

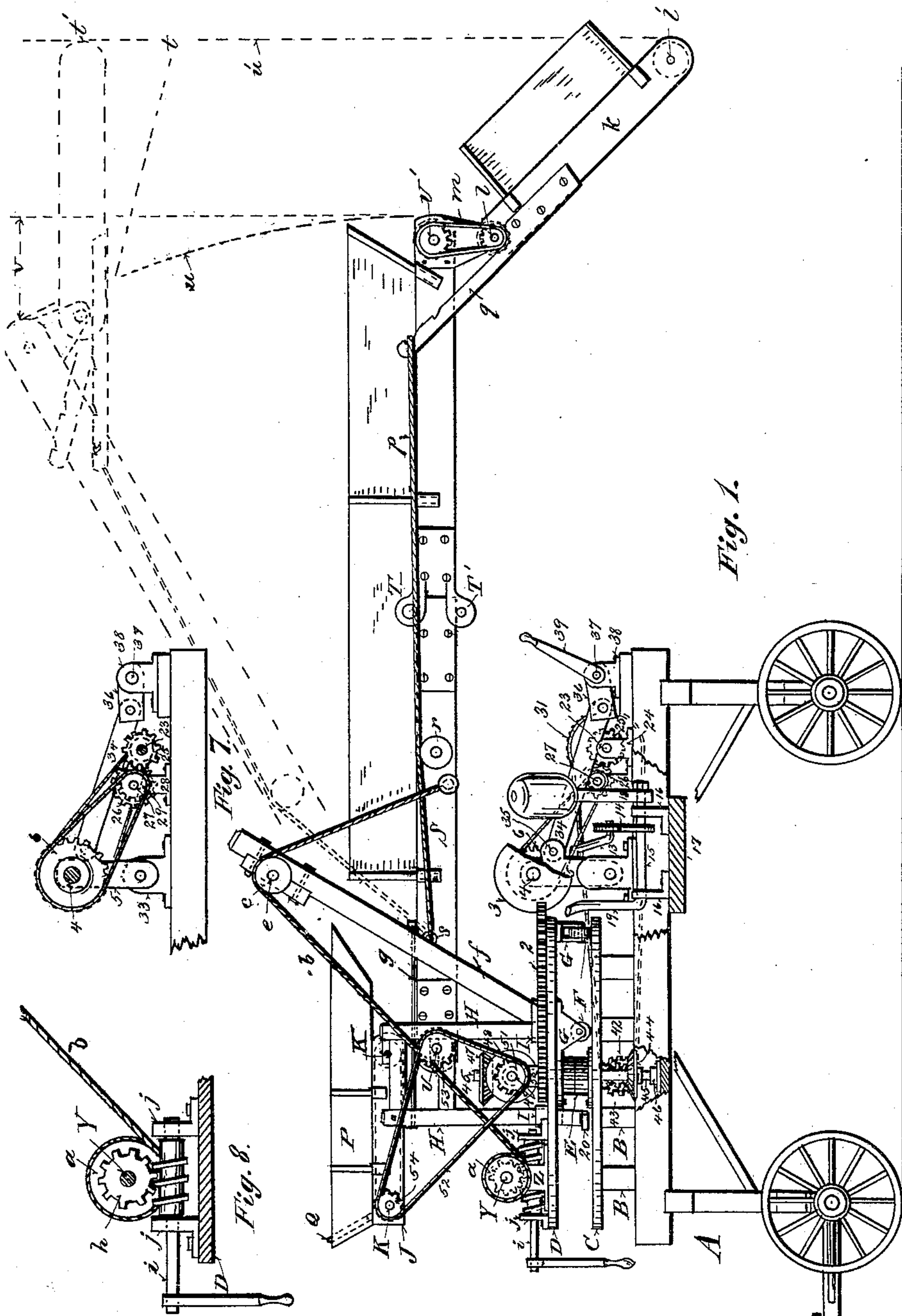
(No Model.)

3 Sheets—Sheet 1.

J. M. SMITH.  
STRAW STACKER.

No. 446,955.

Patented Feb. 24, 1891.



WITNESSES  
H. M. Plaisted  
Warren Hull

INVENTOR  
J. M. Smith,  
By *H. A. Faulstich*  
his Attorney.

(No Model.)

3 Sheets—Sheet 2.

J. M. SMITH.  
STRAW STACKER.

No. 446,955.

