

(No Model.)

3 Sheets—Sheet 1.

C. H. COLES.
BALING PRESS.

No. 549,957.

Patented Nov. 19, 1895.

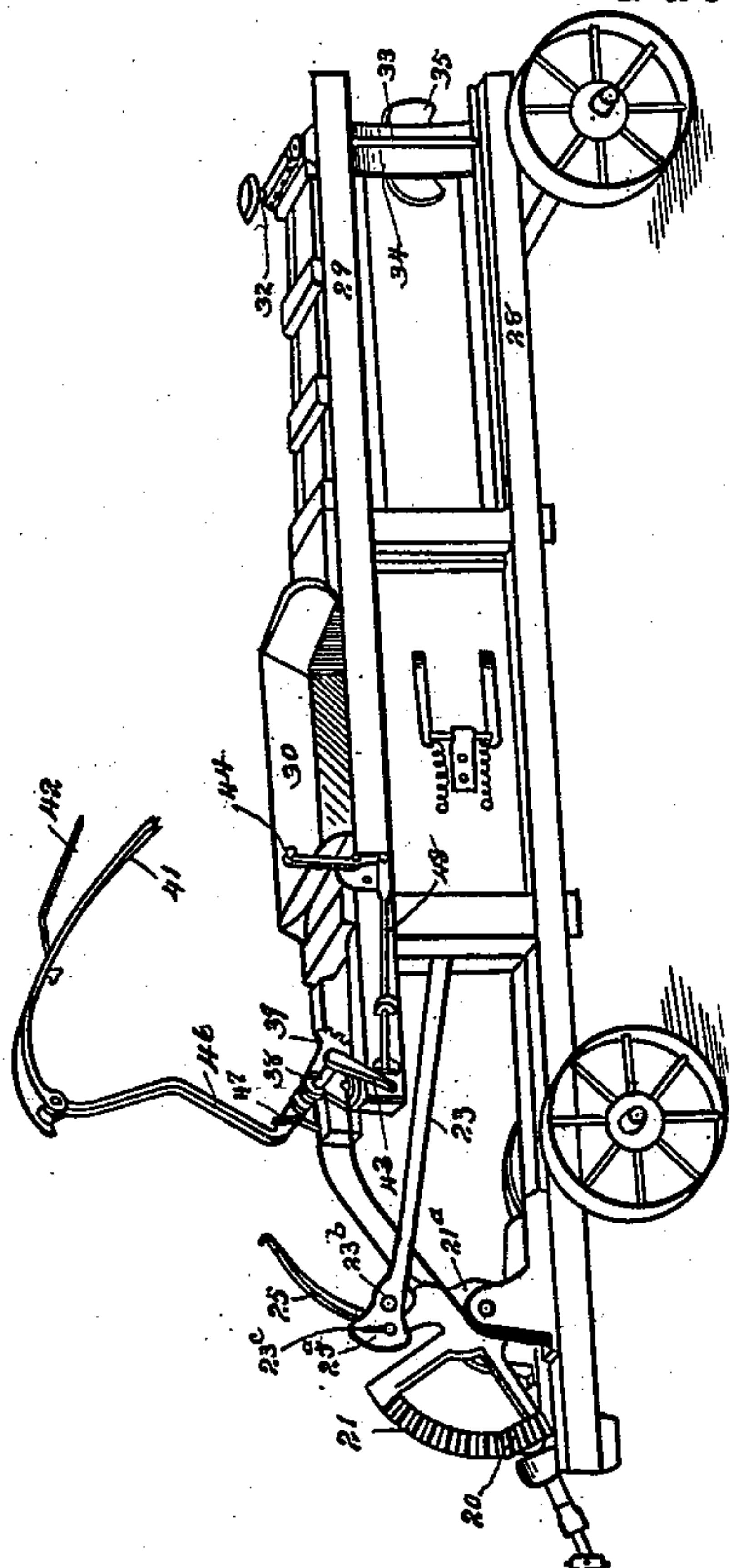


Fig. 1.

