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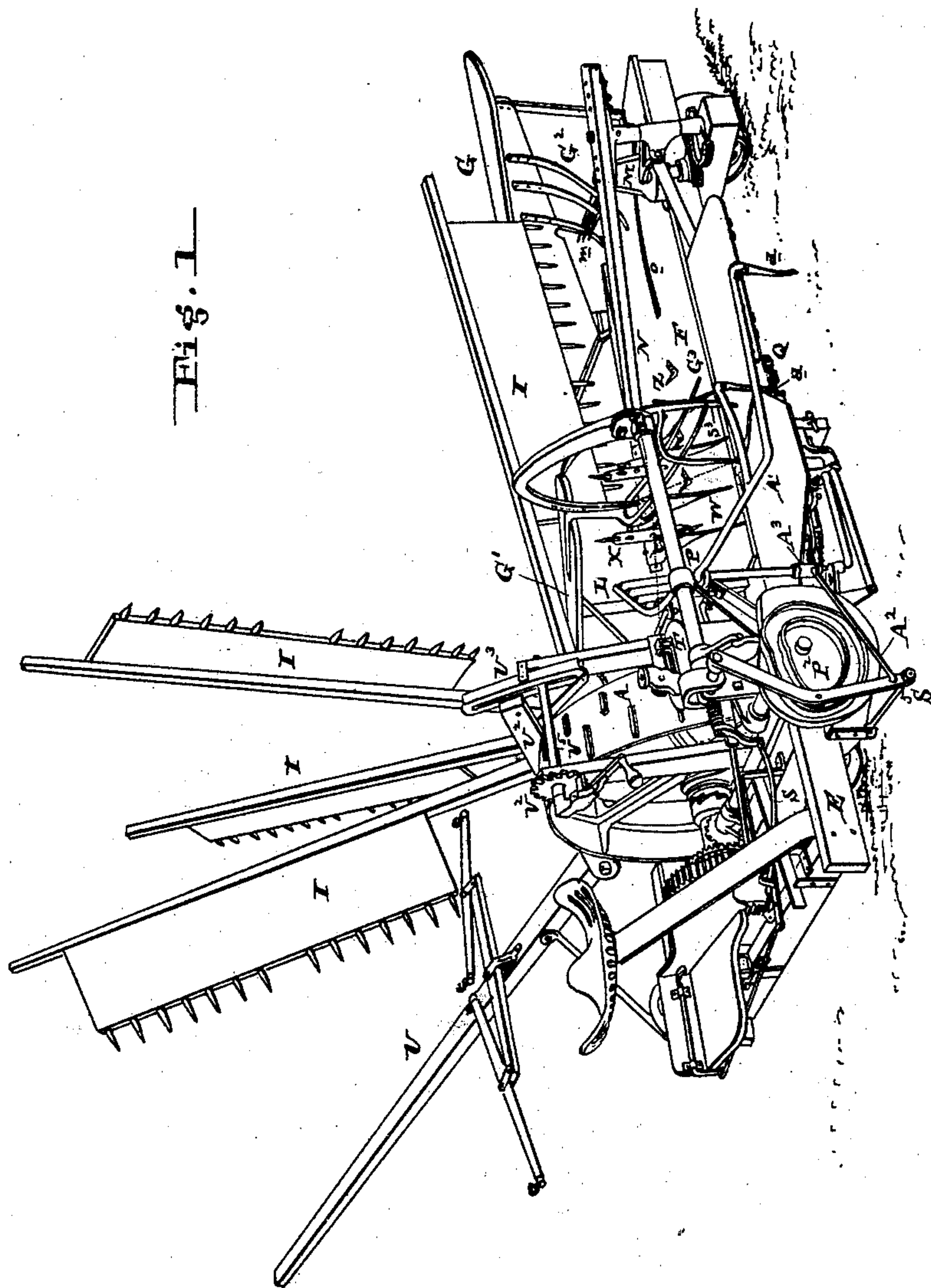
3 Sheets—Sheet 1.

S. JOHNSTON.

HARVESTING AND BINDING MACHINE.

No. 338,273.

Patented Mar. 23, 1886.



Attest
Richard D. Smith
Joshua M. Black, Jr.

Inventor
Samuel Johnston

(No Model.)