Patented Feb. 24, 1891.

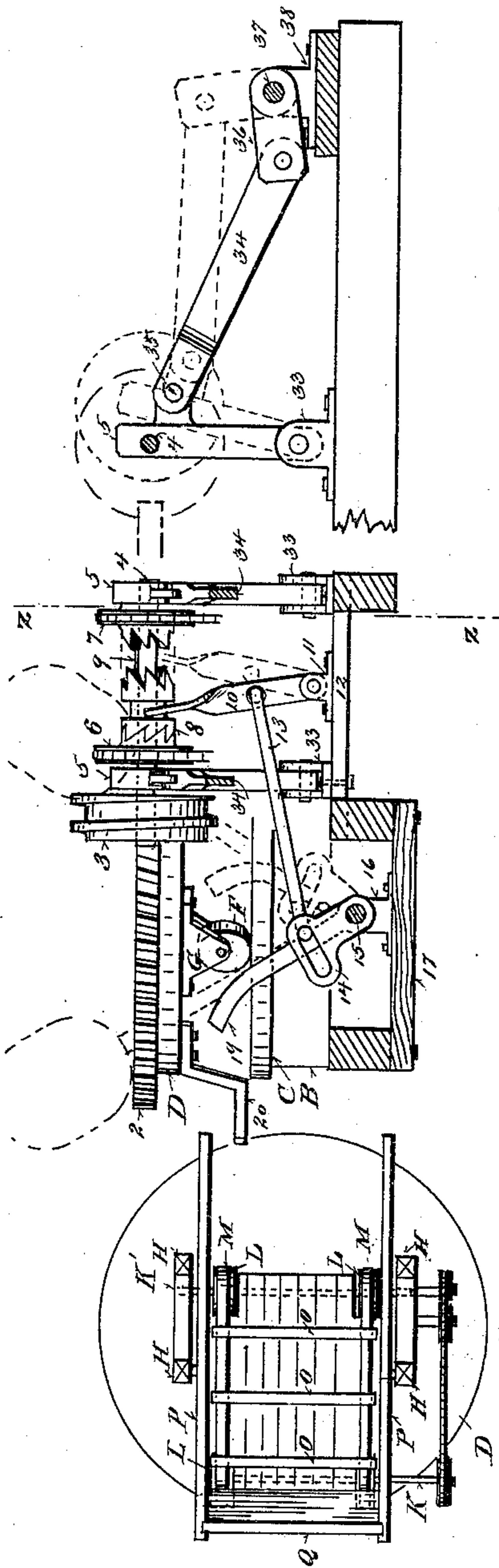


Fig. 6.

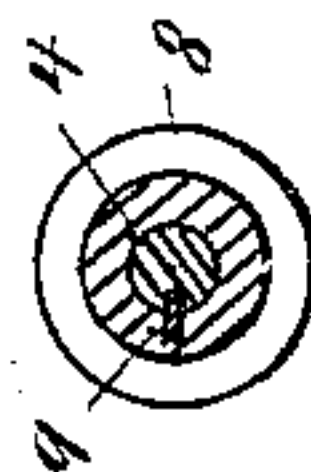


Fig. 9.

