorter the sweep, and the farther apart they are the larger the sweep. A combined segment, 19, and arm 20, integral and preferably at right angles to each other, are mounted on a small shaft, 21, slightly above segment 6. The segment 19 is provided with teeth on its edge, and the arm is bent downwardly at its outer end and provided with laterally-projecting springs o^3. The teeth of the small

segment 19 are meshed with the teeth of pinion 62, keyed to shaft 70. On the opposite end of this shaft a crank-wheel, 66, is keyed, and this wheel is provided with crank-pin *p*.

In the periphery of the crank-wheel or disk 66 notches *p'* are formed at diametrically-opposite points and preferably at equal distances from the crank-pin. Spring-pawl 64 is placed in position so as to engage automatically the notches of the wheel 66. Connecting bar or link 22 extends between sliding journal-box 18 and the crank-pin *p* and is pivotally connected to each.

It will be readily seen that when one of the upwardly-projecting bolts *o'*, adjusted in segment 6, comes in contact with one of the springs o^3 from the turn of the segment the outwardly-projecting end of the spring will be forced against the arm 20, and when sufficient pressure is exerted to throw the toe on the end of spring-pawl 64 out of engagement with the notch in wheel 66 the latter will make a half-revolution, stopping again on the other dead-center, which forms a lock with connecting-bar and holds the teeth of wheels 10 and 13 firmly meshed, as shown in Fig. 4. When in the other position the teeth of wheels 14 and 17 are meshed, and an opposite motion results. The object of springs o^3 is to give wheel 66 a full half-turn and also a yielding contact.

The operation of the stacking-elevator and transferring attachment has been described, and to render comprehensible the *modus operandi* of the swinging gear a brief description of the same will ensue.

Motion is communicated through a suitable belt from driving-shaft O to shaft 14, in the direction of the arrow. The gear-wheel 13, keyed to the inner end of this shaft, is slid backward and forward by each oscillation of segment 6 through the medium of connecting-bar 22, crank-wheel 66, segment 19, and arm 20, so that the teeth of wheel 13 mesh alternately with the internal teeth of wheel 10 and the teeth of gear-wheel 17, the former engagement operating to drive rocking shaft G in the direction indicated by the arrow *u*, while the latter engagement drives the shaft in the opposite direction through the worm-wheels 9 and 12. This change, it will be noticed, is automatic, and the operation of the entire machine is dependent on the single drive-shaft O.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the particular construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a straw-stacker, the combination, with a frame, of a stacking-elevator, a straw-transferring attachment, the forward end of which is supported on the stacking-elevator, and levers and flexible connections whereby these parts are operated simultaneously, substantially as set forth.

2. In a straw-stacker, the combination, with a frame, of a stacking-elevator, a transferring attachment having a sliding pivotal connection therewith, and levers and cables connecting these parts, whereby they are operated simultaneously, substantially as set forth.

3. In a straw-stacker, the combination, with a frame, of a stacking-elevator and a transferring attachment, both being pivoted to the frame and having a sliding pivotal connection with each other, and arms, levers, and cables whereby the elevator and transferring attachment are operated simultaneously, substantially as set forth.

4. In a straw-stacker, the combination, with a frame and a rocking shaft supported therein, of a stacking-elevator supported on said rocking shaft, and levers, arms, and cables connected with this elevator, whereby its inclination is regulated, said levers and arms also being supported by the rocking shaft, substantially as set forth.

5. In a straw-stacker, the combination, with a frame and a stacking-elevator having pivotal connection therewith, of a transferring attachment consisting, essentially, of sides, wind-sheet, and elevating-belt, substantially as set forth.

6. In a straw-stacker, the combination, with a frame and a stacking-elevator having pivotal connection therewith, of a transferring attachment having a swivel-block therein, bows secured to the elevator, and a rod secured to these bows, said rod having a sliding connection with the swivel-block, substantially as set forth.

7. In a straw-stacker, the combination, with a frame, of a stacking-elevator having a swinging axial connection with the frame and a pivoted connection with its axis, and a transferring attachment having a sliding pivotal connection with the stacking-elevator, substantially as set forth.

8. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, and a cross-piece secured to this shaft, of a stacking-elevator pivotally supported upon the cross-piece, and levers connected with the elevator and with the rocking shaft, whereby the inclination of the former is regulated, substantially as set forth.