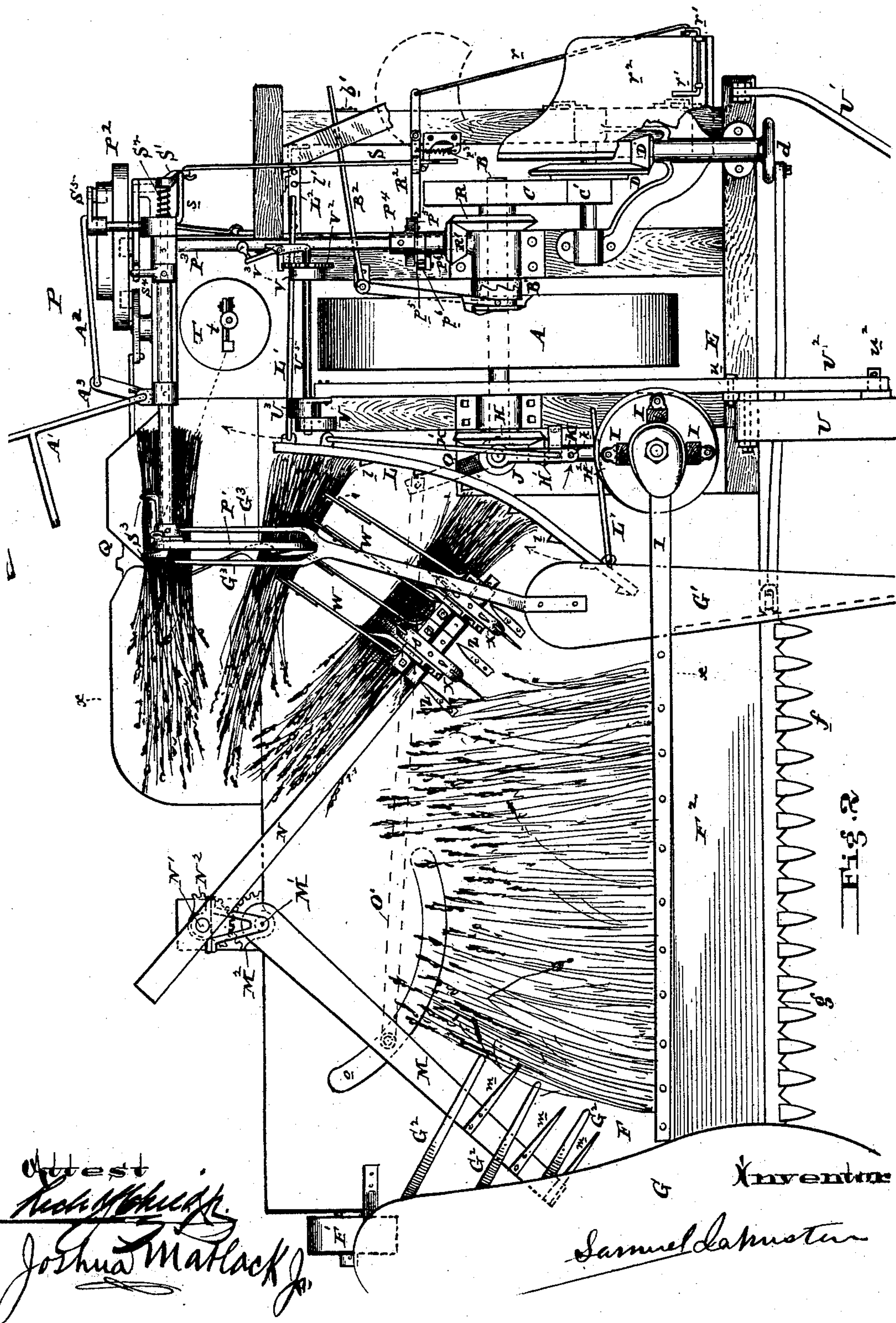
3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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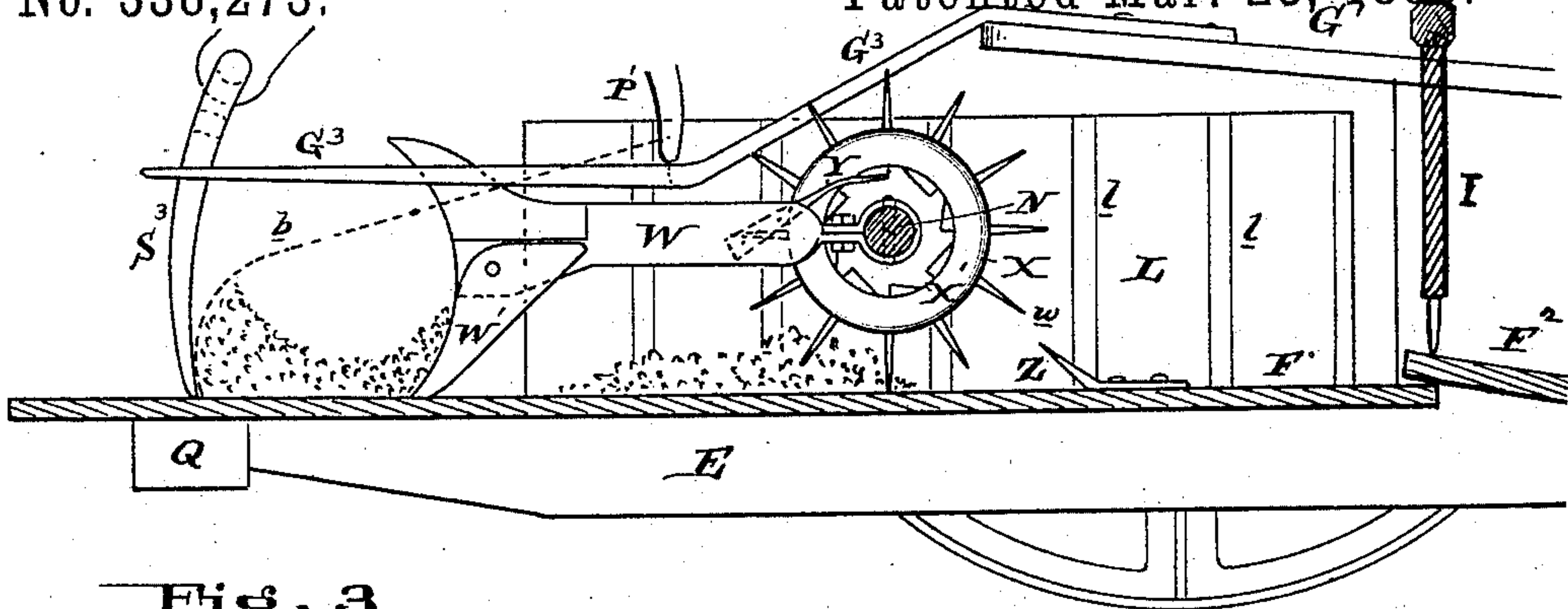


