No. 630,279. Patented Aug. 1, 1899.

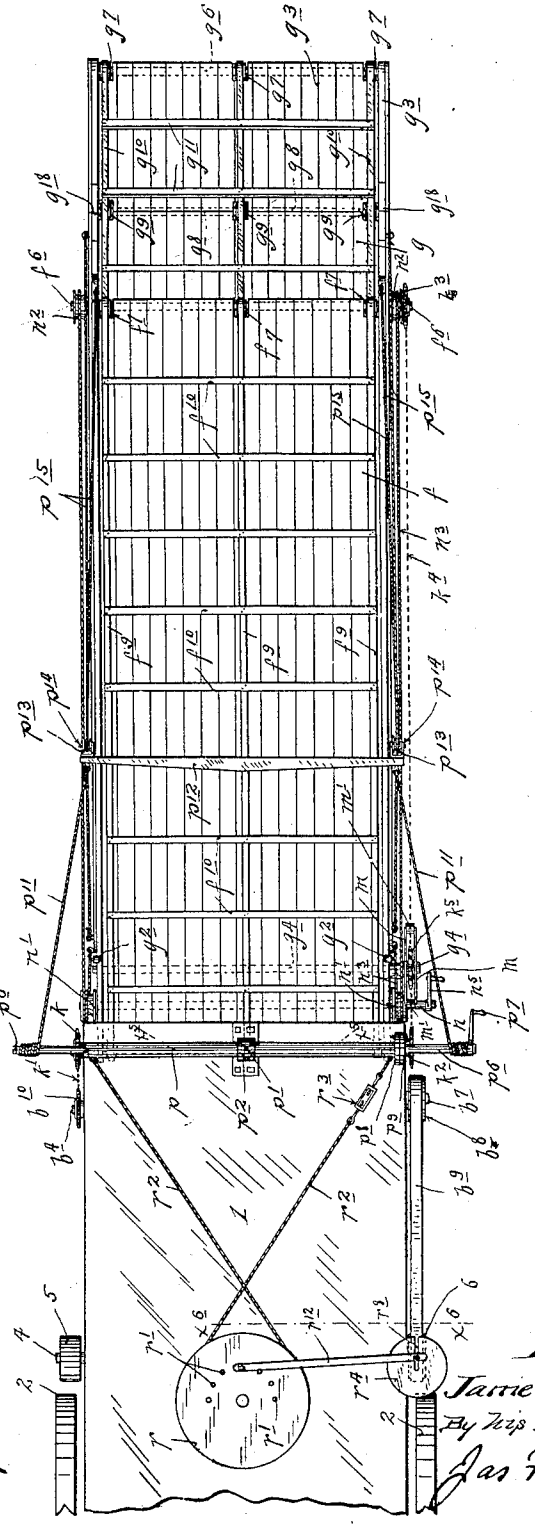
J. N. WILSON.

STRAW STACKER.

(Application filed Feb. 21, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses,
Harry Kilgore
F. D. Merchant.

Inventor.
James N. Wilson.
By his Attorney,
Jas F. Williamson

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(No Model.) 4 Sheets—Sheet 2.