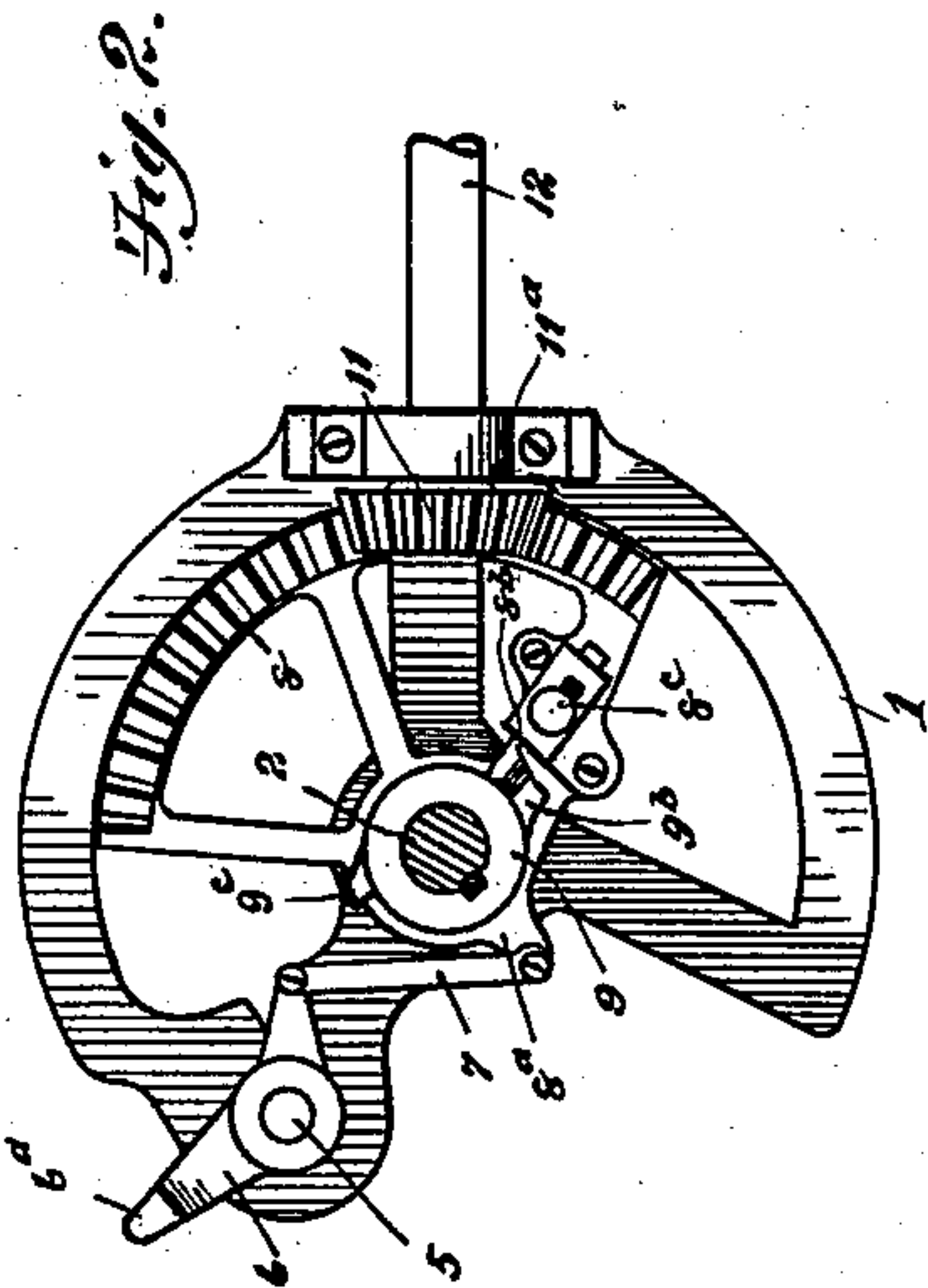