Fig. 3

Fig. 4

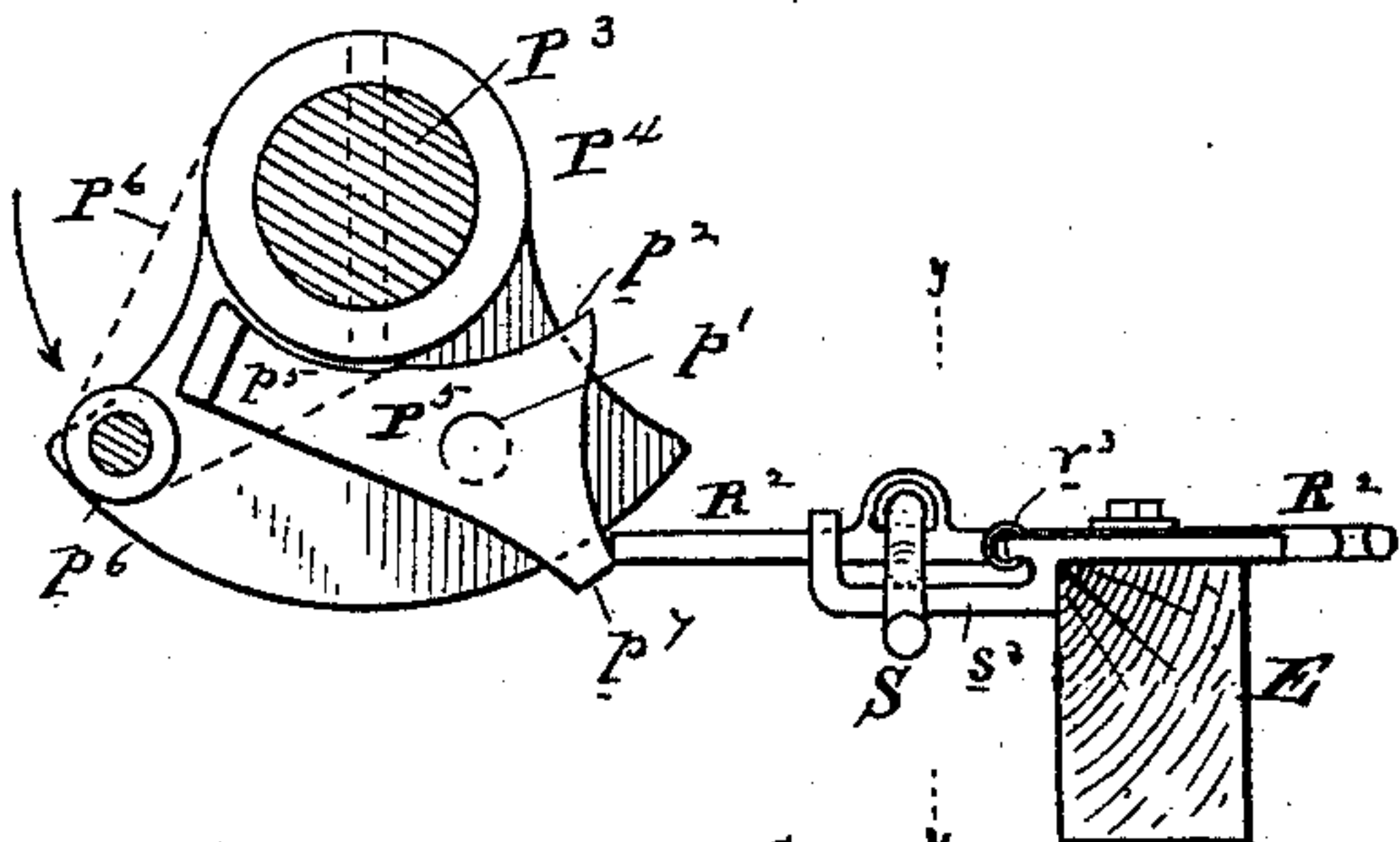


Fig. 5