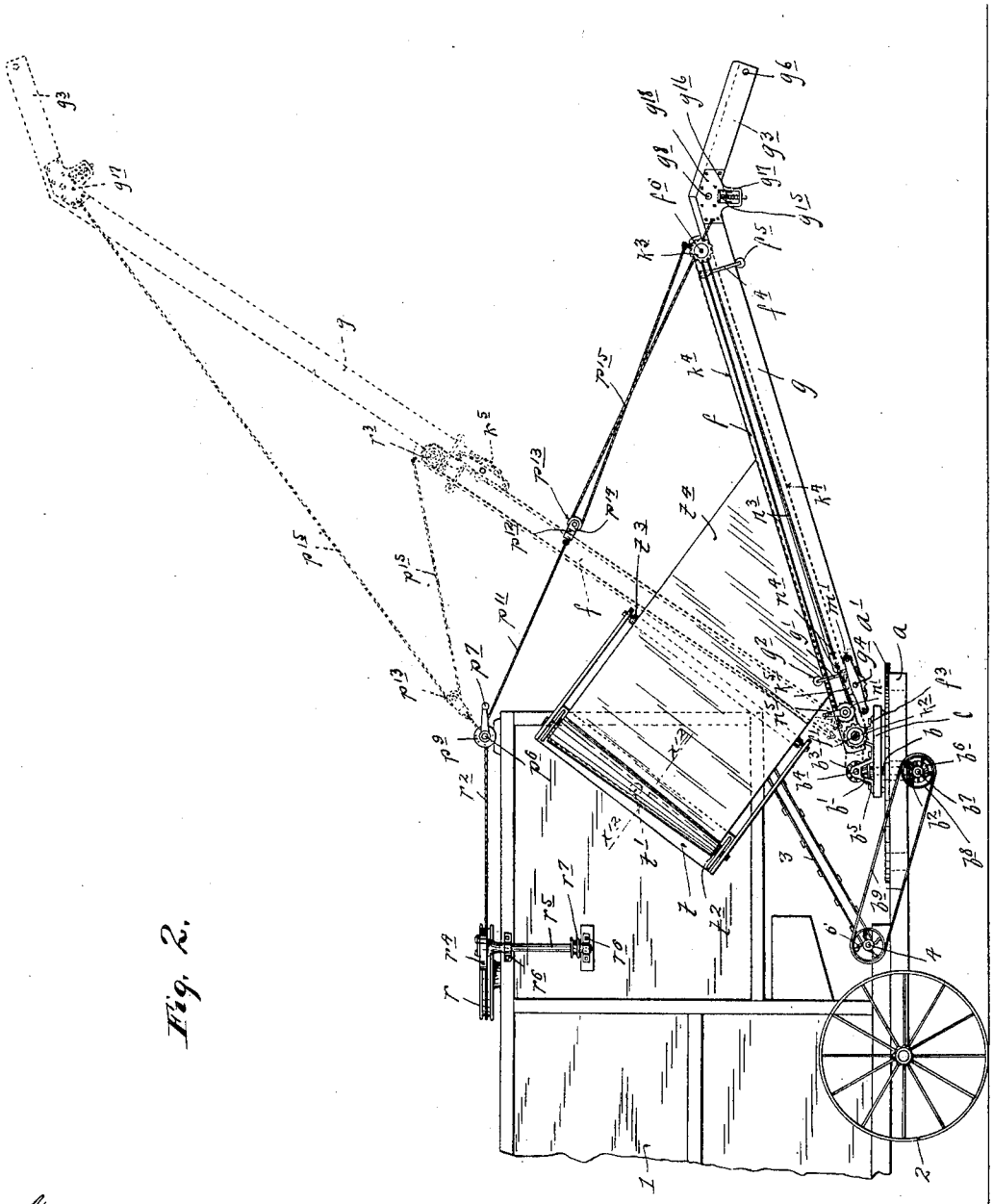

Fig. 2.

Witnesses,
Harry Kilgore
Frank D. Merchant

Inventor
James N. Wilson,
By his Attorney,
Jas F. Williamson

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4 Sheets—Sheet 3.

Fig. 3.

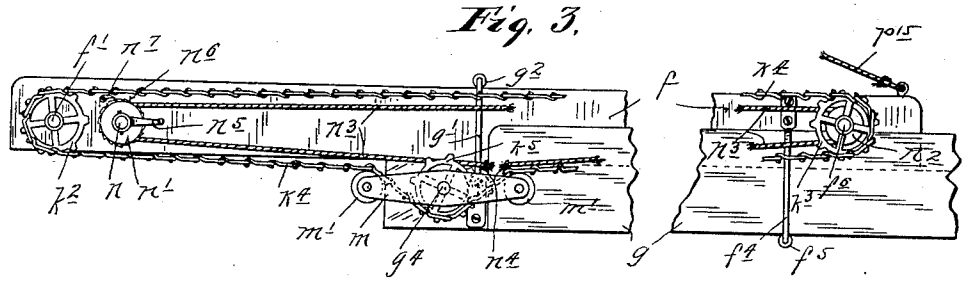


Fig. 4.

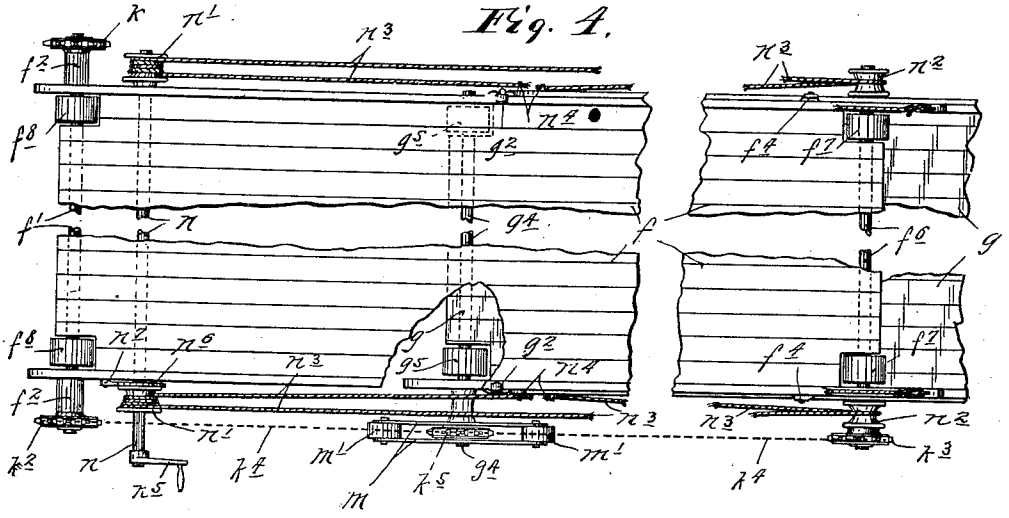


Fig. 7.