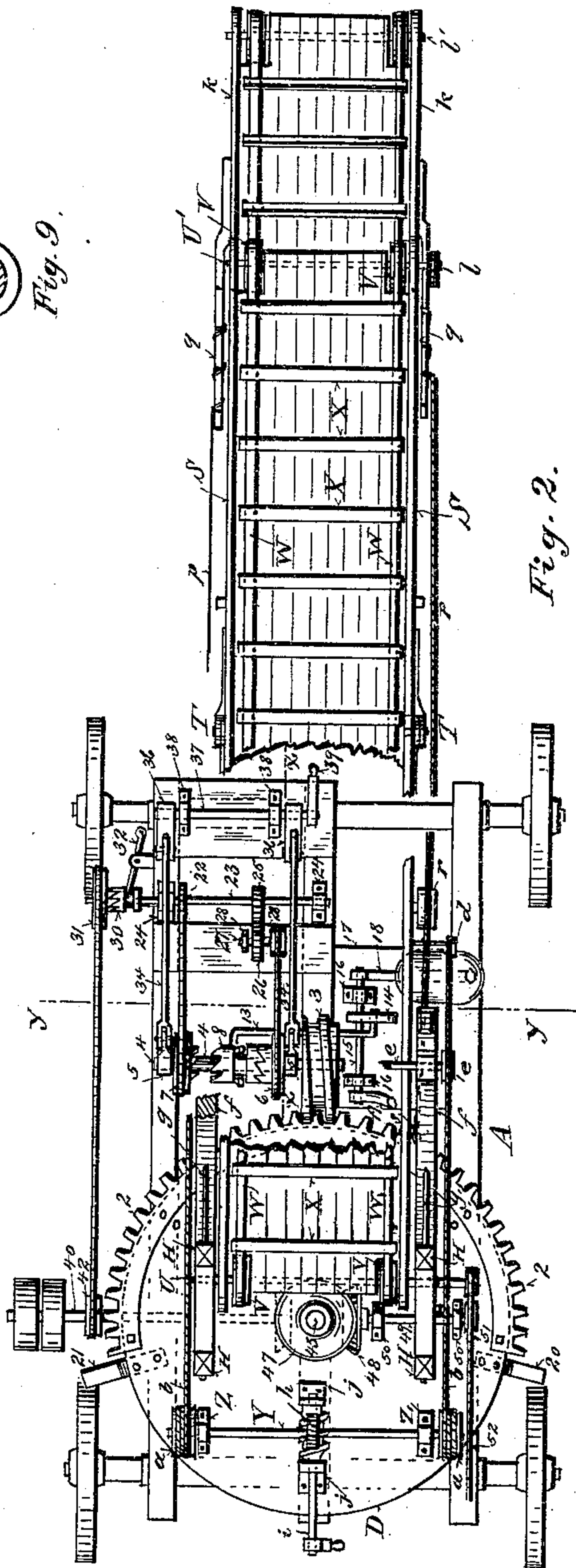


Fig. 2.

WITNESSES  
H. M. Plaisted.  
Warren Hill.

INVENTOR  
Joshua M. Smith,  
By H. A. Pauline,  
his Attorney.

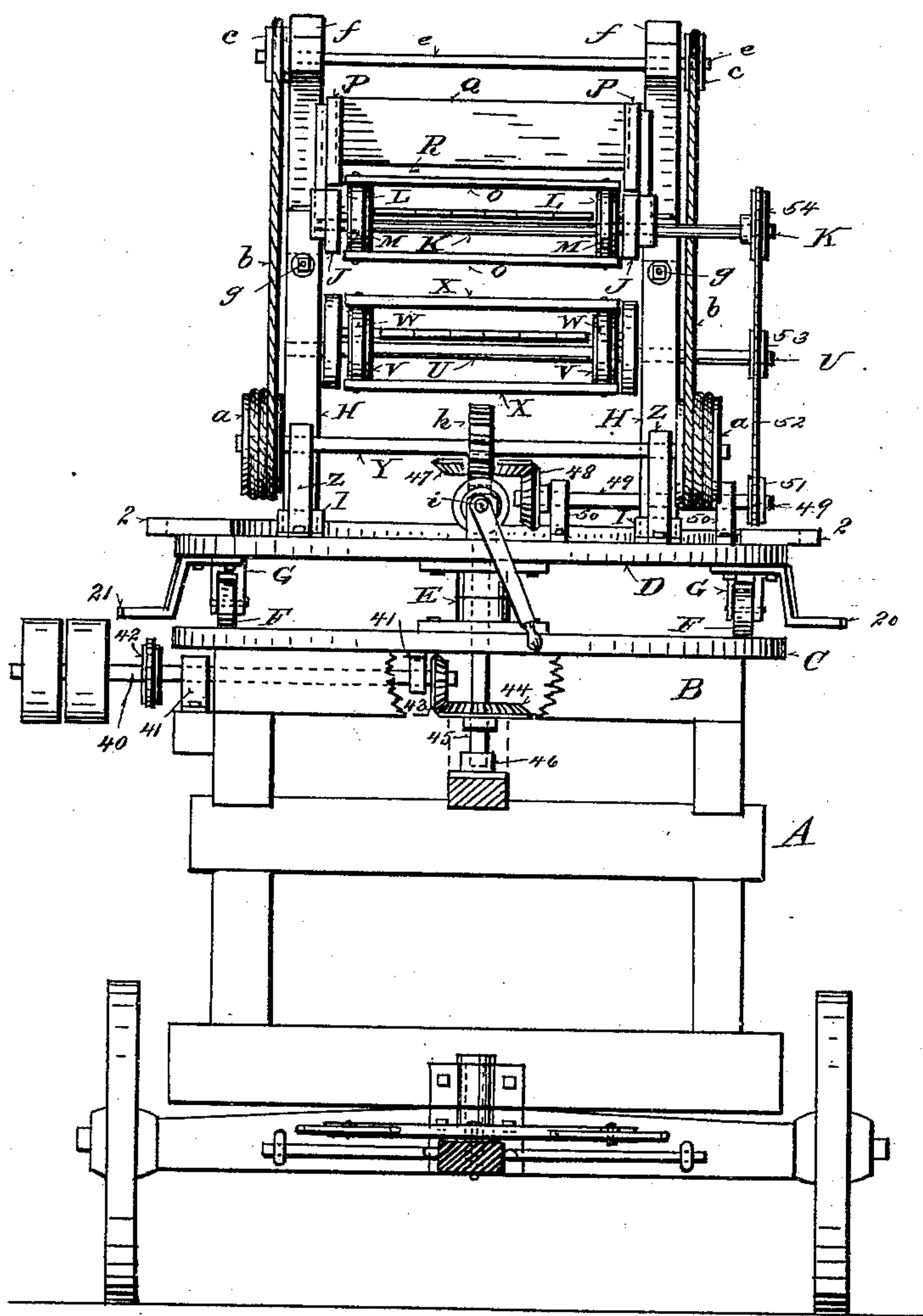
(No Model.)