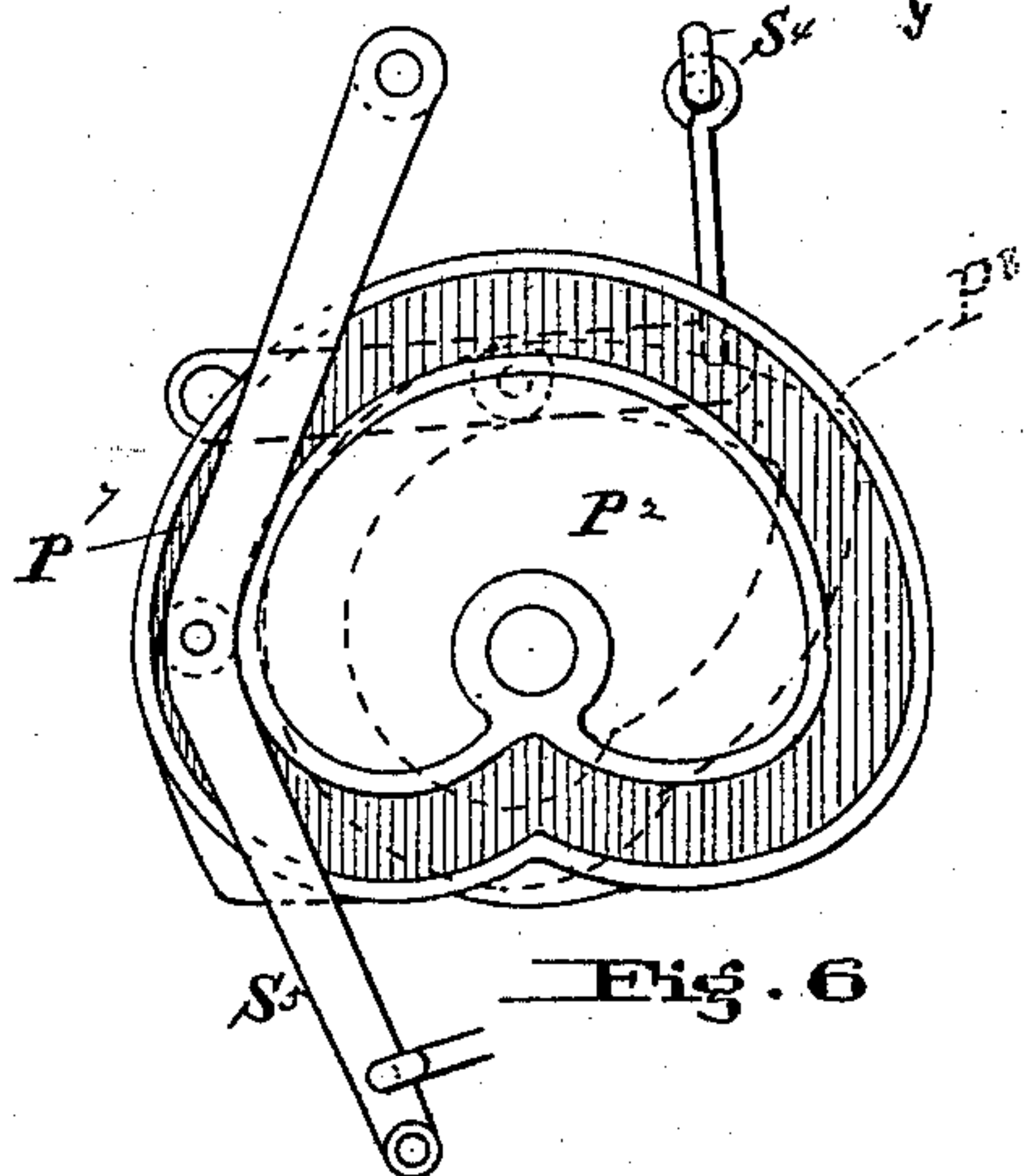
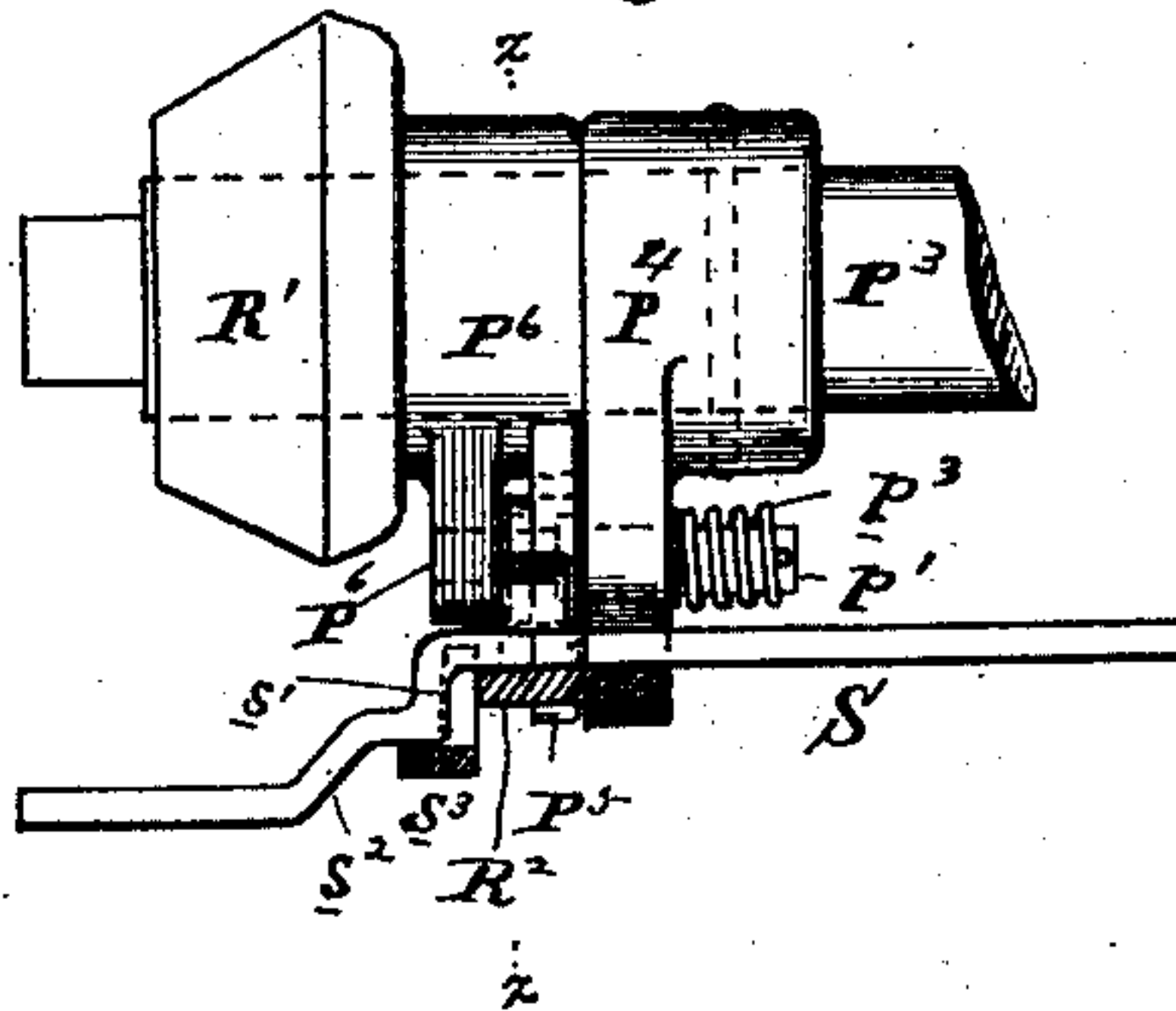