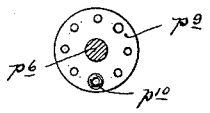


Fig. 5

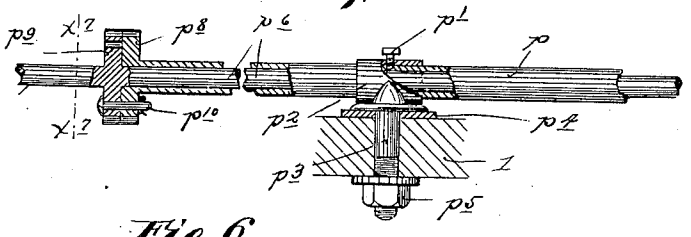
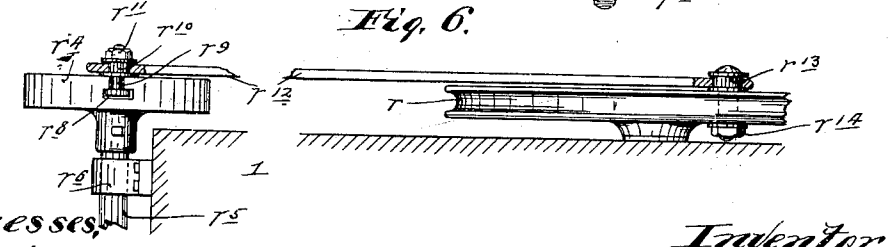


Fig. 6.



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James N. Wilson.
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Jas. F. Williamson

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(No Model.) 4 Sheets—Sheet 4.

Fig. 8.

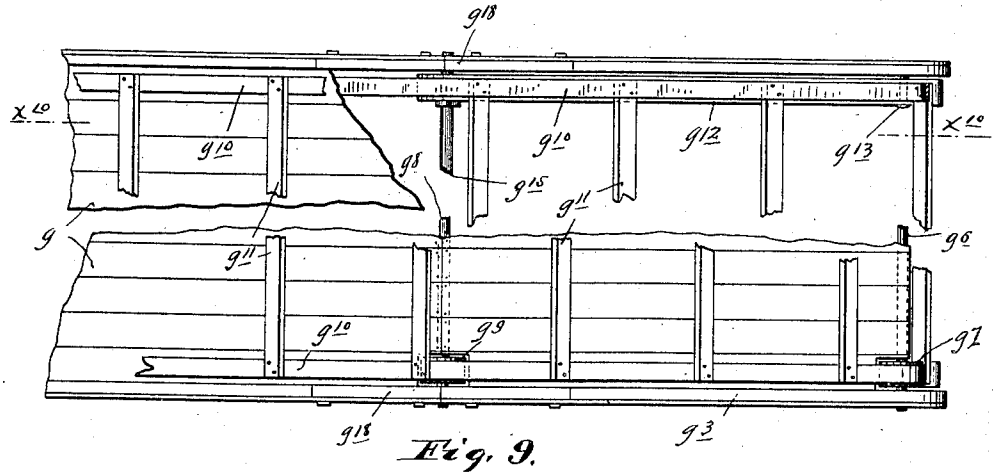


Fig. 9.

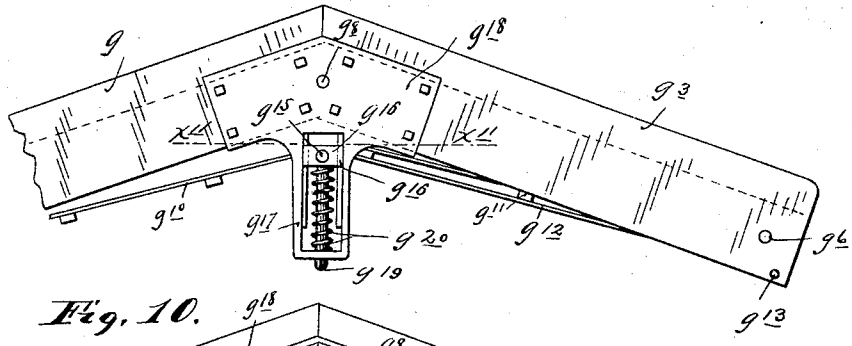


Fig. 10.

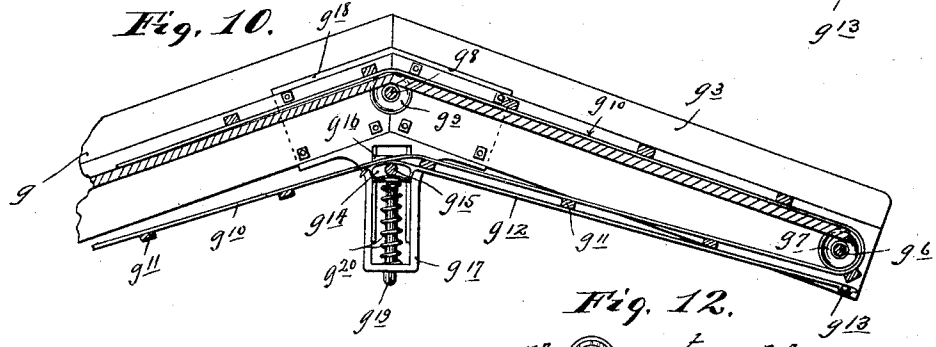


Fig. 12.