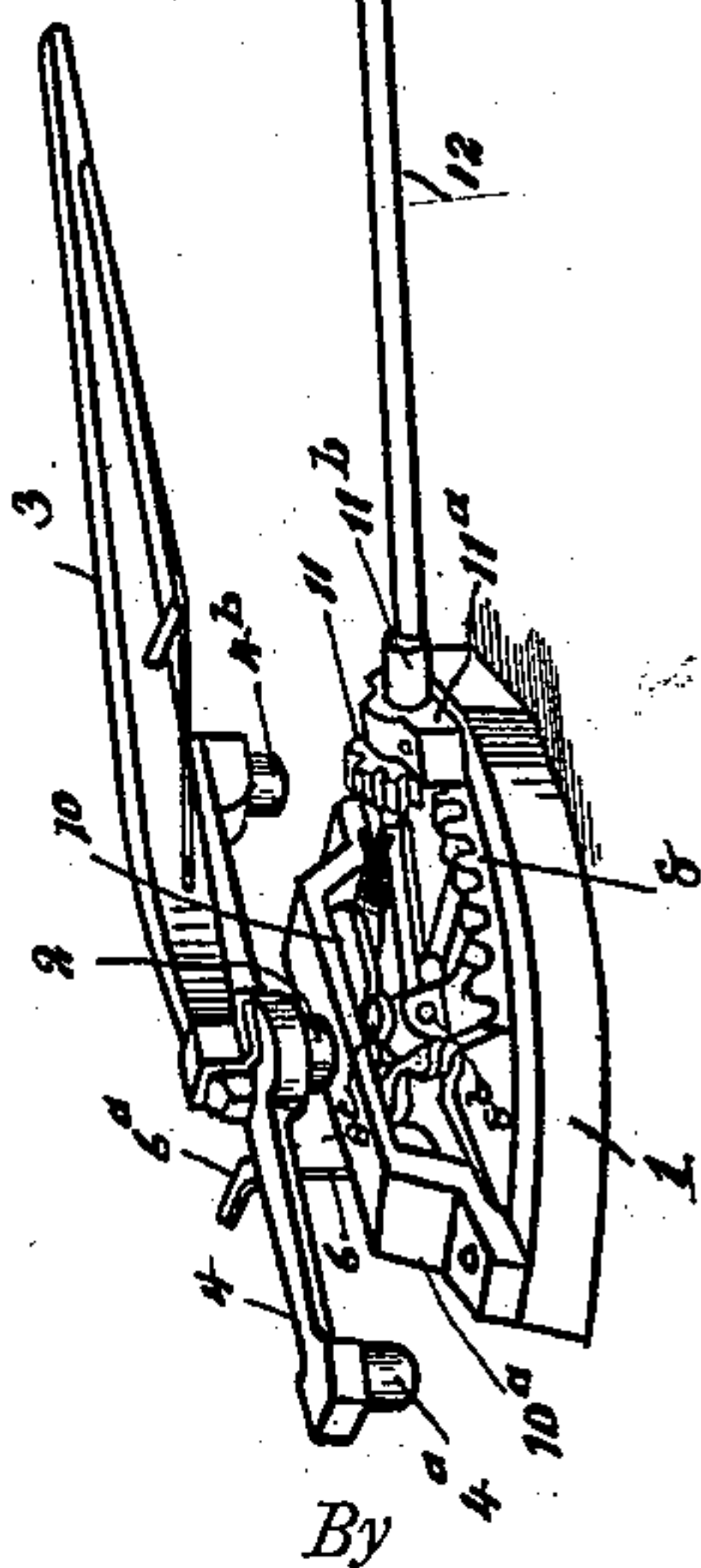