Fig. 6

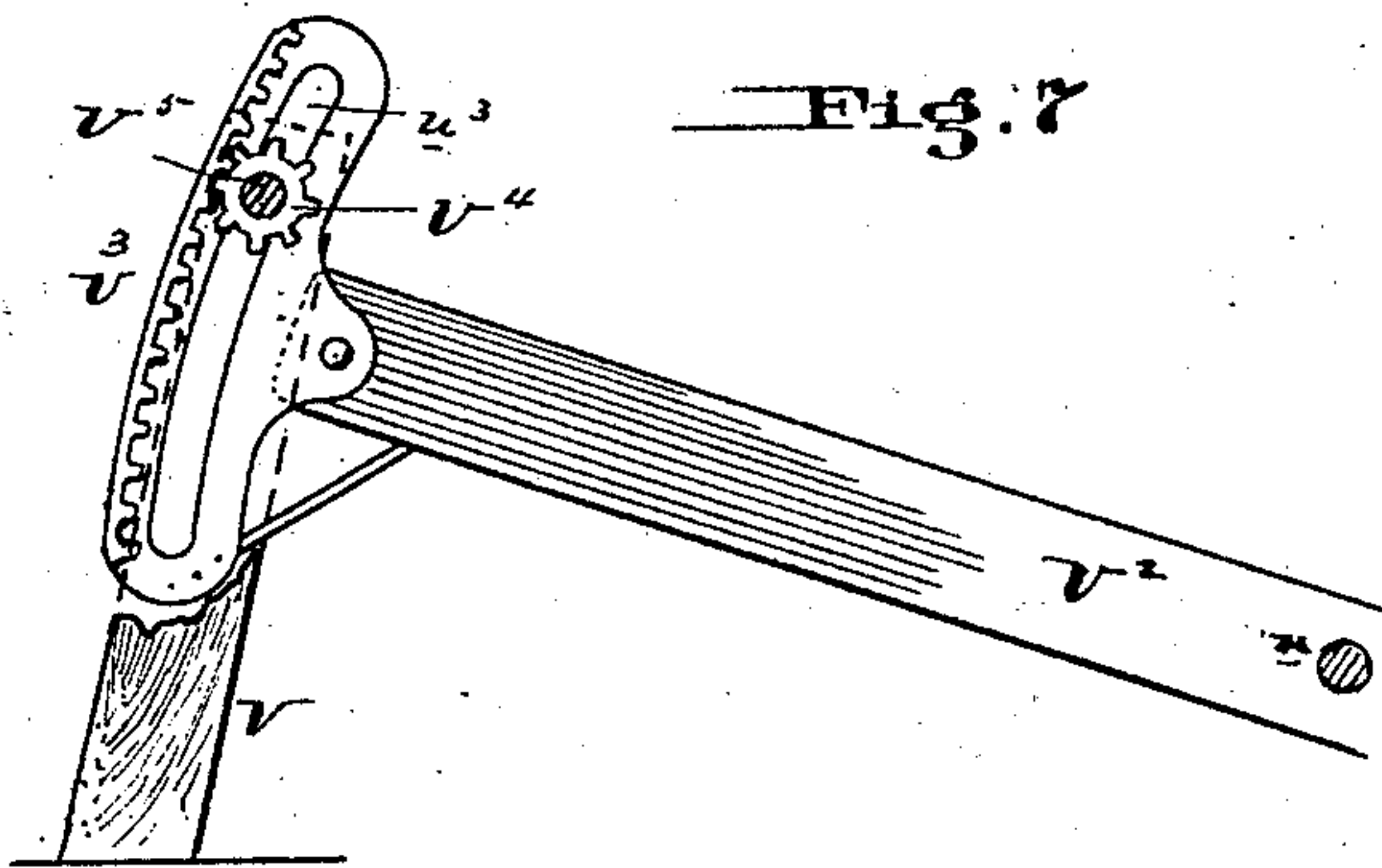


Fig. 7

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UNITED STATES PATENT OFFICE.

SAMUEL JOHNSTON, OF BROCKPORT, NEW YORK.

HARVESTING AND BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 338,273, dated March 23, 1886.

Application filed November 13, 1885. Serial No. 182,651. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL JOHNSTON, a citizen of the United States, and a resident of Brockport, in the county of Monroe, State of New York, have invented a new and useful Improvement in Harvesting and Binding Machines.

My invention has reference to harvesting and binding machines; and it consists in certain improvements, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

In constructing my improved harvester and binder I employ a stationary receiving-platform provided with a suitable vibrating collecting device, working conjointly with a vibrating packing device to collect and pack the cut grain gathered upon the platform by the revolving rake-arms or beaters and place it in the stationary binder located in the rear part of the machine. The said collecting device and packer describe segments of circles and move in opposite directions, to the end that each successive gavel or beaterful of grain shall be collected together on the platform and delivered by the packer into the binder, each gavel or beaterful of grain being kept separate until delivered into the said binder. Moreover, each bundle is, while being bound, kept distinct from the succeeding portion of the grain forming part of the next bundle. In combination with these collecting and packing devices, I provide a suitable vibrating butting-board, the function of which is to make a uniform and even butt to the bundle, and at the same time secure a proper central position for the band. The binding mechanism is automatically put into action, after the bundle has assumed a given size, through the medium of a starting-lever, against which the bundle is pressed by the packer, which starting-lever controls the clutch device connecting the binding mechanism with the driving-gear; or the binder may be started by other mechanism.

In addition to the foregoing features in the construction of my improved harvester and binder, there are a number of important details of construction, fully referred to in the general description hereinafter.

The object of my invention is to form a

compact, durable, and cheaply-constructed low-down harvester and binder, in which the parts shall be suitably balanced and the cut grain shall be treated in gavels separately until it is formed into a bundle, and each bundle (composed of one or more gavels) is formed and discharged separate and distinct from the next succeeding gavel, which is to form part of the succeeding bundle.

In the drawings, Figure 1 is a perspective view looking from the rear of a harvesting-machine embodying my invention. Fig. 2 is a plan view of same. Fig. 3 is a cross-section on line *x x* of Fig. 2, and shows a side view of the packer. Fig. 4 is a cross-section on line *z z* of Fig. 5, and shows part of the clutch mechanism for starting the binder. Fig. 5 is a sectional elevation of same on line *y y* of Fig. 4. Fig. 6 is an elevation of the cams for operating the binding and discharging mechanism; and Fig. 7 is a side elevation, with part broken away, of the device for tilting the platform.

A is the drive-wheel, and B is its shaft.

C and C' are spur-wheels, and D D' bevel-gears, through which power is transmitted from the drive-shaft B to the knife-bar crank *d*, which reciprocates the knife-bar *g*, supported and carried by the finger-bar *f*, as is customary.

E is the frame of the machine, and may be made in any suitable manner, that shown being, perhaps, most suitable.

F is the main receiving-platform, and is provided on its ends with the outer divider, G, and inner divider, G'.

Between the platform F and the cutter-bar I prefer to provide a reeling bar or space, F², which is preferably slightly inclined, as indicated in Fig. 3. This bar or space is about one foot or fourteen inches wide. The cam which guides the reel-arms should be so constructed that the teeth of each reel arm or beater pass in close proximity to and follow the surface of this bar before the reel-arms rise to complete their revolution to the front of the machine. The effect of making each reel-arm pass thus across the reeling-bar is that an immediate and complete severance of the grain brought on by each beater is effected and dragging or tangling between the gavels brought in by successive beaters is avoided.

I prefer to incline the bar F^2 so that the rear shall rise a few inches above the level of the main portion of the platform F , to aid in effecting a complete separation between the gavels brought in by each successive beater.

The arrangement for removing the grain from the platform F into the binder is such that immediately after a gavel or portion of grain is deposited by each reel beater or arm onto the platform F that portion so deposited is removed and carried to the binder and packed under the needle-arm separate and distinct from any other portion of incoming grain.