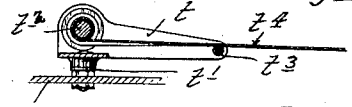
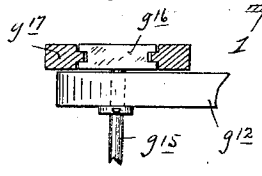


Fig. 11.



Witnesses.

Harry Kilgore.

F. D. Merchant.

Inventor.

James N. Wilson.

By his Attorney.

Jas F. Williams

UNITED STATES PATENT OFFICE.

JAMES N. WILSON, OF PIPESTONE, MINNESOTA, ASSIGNOR OF ONE-HALF TO O. H. LEONARD, OF SAME PLACE.

STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 630,279, dated August 1, 1899.

Application filed February 21, 1899. Serial No. 706,321. (No model.)

To all whom it may concern:

Be it known that I, JAMES N. WILSON, a citizen of the United States, residing at Pipestone, in the county of Pipestone and State of Minnesota, 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 straw-stackers for coöperation with threshing-machines, and has for its object to improve the same in the several particulars hereinafter noted, whereby the device is rendered more efficient, more durable, more easily operated, and of smaller cost.

To these ends my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention in its preferred form, shown as applied in working position to a threshing-machine, is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a plan view showing my improved stacker and a portion of a threshing-machine to which it is attached. Fig. 2 is a side elevation of the parts shown in Fig. 1, one position of the stacker being indicated by dotted lines. Fig. 3 is a detail view, in side elevation, with some parts broken away, showing the lower portion of the stacker. Fig. 4 is a plan view of the parts shown in Fig. 3, with some parts broken away. Fig. 5 is a transverse vertical section taken on the line x^5 x^5 of Fig. 1, some parts being shown in full and others broken away. Fig. 6 is a transverse section taken approximately on the line x^6 x^6 of Fig. 1, some parts being broken away. Fig. 7 is a vertical section taken on the line x^7 x^7 of Fig. 5. Fig. 8 is a plan view of the upper portion of the stacker with some parts broken away. Fig. 9 is a side elevation of the parts shown in Fig. 8. Fig. 10 is a vertical section taken approximately on the line x^{10} x^{10} of Fig. 8. Fig. 11 is a horizontal section taken on the line x^{11} x^{11} of Fig. 9, and Fig. 12 is a detail in transverse section taken on the line x^{12} x^{12} of Fig. 2.

Of the parts of the threshing-machine it is sufficient for the purposes of this case to note the framework or case 1 of the machine, the rear wheels 2, and the endless straw-discharging conveyer at the rear end of the machine. In this illustration the endless conveyer 3 is driven from a shaft 4, having pulleys 5 and 6 at its projecting ends, and it may be assumed that motion is imparted to the said shaft 4 by a power-driven belt, (not shown,) which runs over the said pulley 5 and is itself driven from other parts of the machine.

To support the lower end of the stacker, a supplemental frame or bracket a is detachably secured to the lower portion of the framework 1, being, as shown, projected rearward below the endless conveyer 3. On this supplemental frame a is a suitable bearing plate or segment a', at the center of which is a short vertical shaft b. Mounted for pivotal movement in a horizontal plane on the bearing-segment a' and around the shaft b as a pivot is a bracket c. The vertical shaft b has a pinion b' at its upper end and a pinion b^2 at its lower end. The pinion b' engages with a pinion b^3 on a transverse shaft b^4, mounted in brackets b^5 on the oscillating bracket c. The lower pinion b^2 engages a pinion b^6 on a transverse shaft b^7, mounted in suitable bearings secured to the bottom of the supplemental frame a. The shaft b^7 is provided at one end with a pulley b^8, over which and the pulley 6 on the shaft 4 a belt b^9 runs. At one end the shaft b^4 is provided with a sprocket-wheel b^{10}. The driving connections just described are best shown in Figs 1 and 2. They are the ordinary driving connections usually employed for imparting motions to the stacker-carriers while permitting the stacker to vibrate.

The stacker proper is made up of two sections f and g, which sections are mounted for an extensible sliding movement one upon the other. The stacker-section f is carried by the oscillating bracket c and is mounted for a vertical pivotal movement with respect thereto around a transverse shaft f', being provided with trunnions f^2, that form bearings for said shaft and are themselves mounted in bearing-brackets f^3 on the oscillating bracket c. The extensible stacker-section g is provided with

keeper-arms g', having rollers g^2, that engage the upper side edges of the pivoted stacker-section f, and likewise said stacker-section f has keeper-arms f^4, provided with guide-rollers f^5, that engage the under side edges of said stacker-section g. In this manner the stacker-sections f and g are held together and guided throughout their telescopic or extensible movements.