Fig. 2.



WITNESSES

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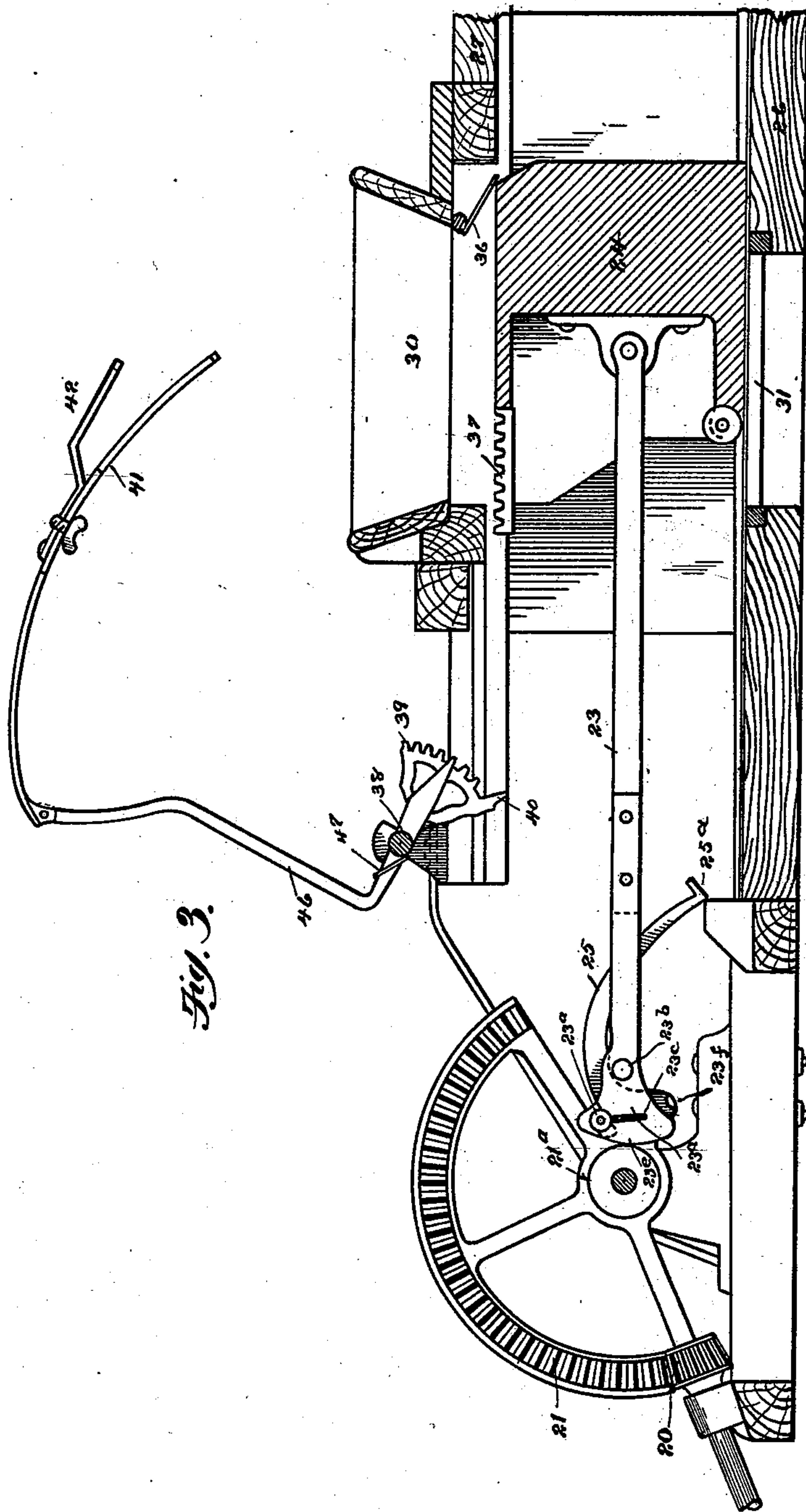


Fig. 3.