The bundle may be composed of one, two, or more beatersful. Each beaterful is packed in the binder separately. The number of beatersful which will be contained in any one bundle will depend on the thickness of the grain being cut and the size of the bundle desired, the binding mechanism being brought into operation when the desired quantity for a bundle is packed under the needle-arm, whether it be one, two, or more beatersful. This distinct removal and packing is effected by two arms, M and N , each pivoted at the rear of the platform, the arm N , carrying the toothed wheel, in its reciprocation passing over the gathering-arm M , which arms vibrate or reciprocate alternately toward and from each other. While reciprocating toward each other the cut grain on the platform is collected toward the middle of the platform, and while they vibrate from each other the grain is all carried by the arm N toward the binder to a point in front of teeth Z , and by a succeeding vibration of the arm N this grain is carried into and packed in the binder. When the arms M and N are vibrated apart from each other to their limit, the platform F is left clear and free to receive a new portion of incoming grain from the next gathering rake-arm or beater. The movement of the vibrating arms M and N is in exact unison with the movement of the reel arms or beaters, so that while each reel-arm is depositing its portion of grain on the platform F the arms M and N are at their maximum distance apart, and before the succeeding reel-arm makes its deposit on the platform F the arms M and N have approached together and receded, moving the deposited gavel from the front of the platform F . The gavels deposited on the platform are kept separate until they reach the binder, and when the binder has received the complement of grain to form a bundle there is a clear space under the needle-arm (between the bundle about to be formed and the next succeeding gavel) free from grain. Into this clear space the needle-arm descends in the act of binding the bundle. By the organization and arrangement of my machine, this unison of action between the reel-arms which gather the grain onto the platform and the collecting arm M and packing-arm N , each beaterful of incoming grain is separately removed and packed in the binder

and the needle-arm descends into a clear space. This arrangement and organization constitutes a leading feature of my invention.

The arrangement of the several parts of my machine is as follows:

F' is the grain-wheel which supports the outer end of the machine. Hinged to the rear of the platform F at M' is an arm, M , having its free end armed with teeth m , so that when the said arm is moved across the platform, describing an arc of a circle, the grain is swept in the direction of the binder—that is to say, from the grain side toward the stubble side of the machine.

G^2 are guards under which the arm M passes, and by which the grain is insured to fall upon the platform clear of the teeth m , and prevent the grain from being thrown back off the platform. The arm M is vibrated by a link, O' , placed below the platform, and which connects up through a curved slot, o , in the platform F with the collecting-arm M . This link O' is connected at its other end to a crank, O , which is rotated by bevel-gears J and H , connecting with the drive-shaft B .

N is a packer-carrying arm, which is pivoted at N' . This arm N is supported some distance above the platform. The arm N is connected with the arm M by means of the segmental gears N^2 and M^2 . The reciprocations of the arm M cause a corresponding reciprocation of the arm N in an opposite direction, so that these arms approach and pass each other slightly, and then recede from each other during their respective movements. The free end of the arm N is provided with the packing-teeth W , the lower portions of which are provided with pivoted pawls W' , which run upon or close to the platform and push the grain toward the binding-arm when the arm N is moving in one direction, and pass over the grain when it vibrates in the other direction. These teeth are preferably four in number, and located between two or more of them, and journaled upon the end of the arm N , are the wheels X , having their peripheries provided with fingers or teeth w . These wheels X are loosely supported upon the arm N , and are provided with ratchets X' , with which spring-pawls Y engage to prevent the said wheels X rotating when the arm N is vibrating toward the binder, but allow of the rotation of X when the arm N is passing over the opposite arm M , so as to roll over the cut grain collected at the center of the platform. The toothed wheels X are preferably held against rotation when approaching the arm M by the pressure of the spring-pawls Y or by friction, so that when moving from the position shown in Fig. 2 toward the center of the platform the toothed wheels X sweep or gather the grain as delivered by the rake arms toward the middle of the platform and toward the approaching arm M . Thus by the combined action of arms N and M the cut grain as delivered by the beaters is compacted at or near the middle of the platform. When the grain

collected between the approaching arms N and M is sufficiently compacted to offer a greater resistance than the spring-pawls or friction devices, the wheels X rotate and pass
 5 over the gathered grain, the arm N passing above the arm M. As the arm N moves back to the position shown in Fig. 2, the toothed wheels X, being held by the pawls and ratchets, move the collected grain away from the
 10 said vibrating arm M toward the binder to a part of the platform in the rear of teeth Z, the platform F between the two arms M and N being then left entirely clear for the reception of the next incoming beaterful of grain. The
 15 next vibration of the arm N causes the packer-pawls W' to pass over the grain lying at one side of the platform, held by the teeth Z. Upon the next vibration of the arm N the last laid gavel is carried by the toothed wheels
 20 X beyond the teeth Z, and by the same vibration of N the previous laid gavel is pushed forward by the packing-pawls W into the binder under the guard G³ and binder-arm P', and against the movable stop lever S³.
 25 In conjunction with the vibrating arm N, which carries the gavel toward the binder and packs it in the binder, I employ a movable butting-board, which straightens each gavel at the butt in the interval while the packing
 30 or teeth pawls W' W' W' are carried by the packer-carrying arm N from the binder, passing over the grain lying in front of the teeth Z and under the guard G³. L is the said butting-board, which is connected by links L', so that
 35 it is caused to swing in such a manner as to act upon the butts of each gavel as it is left upon the platform and before it is carried by the packer-pawls W' W' W' into the binder, causing the butts to be moved backward,
 40 and at the same time pushing any extending grain longitudinally, evening the butts, as shown in Fig. 2, and also insuring the particular location of the band desired. This butting-board may be provided with ribs l, to
 45 more readily insure a rearward pressure being exerted upon the butts. The reciprocation of the butting-board is obtained through the mediation of the link K', connected to a crank, K, which is driven from the gear J.
 50 Its movement is accurately timed with the reciprocation of the arms M and N, so as to act in unison with arm N while passing freely over the gavel and before pushing each separate gavel into the binder.
 55 The links L' L', which connect the butting-board L to the frame of the harvesting machine, are substantially parallel, each acting as a radius bar or link and causing the butting-board to have a lateral parallel movement
 60 as an incident to its longitudinal reciprocations, which are imparted by the rotating crank K and link K'. The longitudinal movements of the butting-board cause it to travel with the grain toward the binder and the lateral parallel movements thereof cause it to
 65 act upon the butts of the grain, making the butts even.