Suitably mounted at the upper or free end of the stacker-section f is a transversely-extended shaft f^6, which is provided with roller-sections f^7, over which and similar roller-sections f^8 on the lower shaft f' an endless slat-and-strap conveyer f^9 f^{10} is mounted to run.

The extensible stacker-section g is provided at its free end with a downwardly bent or turned discharge-section g^3. At its lower end the stacker-section g is provided with a transversely-extended shaft g^4, having roller-sections g^5. At the outer end of its section g^3 it is provided with a similar shaft g^6, provided with roller-sections g^7, and at the junction of said section g^3 with the main section g there is mounted another and similar shaft g^8, having roller-sections g^9. A slat-and-strap conveyer g^{10} and g^{11} runs over the roller-sections g^5, g^7, and g^9, respectively, of the shafts g^4, g^6, and g^8. The under or returning portion of the endless conveyer g^{10} g^{11} runs some little distance below the roller-sections g^9 and is supported as far back as the point of connection between the sections g and g^3 by means of a pair of spring-pressed skids or track-sections g^{12}, which sections are pivoted at their outer ends, as shown at g^{13}, and extend in line with the outer straps g^{10} of the said conveyer. At their free ends the skids or track-sections g^{12} are shown as provided with segmental slots g^{14}, through which a transversely-extended rod g^{15} projects. This rod g^{15} is secured to vertically-movable blocks g^{16}, that work in depending brackets g^{17}, which, as shown, are cast integral with joint-plates g^{18}, that serve to unite the stacker-sections g and g^3. The blocks or heads g^{16} are provided with depending stems g^{19}, on which coiled springs g^{20} are compressed to put the said blocks g^{14}, rod g^{15}, and the free ends of the skids or track-sections g^{12} under strain to move upward, thereby taking up the slack of the endless conveyer g^{10} g^{11} and guiding the return portion of the same for a movement corresponding approximately to the lines of the stacker-sections g and g^3.

The driving motions are imparted to the endless conveyers f^9 f^{10} and g^{10} g^{11} through the following driving connections: The shaft f' at the lower end of the stacker-section f is provided at one end with a sprocket k, over which and the sprocket b^{10}, heretofore noted as being located on the end of the shaft b^4, a short sprocket-chain k' runs to impart motion from the latter to the former-noted sprocket, and hence to the said shaft f'. At its opposite end the shaft f' is provided with a sprocket k^2, over which and a similar sprocket k^3 on the corresponding end of the shaft f^6 a long endless sprocket-chain k^4 runs. At the same side of the machine and in line with the sprockets k^2 and k^3 the shaft g^4 at the lower end of the extensible stacker-section g is provided with a sprocket k^5, under which the returning portion of the sprocket-chain k^4 runs, to impart rotary motion to said shaft g^4, and hence to the endless conveyer g^{10} g^{11}. To cause the said chain k^4 to properly engage the sprocket k^5 and to keep said chain k^4 under the same tension or with the same amount of slack regardless of the position of the stacker-section g with respect to the stacker-section f, I provide a chain-guide of novel construction and which will now be described. Pivotally mounted on the projecting end of the shaft g^4 is a pair of parallel supporting levers or plates m, which are positioned one on each side of the sprocket k^5. Between the adjacent ends of the levers or plates m rollers or wheels m' are pivotally mounted. Sprockets might of course be substituted for the wheels or rollers m'; but the wheels are preferred. These wheels or rollers run under the lower or return portion of the endless sprocket-chain k^4 and properly guide the said chain under the sprocket k^5, and when the extensible stacker-section g is moved these wheels or rollers m', as well as the said sprocket k^5, run along the under section of the said chain, but do not change their relation to the said chain except that they travel lengthwise thereof. They do not change the relation to the section of the chain which they engage, and hence do not take up, let out, or vary the slack of the said chain under the movements of the stacker-section g. Furthermore, the driving actions of the endless conveyers are not interfered with by the movements of the said stacker-section g. The arms or plates m being pivoted or free for a slight oscillatory movement permits the wheels or rollers m' to more easily adapt themselves to the irregularities of the driving-chain.

As a simple and efficient means for adjusting the extensible stacker-section g and holding the same where extended, I employ a transversely-extended windlass-shaft n, which is mounted in the lower portion of the stacker-section f and is provided with a pair of winding sheaves or drums n', over which and coöperating sheaves n^2, loose on the ends of the shaft f^6, a pair of cables or ropes n^3 are mounted to run. The ends of the cables n^3 are attached, as shown at n^4, to the sides and lower portion of the stacker-section g, and the said cables are preferably given several turns around the driving-sheaves n' to increase their friction therewith. The windlass-shaft n is provided with a hand-crank n^5, by means of which it may be turned, and one of the sheaves n' is provided with ratchet-teeth n^6, with which a retaining-pawl n^7, piv-

oted to one side of the stacker-section f, cooperates to hold the extensible stacker-section g in whatever position it may be set.