3 Sheets—Sheet 3.

J. M. SMITH.  
STRAW STACKER.

No. 446,955.

Patented Feb. 24, 1891.



*Fig. 3.*

*WITNESSES*

H. M. Plaisted.  
Warren Hull

*INVENTOR*

Joshua M. Smith,  
By H. A. Paulmier  
his Attorney.



# UNITED STATES PATENT OFFICE.

JOSHUA M. SMITH, OF SPRINGFIELD, ASSIGNOR OF ONE-HALF TO CHARLES F. WOLF, OF MOOREFIELD, OHIO.

## STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 446,955, dated February 24, 1891.

Application filed March 18, 1890. Serial No. 344,439. (No model.)

*To all whom it may concern:*

Be it known that I, JOSHUA M. SMITH, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Straw-Stackers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in straw-stackers. These improvements have reference to a receiving-hopper having a traveling bottom to deliver the straw into the carrier; have reference to an adjustable swinging mechanism, whereby the master-wheel and the mechanism carried thereby is automatically swung from side to side, or the swinging mechanism is disengaged from the master-wheel, so that the master-wheel may be swung by hand or may be locked in any desired position; have reference to an arrangement for driving the belts forming the bottom of the carrier, the hopper, and an extension attachment to the carrier; have reference to an extension attachment to the carrier, by means of which the straw is delivered in substantially a vertical line as the stack is built up, and have reference to other details of construction hereinafter more fully brought out in the specification and the claims.

In the accompanying drawings, forming a part of this specification, and on which like reference letters and figures indicate corresponding parts, Figure 1 represents a side view of my improved stacker, having portions broken away to show the swinging mechanism. Fig. 2 is a plan view of the same with the hopper removed and portions of the carrier-bottom broken away. Fig. 3 is an end view of the machine showing the driving mechanism. Fig. 4 is a plan view of the hopper. Fig. 5 is a section on the line *y y* of Fig. 2, showing the swinging mechanism and a portion of the master-wheel and annular track. Fig. 6 is a section on the line *z z* of Fig. 5, showing a pivoted standard and the method of adjusting it to and from the master-wheel, indicated in dotted lines. Fig. 7 is a sectional view on the line *x x* of Fig. 2. Fig. 8 is a side view of the elevating devices of the carrier-frame, and

Fig. 9 a transverse section of the double-faced clutch.

The letter A designates a stout rectangular frame, suitably braced and mounted on wheels in the usual or any convenient manner. Transverse sleepers B, fastened to this frame, carry an annular track C. A master-wheel D, provided with center bearings E, is mounted to revolve above this track, and is steadied thereon by rollers F, carried by the brackets G, secured to the said master-wheel and bearing on the said annular track C. This master-wheel is adapted to be swung from side to side, as hereinafter described; but I will first describe the mechanism carried by the said wheel.