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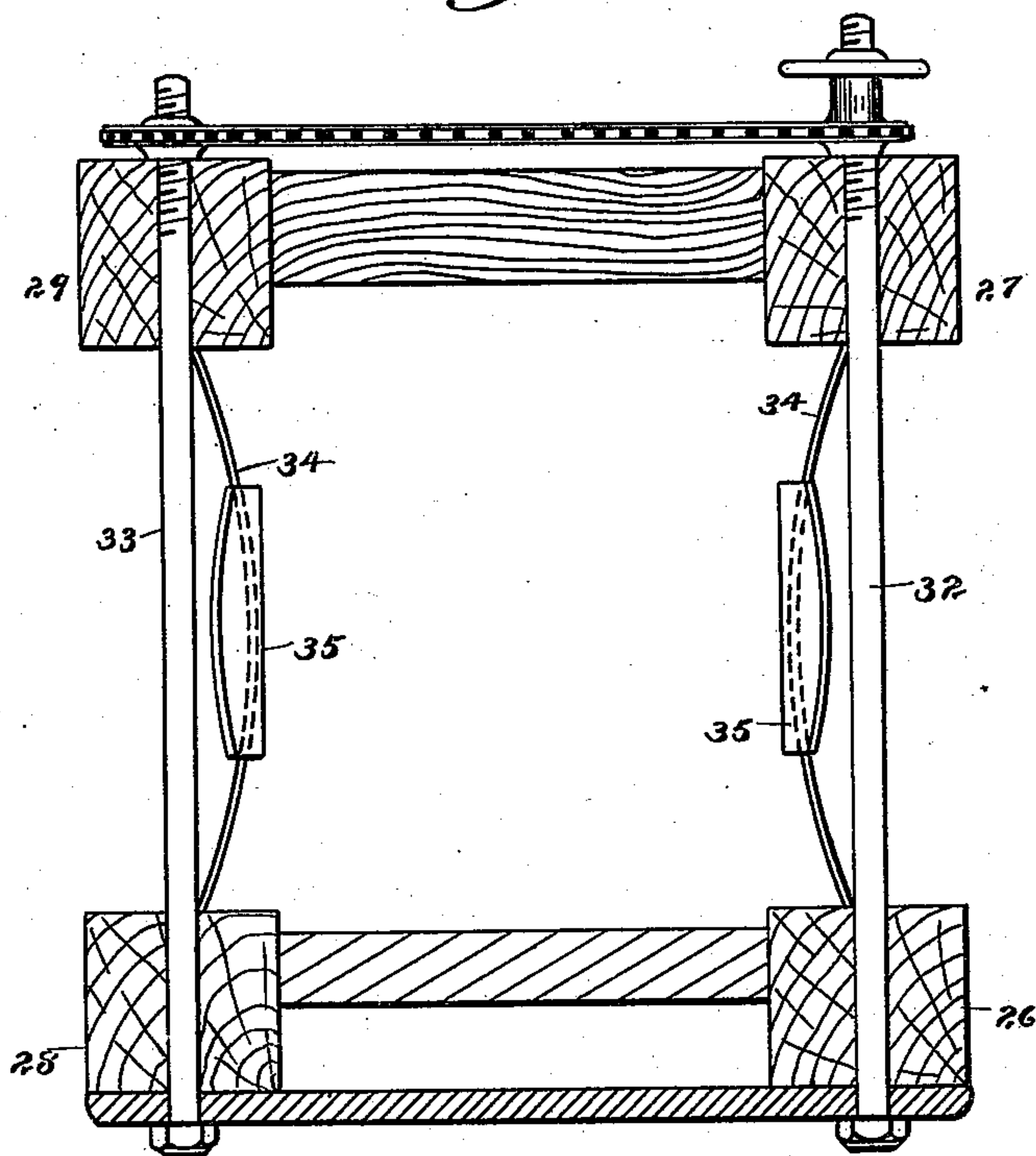
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Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES H. COLES, OF SANDWICH, ILLINOIS.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 549,957, dated November 19, 1895.