As one important feature of my invention I provide a flexible support or supporting connection, which is applied for an equalizing action to both of the stacker-sections and is so disposed that the act of moving outward or extending the stacker-section g will cause the stacker-sections or the stacker as an entirety to move pivotally on the trunnions f^2 and the outer or delivery end of the stacker-section g^3 to rise vertically on a true or approximately true vertical line. The preferred construction by which this is accomplished will now be described.

A sleeve or tube p is rigidly secured at its center, as shown, by means of a set-screw p' to a head p^2, which has a depending pintle or stem p^3, by means of which it is pivotally mounted in a plate p^4 and the top of the machine-case l, said stem being held in place by a nut p^5 or otherwise. Thus the sleeve p is mounted with freedom for vibratory movements in a horizontal plane, and it is important to here note that the pintle or stem p^3, which forms a pivot for the said sleeve, stands vertically in line with the short shaft b, which marks the pivotal center of the stacker base or bracket c. It is in view of this arrangement, as will later clearly appear, that the delivery end of the stacker is not moved vertically as the stacker is oscillated from side to side of the machine.

Extending through the oscillating sleeve p with its ends projecting is a windlass-shaft p^6, which is provided at one end with a hand-crank p^7, by means of which it may be turned. At one end the sleeve p is provided with a perforated disk p^8, and adjacent to this disk and rigidly secured on the shaft p^6 is another perforated disk p^9. A pin or bolt p^{10}, which is passed through coincident perforations of the said two perforated disks, serves to rigidly connect the said shaft p^6 against rotation and to the sleeve p. When the pin p^{10} is removed, the windlass-shaft p^6 may be moved to set the parts in proper adjustment. The plurality of perforations in the disk p^9 serve to permit the said parts to be secured in any desired adjustment for a purpose which will presently more clearly appear.

Ropes or flexible connections p^{11} are wound on the ends of the windlass-shaft p^6 and have their other ends connected to the ends of a floating bar p^{12}. The floating bar p^{12} is provided at its ends with guide-sheaves p^{13}, secured thereto by brackets p^{14}. Ropes or flexible connections p^{15} run over each of the guide-sheaves p^{13}, and each of these ropes p^{15} is attached at one end to the upper and side portion of the stacker-section g and at its other end to the upper side portion of the stacker-section f. In this manner the stacker is supported from the windlass-shaft p^6, and the supporting strain is equalized or distributed between the two sections f and g of the stacker. For example, by reference to Fig. 2 it will be seen that in both of the positions of the stacker illustrated in said view the stacker is supported from its extended end and again from its intermediate portion, the strains being distributed and equalized by the ropes or connections p^{15}, which work freely over the coöperating guide-sheaves p^{13}. This construction has an obvious importance, in that it leaves the telescoping or coöperating guide portions of the stacker-sections free or nearly free from strains, and as the one stacker-section is not called upon to support the other to any material extent, except by direct endwise resistance, the said stacker-sections may be made much lighter than with previous constructions. Furthermore, with the connection above described the disposition and arrangement of the parts are such that when the extensible stacker-section g is extended or moved outward by means of the windlass $n\,n'$ and endless cables n^3 the equalizing cables or ropes p^{15} will cause the stacker to rise at such relative speed that the discharge end of the stacker-section g^3 will be raised on or approximately on a vertical line, as illustrated in Fig. 2. Hence it will be seen that the ropes or equalizing-cables p^{15} perform the double function of properly distributing the strains and of producing the desired movement of the stacker. In building a stack of straw it is of course desirable that the discharge end of the stacker rise vertically, for if the discharge end of the stacker were to be moved forward as it is raised the straw would be dropped onto the ground instead of onto the partially-built stack.

As already indicated, the stacker may be moved vertically as an entirety and without change of positions of the stacker-sections with respect to each other by adjusting the windlass-shaft p^6 with respect to the oscillating sleeve p. By this means the possible zone of operation of the stacker in a vertical direction may be changed; but this is an action which is not often necessary.

It is of course very desirable in an automatic stacker to oscillate the stacker horizontally or from side to side of the machine, so as to spread the stack out over a considerable area of ground. In my present invention I provide an extremely simple and efficient means for producing this automatic movement of the stacker, and this means in its preferred form will now be described.