Standards H, fastened in the sockets I, attached to the master-wheel, carry the hopper and the carrier frame. The hopper-frame is composed of side pieces J, conveniently secured to said standards and having near the ends shafts K K', carrying drums L, on which are mounted belts M, connected together by the slats O. The shaft K preferably has a sprocket-wheel mounted thereon, by which motion is given to the belts and slats forming the traveling bottom of the said hopper, by means to be hereinafter described. The side pieces P of the hopper are connected by an end piece Q, having a portion of the bottom edge cut away, as shown at R in Fig. 3, to form a slot through which the belts and slats travel, and thus carry the straw that is supplied to the hopper forward into the carrier proper. These side pieces are removable, as indicated, by the stakes fitting into the brackets on the side pieces J. By this arrangement of the traveling bottom there is no danger of the straw collecting in the hopper, as it is fed forward as fast as it is received and delivered over the edge of the hopper upon the carrier proper, which will now be described.

The carrier proper consists of side pieces S, preferably formed in sections and hinged at T, so that it may be doubled up and rest upon itself, thereby taking up less space in transportation and housing. The hinge may have projections or lugs, as shown at T', through which a pin is inserted in order to render the carrier-frame stiff and rigid. Near



the ends of the side pieces S are mounted shafts U and U', carrying drums V, on which are mounted belts W, connected by slats X in a similar manner to the traveling bottom of the hopper, afore described. The shaft U passes through bearings carried by the standards II, and the whole carrier turns on this shaft as on a pivot, and is elevated by means of the hoisting mechanism now to be described. This hoisting or elevating mechanism consists of a shaft Y, carried by the brackets Z, secured to the master-wheel, as shown in Fig. 2, and having on the ends thereof drums a, on which are mounted ropes b, which extend over the pulleys c and down to the pins d, fastened in the carrier-frame. The pulleys c are mounted on a shaft e, which is carried by an inclined standard f on each side, fitting into a socket or otherwise secured to the master-wheel at one end and stayed in its inclined position by the rod g, that connects it to the said standards II, that carry the hopper and carrier-frame. This standard f is inclined, as shown in Fig. 1, in order that it may not interfere with supplying the hopper with straw over the sides thereof, as it would if it were placed near the said sides; also because of the elevated position of the rope running over the pulleys c a greater purchase is secured upon the carrier-frame when it is desired to elevate it as the stack increases in height. The rope is wound upon said drums a by means of a spur-wheel h, mounted on the said shaft Y and driven by means of a worm carried by a crank-shaft i, revolving in the brackets j, fastened to the said master-wheel. By revolving this crank-shaft i the worm and spur cause the shaft Y, having the drums mounted thereon, to turn and wind up the rope b and exert an elevating action by means of the ropes b from their elevated position over the pulleys c. Because of the above-described arrangement of the elevating mechanism the carrier-frame is easily raised from any position, and yet the hoisting mechanism in no way interferes with supplying the hopper over the sides thereof.

I will now describe the extension attachment to the carrier. This attachment consists of sides k, having shafts l and l', mounted in bearings near the ends thereof and having drums, belts, and slats carried thereby similarly to the hopper bottom, afore described. One shaft l extends through brackets m, preferably secured to the outer end of the carrier-frame, and has a sprocket-wheel o, mounted on one end of said shaft, by means of which motion is transmitted to the drums and belts carried thereby. The shaft U' in the outer end of the carrier-frame has a sprocket on its outer end, and by means of a sprocket-chain connecting with said sprocket on the shaft l gives motion to the belts in the extensible attachment, causing them to move in the same direction as those in the carrier-frame. In the place of sprocket-wheels I may use pulleys or intergears between the two shafts.