The crank K is provided with a series of holes, k', whereby its throw may be increased or decreased, as desired, and the rear link, L',
 70 connecting with the butting-board, may be adjusted in either of the holes l' of the plate L², thereby varying the distance of the band from the butt of the bundle, as desired, as
 75 this adjustment throws the rear end of the butting-board nearer to or farther from the needle-arm, and when acting upon the butts it pushes the grain longitudinally in accordance with said adjustment.

The relative longitudinal and lateral movements of the butting-board are substantially the same, no matter what adjustment may be given the rear link, L'.

P represents the location of the binder.

The needle-arm of the binder P is shown
 85 at P', and is of the usual curved form. It is secured on cranked shaft S⁴, and is operated as follows:

P² is a double-faced cam which operates the various portions of the binder and discharging
 90 device, the inner cam, P³, thereof actuating the crank S⁴, by means of pivoted arm S⁶ and link S⁷, to oscillate the needle-arm, while the outer cam, P⁷, rocks the arm S⁵, which (through the mediation of link A² and crank A⁵) oscillates the discharging-lever A', which is provided with the loose hinged fingers a. These
 95 fingers are free to fold up when passing forward over the bundle, but when moving backward catch and discharge the bundle from
 100 under the starting-lever S³ onto the ground at the rear of the machine, in the rear of the driving-wheel, turning the bundle at right angles to the line of the rear of the machine.

T is the cord-box, and t is the band-tension
 105 device.

P³ is a shaft connecting the cam P² with the gearing R R', by which it receives its power of rotation from the drive-shaft B. The bevel-gear R' is loose upon the shaft P³, and is
 110 intermittently connected therewith through the agency of the clutch device shown in Figs. 4 and 5. The bevel-gear R' is provided with an arm, P⁶, furnished on its end with a roller, p⁶. This roller revolves about the shaft P³
 115 constantly while the machine is in motion, and has no effect until the lever R² is pulled aside and the pawl P⁵, having the foot p⁵, is thrown down in front of the roller p⁶ by spring p³, which is coiled about the fulcrum p' of the
 120 said pawl, which is journaled to the crank-shaped hub-piece P⁴, secured to the shaft P³.

p² is a stop which prevents the shoe p⁵ being thrown too far outwardly, and the extension p⁷ projects sufficiently far to catch upon the
 125 lever R² to trip the pawl P⁵. When the lever R² is drawn aside, the foot p⁵ is thrown down, and the next rotation of the gear R' and the arm P⁶ causes a rotation of the said shaft by coming in contact with the foot p⁵, and the rotation of said shaft will continue until the
 130 lever R² is allowed to move back into position so as to catch upon the pawl and throw it out of contact with the roller. The lever R² may

be operated by the driver through the agency of the link r and crank r' , secured to the foot-board r^2 ; or it may be actuated automatically by the starting-lever S^3 by means of the crank S' , secured thereto, and the rod S , hinged to said crank and having its free end bent so as to form a catch, s' , and a cam part, s^2 . When the starting-lever S^3 is oscillated against the pressure of the coil-spring S^2 , the rod S is drawn backward, pulling back the lever R^2 against the tension of the spring r^3 , and upon a continuation of this backward movement after the binder mechanism has been thus put into operation the cam portion s^2 of the rod S rides upward upon the supports s^3 , raising the rod S until the lever R^2 is again freed, allowing it to be quickly drawn back and act to throw the pawl P^5 out of contact with the roller p^6 on the end of the arm P^6 , arresting the rotation of the shaft P^3 , and consequently the action of the binder.

Any other form of intermittent clutch device may be used, if desired; but I prefer the construction shown.

B' is a clutch connecting the drive-wheel A with the drive-shaft B , and is thrown in or out of action by the spring-lever B^2 , being held in either position by the said lever being placed upon either side of the catch b' .

U is the tongue or pole, and is hinged to the frame E and also braced by the link U' .

Pivoted to the frame E at u is a lever, U^2 , its outer end being connected to the pole at u^2 , and its inner end being provided with the rack U^3 , having a guide slot, u^3 .

Meshing with the rack U^3 is a pinion, U^4 , which is secured to a shaft, U^5 , passing through the slot u^3 and journaled in the bearings $V V'$, the latter of which is provided with a notched disk or wheel, v^2 .

The end of the shaft U^5 next to the driver's seat is provided with a spring crank-handle, which catches in the notch of the disk V^2 , and also acts as the crank to rotate the pinion U^4 when raising or lowering the inner end of the lever U^2 when tilting the platform to cut high or low.

While I prefer the construction shown, as being found most suitable in practice to accomplish the objects desired, it is to be understood that I do not limit myself thereto, as it may be modified in various ways without departing from my invention.

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

1. In a harvesting-machine, the combination of the platform and the binding devices with a pivoted vibrating collecting-arm adapted to sweep across the platform from the grain side when collecting the cut grain, a reciprocating arm carrying a packer and adapted to receive the grain from the advancing collecting-arm and deliver it to the binder, the said packer being adapted to approach toward and recede from the collecting-arm, reel arms or beaters to deposit each gavel upon the platform, when

the said packer and collecting-arm are farthest from each other, and operating mechanism to actuate said parts, whereby their movements shall be properly timed, substantially as and for the purpose specified.

2. In a harvesting-machine, the combination of the platform and the binding devices with a pivoted collecting-arm adapted to sweep across the platform from the grain side when collecting the cut grain, a reciprocating arm carrying a packer adapted to approach the collecting-arm and receive the grain therefrom and to retreat and deliver it to the binder, and a vibrating butting-board arranged to act upon the butts of the grain during its transit to the binder, substantially as and for the purpose specified.

3. In a harvesting-machine, the combination of the platform and the binding devices with a pivoted collecting-arm adapted to sweep across the platform from the grain side while collecting the cut grain, a reciprocating arm carrying a packer adapted to approach the collecting-arm from the other side of the platform and receive the grain therefrom as said collecting-arm advances, and then to retreat and deliver it to the binder, and a vibrating butting-board arranged to act upon the butts of the grain during transit to the binder, reel arms or beaters to deposit each gavel upon the platform when the said packer and collecting-arm are farthest from each other, and operating mechanism to actuate said parts, whereby their movements shall be properly timed, substantially as and for the purpose specified.