To the top of the machine-case l and to the front of the oscillating sleeve p is mounted a large sheave or oscillating disk r, which is preferably provided with a plurality of segmentally-positioned perforations or pin-seats r'. The cable or flexible connection r^2, which is attached at its ends to the opposite ends of the oscillating sleeve p, is wound around or run over the sheave r. Preferably the cable r^2 is provided at some suitable point with a take-up buckle or device r^3, by means of which the cable may be set for the proper frictional

engagement with the sheave or oscillating disk r. As is evident, the oscillation of the sheave or disk r will oscillate or vibrate the stacker from side to side of the machine. It may, however, be here stated that the weight of the stacker is such with respect to the force required to oscillate it that it will not be raised by the strains put upon the so-called "equalizing" cables or ropes p^{15} under the oscillating movements of the sheave r and connections therefrom.

To oscillate the sheave or disk r, I preferably employ a rotary crank disk or head r^4, which is carried by a vertical shaft r^5, mounted in suitable bearings r^6 on the machine-frame and suitably driven from moving parts of the thresher. As shown, the shaft r^5 is provided with a worm-gear r^7, with which a worm (not shown) would coöperate. The crank disk or head r^4 has a radial slot or pin-seat r^8, in which a headed crank-pin r^9 is mounted to slide. A crank-sleeve r^{10} is placed on the outer end of the crank-pin r^9, and a nut r^{11} on the screw-threaded end of said crank-pin serves to hold the said pin and sleeve in whatever radial adjustment they may be set. A pitman r^{12} is pivoted at one end on the crank-sleeve r^{10}, and at its other end it is pivoted on a sleeve r^{13}, which is secured to the sheave or disk r by means of a nutted bolt r^{14}, passed through one of the perforations or seats r'. With this construction when the crank disk or head r^4 and its shaft r^5 are rotated the disk or sheave r will be oscillated, and, as already indicated, this oscillation of the sheave r through the intermediate connections will cause the oscillation of the stacker.

The amount of oscillation which the stacker will be given from side to side of the machine may be varied by adjusting the crank-pin r^9 in the radial slot r^8 of the crank disk or head r^4.

Independent of the adjustment just described the zone of lateral oscillation of the stacker may be varied by moving the bolt or pin r^{14} into different members of the perforations or seats r' of the sheave or disk r. For example, by placing the said bolt r^{14} into one of the perforations r' farther toward the right the stacker will be oscillated through a zone of movement farther toward the left.

I desire here to further call attention to these facts. In stackers as hitherto constructed the stacker has usually been given its lateral oscillation by gears located in the vicinity of the pivot on which the stacker is oscillated. When the stackers have been used with a heavy wind blowing sidewise against them, it has been a very common thing for these gears to be broken by the intense strains put upon them from the pressure of the wind against the stacker. With my improved means for oscillating the stacker, which means in its preferred form has just been described, the cable r^2 is frictionally held with respect to the oscillating sheave or disk r. Hence while this fractional engagement is sufficient to oscillate the stacker under ordinary conditions it will rather than permit breakage of the parts yield and permit the cable or rope r^2 to slip on the said sheave r.

At the sides of the machine, to prevent blowing of the straw and to guide the same as it is delivered onto the stacker, I provide curtains or wind-screens of novel construction, the preferred arrangement of which is illustrated in the drawings on Figs. 2 and 12. In the construction illustrated each of these devices comprises a frame t, pivoted to the adjacent side of the machine-case l at t' and provided each with a pair of rollers t^2 and t^3. The roller t^3 is an idle guide-roller, while the roller t^2 is a winding-roller and is under spring tension to wind up the coöperating curtain t^4, which is secured thereto, the arrangement being preferably very much after the plan of a window curtain and roller. The outer end of the curtain t^4 is securely attached to the upper edge of the adjacent side of the lower stacker-section f. As one edge of the curtain t^4 is secured nearer to the pivot on which the stacker moves than is the other edge, I have found it extremely desirable to taper the winding-roller t^2, so that one edge of the said curtain will be wound up and unwound more rapidly than the other edge thereof. The frame t, being pivoted, is free to move and adapt itself both to the lateral and vertical pivotal movements of the stacker, and the guide-roller t^3 holds the curtain clear from and out of engagement with the machine frame or case. The spring-rollers t^2 will of course keep the curtains t^4 always tightly drawn and will yield to let them out as may be necessary under the movements of the stacker.

The curtain devices above described are in the nature of what may be well termed "flexible pay-out and take-up curtains or bands," and they form sides for the receiving end of the stacker.

The downturned discharge end of the stacker in connection with the carriers mounted to follow the general line of the same and the stacker-section which carries it makes it possible to build up the stack more closely to the discharge end of the stacker, inasmuch as the returning portion of the carrier after it has deposited the straw will be carried farther away from the stack and not permitted to drag over the same. If used to deposit the straw or other material, such as hay, into the opening of a building—such, for example, as an upper window of a barn—the so-called "downturned" section may be projected a considerable distance into the building, which could not be done if the stacker were entirely straight.