The attachment is thus pivoted about its shaft l, so that any movement about the axis of said shaft as a center will not vary the distance between the shafts U' and l. This movement is preferably effected automatically by means of ropes p, each attached at one end to the arms q, securely fastened to said attachment by screws or otherwise, as shown in Fig. 1, and at the other end to a staple s, at a point eccentric to the pivotal shaft U, or to other fixed portion of the mechanism carried by the said master-wheel. These ropes preferably extend over the drums r, mounted on the sides of the said carrier-frame, and their action on the said attachment so as to automatically extend it will now be described. If the said ropes were secured to the shaft U itself, the angle of the attachment to the carrier-frame would be the same whatever its elevated position, because the shaft U is the pivot or axis about which the carrier-frame and its attachment would then unchangeably revolve, and in that case the attachment would assume the position along the line t indicated in dotted lines in Fig. 1. Because, however, of this eccentrically-fastened arrangement of the ropes and the arms of the extension attachment the ropes will act on the arms to elevate the outer end of the attachment automatically as the carrier-frame is raised by means of its hoisting mechanism, and by elevating the outer end of the said attachment it is extended so as to compensate for the receding action of the carrier-frame as it rises in the arc u about the shaft U as a center. Thus, the horizontal distance v from its end in an elevated position to the perpendicular through its end when in a lowered position is compensated for by the extensible attachment, which is indicated by dotted lines in an elevated position at t', its delivery end being substantially over and in the same vertical plane that it occupies when in its lowered position. In other words, the outer end of the carrier-frame rises in the arc u, while the outer end of the extensible attachment rises in the perpendicular plane u', and this it does automatically by means of the ropes attached to the staples s and arms q and passing over the rollers r. This extension may be effected by hand instead of automatically, if so desired. By this peculiar and important arrangement the straw is delivered in the same vertical plane instead of being delivered nearer and nearer to the stacker as the carrier-frame rises, as would be the result if no such extensible attachment were provided. The stack is thus built up perpendicularly when the stacker is used as a stationary stacker, and is built up in the same vertical plane when the stacker is used in its swinging form.

The mechanism for swinging the master-wheel and its supported mechanism will now be described. Attached to or formed integrally with the said master-wheel is a rack-



plate 2, extending around conveniently one-half of its circumference similar to a spur-gear. Engaging with the teeth of said rack-plate is a worm 3, mounted on a shaft 4, which is carried by the pivoted standards 5 and in the upper ends of the same, and has sprocket-wheels 6 and 7, loosely mounted on the said shaft. A double-faced clutch 8 is slidingly mounted on the said shaft, but is connected therewith by a spline or feather-key 9, as shown in Fig. 9, so as to revolve with the shaft and yet slide on it and engage by means of its double faces with the corresponding clutch devices formed on the insides of the said sprocket-wheels 6 and 7 when actuated by the tripping mechanism, and thus cause the shaft to revolve in the same way with the clutched wheel. This sliding motion on the shaft is caused by engaging the yoke-lever 10, which fits about said clutch 8 in an annular groove therein, and is pivoted in a bracket 11, secured to a cross-piece 12 on the said stacker-frame. A connecting-rod 13 connects said yoke with the tripping mechanism consisting of a slotted crank 14, mounted on a shaft 15, carried by the bracket 16, secured to a cross-piece 17 on the said frame. A weighted arm 18, attached to one end of said shaft 15, assists in preserving the engagement of the clutch 8 with either of the sprocket-wheels 6 or 7, according to its adjusted position to one side or the other of the shaft 15, as indicated by the dotted lines in Fig. 5. On the other end of the shaft 15 is mounted a preferably curved arm 19, which occupies a position near the edge of said master-wheel, so as to be engaged by the strikers 20 and 21, which are removably secured to the master-wheel by means of bolts or otherwise, as shown in Figs. 2 and 5. For instance, the striker 20 will act on the curved arm 19 and throw it into its dotted position, as shown in Fig. 5, thereby turning the shaft 15, to which the slotted arm 14 is attached, and also a weighted arm 18, whereby the connecting-rod 13 will act on the pivoted yoke 10 to cause the double-faced clutch 8 to lose its engagement with the sprocket 6 and engage with the sprocket 7, and cause said shaft to revolve in the direction of the said latter sprocket-wheel by means now to be described. The use of the slot in the slotted arm is to enable the weighted arm 18 to move farther than the clutch 8, and it allows the weight to act more effectively thereon. The sprocket 7 is connected by a sprocket-chain to a sprocket 22, mounted on a shaft 23, carried by brackets 24, secured to the stacker-frame. Motion is given to this shaft by means hereinafter to be described, and forms the driving mechanism for the said sprocket-wheels. A spur-wheel 25 is also carried by said shaft 23 and gears with another spur-wheel 26, mounted on a shaft 27, carried by the brackets 28, secured to a cross-piece on said stacker-frame. A sprocket-wheel 29 is also carried by the shaft 27, and is connected by a sprocket-chain with

the sprocket-wheel 6 on the said shaft 4. By means of these spur-wheels 25 and 26 the motion of the sprocket-wheel 6 is reversed to that of the wheel 7, so that by engaging with one or the other of these sprocket-wheels 6 or 7 the shaft 4 is caused to revolve in one or the other direction, and thus the master-wheel is swung to one side or the other by means of said worm 3 engaging therewith.