9. In a straw-stacker, the combination, with a frame and a rocking shaft supported therein, said shaft having a brace secured thereto and also a cross-piece secured to its upper end, of a stacking-elevator, arms pivotally connecting the elevator at one end to the cross-piece, a lever pivoted in the brace, a cable loosely connecting the arms with the lever, and a cable whereby the lever is operated, substantially as set forth.

10. In a straw-stacker, the combination, with a frame, a rocking shaft, the latter hav-

ing a cross-piece on its upper end and a brace projecting from the rocking shaft, of a stacking-elevator, arms pivotally connecting the forward end of this elevator with the cross-piece on the rocking shaft, an arm projecting from these pivotal arms and provided with a pulley, a lever pivoted in the brace, this lever having a pulley in one end and a pivotal connection at the opposite end with the elevator, a cable secured to the rocking shaft and the lever and passed over the pulley in the end of the projecting arm, also a cable secured at one end to the brace, passed over the pulley in the lever, then over a pulley in the brace, a swivel-pulley in the lower end of the frame, and finally to a drum, where it is wound or unwound to regulate the inclination of the elevator, substantially as set forth.

11. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, and a stacking-elevator pivotally supported on said shaft, of automatically-swinging gear for periodically turning the elevator in opposite directions, substantially as set forth.

12. In a straw-stacker, the combination, with a frame and a rock-shaft supported therein, the latter having a segment or half-wheel thereon, of a gear-wheel meshed therewith and a shifting-lever arranged to receive motion from the segment, whereby the motion of the gear-wheel is changed, substantially as set forth.

13. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, said shaft having a segment thereon, of a transverse shaft having a worm-gear connection with the rocking shaft, said transverse shaft having an internal toothed gear-wheel on one end and a gear-wheel, 17, meshed with the teeth of this wheel, and a second transverse shaft having a gear-wheel on one end and an arm operated by the segment adapted to automatically slide this gear-wheel back and forth in engagement with the gear-wheel 17 or the teeth of the internal gear-wheel, substantially as set forth.

14. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, said shaft having a segment keyed thereon, and a transverse shaft having a worm through which motion is communicated to the rocking shaft, of an arm operated by the segment and connected gearing for periodically changing the motion of the rocking shaft, substantially as set forth.

15. The combination, with a shaft having an internal toothed gear-wheel thereon and a gear-wheel, 17, the teeth of which are meshed with the teeth of the internal toothed gear-wheel, of a sliding gear-wheel, an arm for moving said wheel into engagement with the teeth of the internal toothed gear-wheel or the gear-wheel 17, and means for oscillating this arm at predetermined intervals, substantially as set forth.

16. The combination, with a shaft having an internal toothed gear-wheel thereon and a gear-wheel, 17, the teeth of which are meshed with these teeth, of a sliding gear-wheel, an integral segment and arm adapted to operate the sliding gear-wheel, and means for oscillating this segment and arm, substantially as set forth.

17. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, this shaft having a toothed segment keyed thereon, a spindle having a gear-wheel keyed thereon, the teeth of which are meshed with the teeth of the segment, and a worm-wheel also keyed to this spindle, of a transverse shaft having an internal toothed gear-wheel keyed to one end and a worm at the other end meshed with the spindle worm-wheel, a gear-wheel, 17, the teeth of which are meshed with the teeth of the internal toothed gear-wheel, a sliding gear-wheel, a crank-wheel connected therewith, a spindle journaled in close proximity to the toothed segment, a combined segment and arm thereon at right angles to each other, and bolts adjustably secured in the toothed segment adapted by their abutment against the arm to change the motion of the stacking apparatus, substantially as set forth.

18. In a straw-stacker, the combination, with a frame, a rocking shaft supported therein, this shaft having a segment keyed thereon, a spindle having a gear-wheel keyed thereon, the teeth of which are meshed with the teeth of the segment, and a worm-wheel also keyed to this spindle, of a transverse shaft having an internal toothed gear-wheel keyed to one end and a worm at the other end meshed with the spindle worm-wheel, a gear-wheel, 17, the teeth of which are meshed with the teeth of the internal toothed gear-wheel, a sliding gear-wheel, a crank-wheel having notches in its periphery at diametrically-opposite points, a pawl for engaging said notches, a link connecting the crank-wheel with the sliding gear-wheel, a pinion keyed on the shaft with the crank-wheel, and a combined toothed segment and arm, the former having teeth meshed with the teeth of the pinion and the latter having laterally-projecting springs and bolts adjustably secured in the toothed segment on the main rocking shaft, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY M. COFFEE.

Witnesses:
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LOT COLTHAR.