4. In a harvesting and binding machine, the platform and cutters, in combination with the usual gathering reel or rakes to deliver the cut grain back upon the platform, collecting devices adapted to sweep across the platform and collect each gavel before the next succeeding one falls and deliver it to the binder, an adjustable butting-board hinged or pivoted to the machine by parallel bars and operated by means of crank and pitman connected to the board between the points of connection of the bars with the board, substantially as described, to straighten the butts of the gavel during their passage to the binder and control the location of the band around the bundle, substantially as and for the purpose specified.

5. In a harvesting-machine, the platform, the binder, and suitable rake or reel arms to deliver the cut grain onto the platform, in combination with a collecting device to pass across the platform and deliver the grain to one side, leaving the platform clear for the next gavel, and a packer adapted to reciprocate between the binder and collecting device, said packer being provided with two sets of prongs or fingers arranged one in advance of the other, each set acting on different gavels, whereby when one set is receiving the gavel from the collecting device the other set is receiving the gavel previously acted on by the

first set, and whereby both gavels are simultaneously advanced toward the binder, substantially as and for the purpose specified.

6. A device for collecting cut grain and moving it over a platform of a harvesting-machine, consisting of a vibrating arm to which one or more wheels armed with fingers or teeth are journaled, in combination with means to reciprocate said arm and means to prevent the toothed wheels rotating in one direction, but allowing of their rotating in the other direction when passing the pivoted collecting-arm, whereby they roll over the collected grain without disturbing it, and in moving in the opposite direction they are locked against rotation and move the cut grain with them, substantially as and for the purpose specified.

7. In a device for collecting cut grain and moving it over a platform, the combination, with a reciprocating collecting-arm, of a vibrating arm to which one or more wheels armed with fingers or teeth are journaled, in combination with means to reciprocate said arm and means to prevent the toothed wheels rotating when the arm is moving toward the binder, springs or friction devices whereby the rotation of the wheel is prevented when the arm is moving in the other direction or gathering the grain, and until the resistance offered by the collected grain is greater than that offered by the spring or friction devices when the wheels are allowed to rotate and pass over the gavel, substantially as and for the purpose specified.

8. A packer for a harvester and binder, consisting of a vibrating arm having its free end provided with toothed wheels adapted to turn when passing the pivoted collecting-arm, and having pawls to prevent said wheels rotating when the arm is moved in the other direction, and projecting arms arranged in front of the wheels and provided with gravitating pawls, whereby as the packer-carrying arm is moved the toothed wheels move the grain forward, and upon the next movement in the same direction the pawls push the grain still farther forward, thereby keeping each gavel separate and causing an extended movement of the grain with a limited throw of packer-carrying arm, substantially as and for the purpose specified.

9. A packer for a harvester and binder, consisting of a vibrating arm having its free end provided with toothed wheels adapted to turn when passing the pivoted collecting-arm, and having pawls to prevent said wheels rotating when the arm is moved in the other direction, and projecting arms arranged in front of the wheels and provided with gravitating pawls, whereby as the packer-carrying arm is moved the wheels move the grain forward, and upon the next movement in the same direction the pawls receive and push the grain still farther forward, thereby keeping each gavel separate and causing an extended movement of the grain with a limited throw of packer, in combination with a vibrating butting-board adapt-

ed to act upon the grain while in transit to the binder, substantially as and for the purpose specified.

10. A packer consisting of the vibrating arm N, having toothed wheel X, provided with ratchet-wheels X' and spring-pawls Y, in combination with the arms W, having gravitating pawls W', substantially as and for the purpose specified.

11. The packer consisting of vibrating arm N, provided with toothed wheels X, and arms W, provided with gravitating pawls W', in combination with the vibrating butting-board L, hinged to links L', operating-rod K', and crank K, substantially as and for the purpose specified.

12. The packer consisting of vibrating arm N, provided with toothed wheels X, and arms W, armed with gravitating pawls W', in combination with the vibrating butting-board L, hinged to links L', means to adjust the butting-board to or from the packer, operating rod K', and crank K, substantially as and for the purpose specified.

13. The packer consisting of vibrating arm N, provided with toothed wheels X, and arms W, armed with gravitating pawls W', in combination with the vibrating butting-board L, hinged to links L', means to adjust the butting-board to or from the packer, operating-rod K', and crank K, and means to vary the throw of the said butting-board, substantially as and for the purpose specified.

14. The packer consisting of vibrating arm N, provided with toothed wheels X, and arms W, provided with pawls W', in combination with vibrating butting-board L, hinged to links L', operating-rod K' and crank K, the platform F, vibrating collecting-arm M, provided with teeth m, gearing M² N², connecting the packer-carrying arm N and collecting-arm M, crank O, and link O', to vibrate said collecting-arm, substantially as and for the purpose specified.

15. The packer consisting of toothed wheels X and the projecting arms W, provided with pawls W', forming two sets of teeth to act upon the grain, in combination with the binder or needle arm, and the guard G³, under which the packer works and through which the needle-arm descends, substantially as and for the purpose specified.

16. The packer consisting of toothed wheels X and the projecting arms W, provided with pawls W', forming two sets of teeth to act upon the grain, in combination with the binder or needle arm, the vibrating collecting-arm M, adapted to sweep the grain across the platform to the packer, and teeth Z on the platform, over which the grain is swept by the gathering-arm and by which it is prevented from moving back while the packer-carrying and gathering arms recede to gather and carry a fresh gavel to the binder, substantially as and for the purpose specified.

17. The combination of the collecting-arm M, the packer-carrying arm N, and the nee-

dle-arm, and the devices for starting said
needle-arm, and operating mechanism where-
by the collecting, the packer-carrying, and
the binder arms are caused to work in unison,
5 so that the needle-arm shall descend between
the arms W W W while holding the comple-
ment of grain for one bundle and before the

first gavel for the next bundle is delivered to
the binder, substantially as and for the pur-
pose specified.

SAMUEL JOHNSTON.

Witnesses:

W. E. STEARNS,
W. E. CHAFFEE.