I will now describe how the said shaft 23 is driven. A clutch 30 is slidingly mounted on said shaft in a similar manner to the double-faced clutch 8, so that it can slide axially on the shaft, but must revolve in the same direction as the shaft. On the outer end of the shaft 23 is preferably mounted a sprocket-wheel 31, having a clutch-face that matches with the clutch 30. This sprocket revolves loosely on the shaft unless engaged by the clutch, which engagement is conveniently produced by means of a lever 32, pivoted on a bracket secured to said stacker-frame and engaging at one end with the clutch 30 to cause it to slide longitudinally on the shaft. Thus when the clutch and sprocket 30 and 31 are in engagement the shaft 23 revolves and the sprockets 6 and 7 are driven in the opposite direction, one of them (either 6 or 7) being engaged by the double-faced clutch 8 to swing the master-wheel and its superincumbent mechanism. When sprocket-wheel 31 is not engaged by the clutch 30, it revolves loosely on the shaft 23 without turning it, and the swinging mechanism will remain inoperative. It may be desired, however, to swing the stacker by hand, and on this account the swinging mechanism is made adjustable to and from the master-wheel, as will now be described. The pivoted standards 5, before referred to as carrying the shaft 4, are secured at their lower ends in the brackets 33 on the stacker-frame and braced in their substantially perpendicular position by means of links 34, which are pivoted at one end to the standard by the pin 35 and at the other end to a crank 36, carried by a shaft 37, mounted in the brackets 38, secured to a cross-piece on the stacker-frame. A crank-arm 39 is preferably secured at one end of said shaft 37, by means of which the shaft is turned into the dotted position shown in Fig. 6, whereby the standards 5 cause the worm 3 to be drawn out of engagement with the annular rack on the said master-wheel. The master-wheel may now be swung by hand or left in any desired position. If it is desired to lock it in any position, the worm 3 is thrown into engagement with the toothed master-wheel, and the carrier will discharge in one position. Thus it will be observed that the swinging mechanism can be made to swing the carrier-frame automatically; or by the simple action of the lever 32 the whole swinging mechanism may be disengaged from the driving-sprocket 31, and the master-wheel will remain at rest. The worm 3 may be thrown out of engagement



with the master-wheel by revolving the crank-shaft 37, so that the stacker may be swung by hand; or the master-wheel may be locked in any desired position by throwing the worm 5 into engagement therewith, while the clutch 30 is out of engagement with its driving-sprocket 31.

The means for driving the latter sprocket will now be described. A shaft 40 is mounted 10 in brackets 41, conveniently secured to said master-wheel and stacker-frame, respectively, and carries a sprocket-wheel 42, which gives motion by a sprocket-chain to the driving-sprocket 31 of the swinging mechanism. A 15 fast and a loose pulley are preferably mounted on the outer end of the said shaft 40, and are belted to the thrashing-machine with which the stacker is used, or to any other convenient source of power, whereby motion is given to 20 the driving-shaft 40. Near the end of this shaft is mounted a bevel-pinion 43, engaging with a bevel-gear 44, mounted on an upright shaft 45, passing through the said center bearings E and forming the king-bolt for the 25 same, and supported at its lower end in a step 46, secured to the stacker-frame. By this means the shaft 45 is caused to revolve, and by a bevel-gear 47, mounted near the upper end of the said shaft, it transmits its motion 30 through a bevel-pinion 48 to a horizontal shaft 49, turning in the brackets 50, secured to said master-wheel. A sprocket-wheel 51 is preferably mounted on the outer end of the said shaft 49 and drives a sprocket-chain 52, which 35 passes over the sprocket-wheels 53 and 54, preferably mounted on the shafts U and K, respectively, whereby motion is given to the belts and slats forming the traveling bottom of the hopper and the carrier, respectively.

40 The manner by which the belts are driven in the extension attachment has already been described, and thus it will be seen that by this system of sprocket wheels, chains, and connecting-belts the whole carrier mechanism is driven in the same direction, also that 45 no adjustment of the carrier-frame affects the uniform action of the carrier sprocket-chains, or the sprocket-wheels giving motion thereto. It will also be observed that the swinging 50 mechanism may be thrown out of action without affecting the action of the carrier, so that it may be used as a stationary carrier or a swinging carrier, and may be locked in any adjusted position.