Application filed December 7, 1894. Serial No. 531,144. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. COLES, a citizen of the United States, residing at Sandwich, county of De Kalb, State of Illinois, have invented a certain new and useful Improvement in Baling-Presses; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain improvements in baling-presses and in the power by which rotary motion is converted into the reciprocating motion by which the plunger or press is actuated.

One feature of the improvement relates to the power, which in the form shown by me is actuated by horses traveling in a circle, and has for its object an improvement which enables the horses to produce at each complete circle of travel a double reciprocation of the plunger and which also causes the return or back motion of the plunger to be effectuated much more rapidly than the forward or pressing motion of the plunger.

Another feature of the improvement relates to the actuation of the plunger itself during its forward or pressing stroke and causes that forward stroke to be rapid during the first part of its movement and to gradually decrease in rapidity toward the close of the stroke, while together with this decrease in rapidity of motion there is a corresponding increase of the strength of action, so that the constant steady circular travel of the horses not only produces the reciprocating motion of the pitman and plunger-head, but produces it in such a way that its motion is rapid during the time it is returning from its pressing action and is doing no work and is variable during the time it is advancing and doing pressing work, being more rapid at the time that there is less resistance and slowing down as the resistance is increased.

Another feature of the improvement relates to what is called the "feeder" and to an attachment which I place upon the feeder and which I call the "tucker;" and still another improvement relates to the means employed by me to hold the front end of the bale, pre-

venting its easy forward advance and utilizing it as the abutment against which the following end of the bale or following bale is compressed.

In the drawings, Figure 1 shows in perspective the press and the power. Fig. 2 is a plan of the gearing of the power, the top part being removed therefrom. Fig. 3 is an elevation of the pressing end of the press, showing the plunger, pitman, and the gearing by which it is actuated, the feeder and the gear by which it is actuated, one side of the casing being removed and the plunger-head being shown in section. Fig. 4 shows on an enlarged scale the means for adjusting the exit-opening of the press.

The horse-power is shown in Figs. 1 and 2. It consists, essentially, of a heavy bed-piece 1, which is adapted to be secured to the ground by stakes or in any other convenient way and supports at a central point a vertical shaft 2, to the top end of which is secured a sweep 3, and upon the sweep is placed a plate 4, that extends on both sides of the shaft 2 and carries at its extremities two hanging friction-wheels 4^a and 4^b. From the frame 1 rises a second stud 5, upon which is a rock-arm 6. One end 6^a of the rock-arm 6 rises into the path of the friction-wheels 4^a 4^b, and the rock-arm 6 is engaged at each revolution of the sweep 3 by the friction-wheels 4^a 4^b, and each time is pushed or rocked on its stud out of the path and permits the friction-wheel by which it was engaged to slip by it. Subsequent to engaging with one friction-wheel 4^a and prior to engaging with the other friction-wheel 4^b the rock-arm 6 is returned and the branch 6^a brought again into the path of the friction-wheels. The return movement is produced by a link 7, one end of which is secured by a pin to the arm 6^b of the rock-arm 6, the other end of which is secured to an arm 8^a on a quadrant-rack or mutilated wheel 8, that is journaled on the axle 2. Above the quadrant-rack 8, on the axle 2, is a collar 9, which is keyed to the axle 2 and carries a spur 9^b, that engages with a sliding bolt 8^b, mounted upon and secured to the quadrant-rack 8. The bolt 8^b is held by a suitable housing and is driven inward in the position shown in Fig. 2 by a spring located within the housing. Above the collar 9 is secured a cam 10, (seen in Fig. 1,) held in place with

respect to the main framework 1 by a strap 10^a, that supports and guides the upper part of the axle 2, upon which the sweep is held. The useful part of the cam 10 is that shown in Fig. 1 and lies on that side of the strap 10^a which is toward the rack 8 or the pinion 11. A pinion 11, held in a suitable bearing 11^a, meshes with the rack 8, and at that part of its shaft which projects from the frame 1 is a sleeve-coupling 11^b, into which engages the end of a tumbler-shaft 12.