It will of course be understood that my invention above described is capable of many modifications in the details of its construction. Attention will here be called to a few only of such modifications. As one modification as to detail I contemplate providing the oscillating sheave or head r with a groove or slot instead of the perforations r' and to

mount in this slot a sliding head, to which the pitman r^{12} may be pivotally connected in much the same manner as the other end of the said pitman is connected to the crank-disk r^4. As another modification, though not the full equivalent of the roller-mounted side pitmen, I contemplate providing elastic curtains.

It will of course also be understood that the stacker above described is not necessarily an attachment to a threshing-machine, but is capable of more general use and might be mounted either on a support of its own or in connection with other mechanism. It would be a very efficient device for elevating and stacking hay in the loft of a barn.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a stacker made up of sections, one having an extensible movement in respect to the other, of means for extending the said extensible stacker-section, and an equalizing-support working over a relatively-fixed guide and attached to said stacker-sections, with said parts so disposed that the said equalizing-support will raise the stacker as an entirety when said stacker is extended, substantially as described.

2. The combination with a threshing-machine, of a stacker pivoted thereto, and provided with an extensible section, of means for extending said extensible section, an equalizing-support for said stacker involving a guide anchored to the machine-frame, and a flexible connection working over said guide and attached at its ends to the said two stacker-sections, with said parts so disposed that said equalizing-support will raise said stacker as an entirety, and cause the delivery end of said stacker to move approximately on a vertical line, when the said extensible section thereof is extended, substantially as described.

3. The combination with a stacker mounted for lateral oscillations, of means for oscillating said stacker comprising an oscillating sheave or head, and a flexible connection frictionally engaging said sheave and connected to said stacker, substantially as described.

4. The combination with a stacker mounted for lateral oscillations, of means for oscillating said stacker involving as an element a friction device adapted to slip under extreme strains, substantially as described.

5. The combination with a stacker pivoted for vertical adjustments, of means for raising and lowering the same as an entirety, comprising a windlass-shaft mounted in relatively-fixed supports, a floating bar connected at its ends to the ends of said windlass-shaft by winding cords or connections, guide-sheaves mounted at the ends of said floating lever, and flexible connections running over said guide-sheaves and attached at their ends to the sides of said stacker, substantially as described.

6. The combination with an oscillating stacker, of means for oscillating the same involving an oscillating head provided with connections to said stacker, and a crank-and-pitman connection to said oscillating head, which pitman is pivotally securable to said head in different positions circumferentially thereof, whereby the zone of operation of the said stacker may be varied, substantially as described.

7. The combination with a stacker, provided with a delivery-section that is turned downward with respect to the general direction thereof, of guide-rollers located one at each end of the stacker-sections and one at the junction thereof, an endless carrier running over said rollers, and pivoted and spring-pressed guide skids or levers engaging and pressing upward on the return portion of said carrier, and guiding the same to movement within the general outline of the stacker, substantially as described.

8. The combination with a threshing-machine, of a stacker pivotally connected thereto, and automatically-extensible wind-shields involving brackets pivoted to the sides of the machine-case, spring-mounted curtain-rollers on said brackets and curtains wound on said rollers and connected to the sides of said stacker, substantially as described.

9. The combination with a threshing-machine, of a stacker pivoted thereto, and wind-shields involving tapered rollers mounted on said machine-frame, and curtains wound on said rollers and connected to said stacker, substantially as described.

10. The combination with a threshing-machine, of a stacker pivoted thereto for vertical and lateral oscillations, and wind-shields involving the brackets t pivoted to the machine-frame at t' and provided with the rollers t^2 and t^3, and the curtains t^4 wound on said rollers t^2 and connected to the sides of the stacker, substantially as described.

11. The combination with a threshing-machine, of a stacker pivoted thereto for lateral and vertical oscillations, and the wind-shields involving the brackets t pivoted to the machine-case at t' and provided with the tapered spring-mounted rollers t^2 and the loose guide-rollers t^3, and the curtains t^4 wound on the said rollers t^2 and connected with the sides of the stacker, substantially as described.

12. The combination with a stacker having an extensible section, of endless conveyers mounted on each stacker-section, and a drive for said conveyers comprising sprocket-wheels on the lower stacker-section, a driven sprocket on the lower end of the extensible stacker-section, an endless sprocket-chain running over said three sprocket-wheels, a bracket pivoted for movement on the axis of said driven sprocket, and a pair of guiding projections one at each end of said pivoted bracket and engaging said sprocket-chain on the opposite side of the said driven sprocket, substantially as described.

13. The combination with a stacker having an extensible section, of endless conveyers

mounted on each stacker-section, and a drive for said conveyers comprising sprocket-wheels on the lower stacker-section, a driven sprocket-wheel on the lower end of the extensible stacker-section, an endless sprocket-chain running over the said three sprocket-wheels, a bracket pivoted for movement on the axis of said driven sprocket, and a pair of antifriction wheels or guides mounted at the projecting ends of said pivoted bracket and engaging said sprocket-chain on the opposite sides of the said driven sprocket, substantially as described.

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

JAMES N. WILSON.

Witnesses:
M. M. McGRARY,
F. D. MERCHANT.