55 For the purpose of keeping the straw upon the carrier, especially when in an elevated position, removable stakes, preferably having canvas secured thereto, carried in brackets in the carrier-frame S and the extension at- 60 tachment are provided. These sides may be taken off when it is desired to fold up the carrier-frame, and yet they can be quickly adjusted when desired for use.

It will be observed that the belted and geared 65 connections of the swinging mechanism and driving mechanism of the stacker are speeded down, causing a slower action of the driven

parts, and therefore requiring less power to do the driving. This causes the mechanism to run smoothly and easily with a small ex- 70 penditure of power.

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

1. The combination, with a toothed master-wheel in a straw-stacker, of swinging mechanism consisting of a shaft adjustably mounted near said master-wheel, means to adjust it to and from the same, a worm carried by said shaft and adapted to engage said wheel, 80 sprockets loosely and revolubly mounted on said shaft and having clutch-teeth on their opposing faces, a double-face clutch slid- 85 ingly mounted on said shaft so as to revolve therewith, situated between the said sprocket- 85 wheels and adapted to engage with each alternately, and means to effect said alternate engagement, a driving-shaft, and intermediate mechanism between it and said sprocket- 90 wheels adapted to revolve one of them in one direction and the other in the opposite direc- 90 tion.

2. In the swinging mechanism of a straw-stacker, the combination, with a master-wheel and standards pivoted at their lower ends so 95 that their upper ends may be moved to and from the master-wheel, means to cause said movement, a shaft mounted in said upper ends, and a worm mounted on said shaft and adapted to engage said master-wheel, of a 100 pair of sprocket-wheels loosely mounted on said shaft and adapted to turn in opposite directions, a clutch to engage said sprocket- 105 wheels alternately, driving means to actuate said wheels, and tripping mechanism to cause said engagement of the clutch and sprocket- 105 wheels.

3. In a straw-stacker, the combination, with a toothed master-wheel, of pivoted adjustable standards, driving mechanism carried by said 110 standards, a crank-shaft adjacent to said standards, and links for connecting said standards to the said crank-shaft to effect said adjustment.

4. In a straw-stacker, the combination, with 115 the carrier-frame proper, of an extension attachment consisting, essentially, of a section of the said frame proper, a carrier for said frame proper, and a carrier for the said ex- 120 tension attachment, intergeared one with the other, and an adjustable connection having a fixed length extending from said attachment to a relatively fixed part of the machine at a point eccentric to the foot of the carrier-frame 125 proper, adapted to simultaneously and auto- 125 matically operate said attachment, whereby the straw may be delivered from the end of said attachment in a substantially vertical plane whatever the elevation of the carrier-frame proper. 130

5. In a straw-stacker, the combination, with a carrier-frame proper, of an extension at- 130 tachment pivoted near the outer end of said carrier-frame and consisting, essentially, of a



section of the carrier-frame, an arm secured to the inner end of said attachment, and a rope of a fixed length fastened to said arm and to a stationary part at a point eccentric to the pivot of the carrier-frame proper, whereby the said attachment may be automatically extended when the carrier-frame is elevated.

6. In a straw-stacker, the combination, with a master-wheel, an intergearing worm and its shaft, loose sprocket-wheels having opposing clutch-faces and a double-faced sliding clutch on the said shaft, a pivoted yoke, a rock-shaft having a weight and an operating-arm adapted to be engaged by a projection on the master-wheel, and a rod connecting the pivoted yoke to the shaft through a sliding connection, whereby the weight in moving from one posi-

tion to the other may not at first affect said yoke, but will actuate it suddenly at the completion of its movement.

7. In a straw-stacker, the combination, with a toothed master-wheel, of swinging mechanism consisting of a shaft adjustable at both ends to and from the said master-wheel, pivoted brackets for said shaft to so adjust it, a worm on said shaft adapted to mesh with said master-wheel, driving mechanism therefor, and a clutch to connect and disconnect said worm and its driving mechanism.

In testimony whereof I affix my signature in presence of two witnesses.

JOSHUA M. SMITH.

Witnesses:

H. E. SMITH,  
WARREN HULL.