The operation of this power is as follows: When the parts are in the position shown in Fig. 2, the rotation of the sweep turns the axle 2, the collar 9, and the lug 9^b. The lug 9^b, engaging with the end of the bolt 8^b, drives the rack and the pinion 11. This continues until the engagement between the cam 10 and the bolt 8^b or an extension 8^c on the bolt forces the bolt 8^b out of engagement with the lug 9^b. The rotation of the rack 8 has drawn the link 7 and rocked the rock-arm 6, bringing the arm 6^a into position to engage with one or the other of the rolls 4^a or 4^b. The parts are adjusted so that the bolt 8^b and the lug 9^b pass out of engagement at the moment of time that the arm 6^a is engaged by one of these rolls, and, the lug and bolt being out of engagement, the rack is free to move backward around the axle and is rapidly pulled backward, when the arm 6^a, pushed in front of the roll, swings inward out of the path of that roll, the opposite arm 6^b at the same time swinging outward, pulling on the link 7 and the arm 8^a of the rack. Immediately when the rack swings back the bolt 8^b ceases to be forced out by the cam 10, as it passes back beyond the point where it engages with the cam, and the inner end of the bolt 8^b moves inward toward the axle 2 in position to engage with the second lug 9^c on the collar 9.

Motion is communicated from the power through the tumbling-rod to the press through a pinion 20 and a circular rack 21. The circular rack 21 is in the form of a segment of a wheel that is journaled in pillow-blocks 22, and on that side of the hub of this wheel which lies opposite the pinion 20 is a reciprocating pitman 23, on one end of which is a plunger or piston-head 24 and on the opposite end of which is a cam-head and appliances which act, in conjunction with peculiarly-shaped arms reaching out from the hub 21^a, to produce a rapid initial forward movement and a slower but powerful concluding forward movement of the piston and a rapid withdrawal of the piston, slow at first, but rapidly accelerated. The advance movement and the return movements of the piston correspond with the vibratory movement of the rack 21 and would be equal in time if the forward-and-back movement of the rack were equal in time; but inasmuch, as has already been explained, as the forward movement of the driving-rack occupies twice the time of the return movement so also the forward movement of the plunger occupies twice the time of the return movement. The

rear end of the pitman 23 is preferably forked, and between the branches of the fork is a curved arm 25, that extends from the hub 21^a, at first radially or nearly radially, and gradually turns in a curve, so that at its extreme end it is in a line substantially tangent to the circle of the rack 21. The curvature of the arm might be varied within certain limits, the fittings on the end of the pitman being arranged to correspond. In the slot between the forks 23^a at the end of the pitman and on that side of the pitman which lies under and forward of the arm 25 is journaled a friction-roll 23^b. This friction-roll is fixed with respect to the head of the pitman. At another part of the head of the pitman nearer to its rear end, through each of the forks 23^a, is a slot 23^c. The axis of this lies across the axis of the pitman 23 and substantially at right angles thereto. In the slot, upon an axle that slips along the slot, is a friction-roll 23^d. It is upon this roll that the head of the pitman is carried along the upper curve of the arm 25 when the pitman is retracted. The extreme rear end of the pitman terminates in a blunt arrow-head, one face of which 23^e is utilized as a cam-surface to engage with the hub 21^a and give the final short thrust of great force to the pitman. A branch of the arm 25 lies below the pitman and is provided with a pair of lifting-lugs 23^f, that engage with the under side of the pitman and lift it upward during the time of the retraction. At the extreme end of the arm 25 is a hook or enlargement 25^a, which prevents the accidental disengagement of the pitman from the arm 25. The movable friction-roller 23^d is employed, as were it not so movable the end of the arm 25 would bind between the rollers 23^d and 23^b when the pitman is at its extreme backward position. By employing this movable roller I am enabled to obtain a much longer stroke of the pitman than I otherwise could without making some material change in the shape of the parts.

The extreme or outer end of the arm 25 swings much more rapidly than the inner end, and during the first period of its forward stroke the pitman is pressed forward by the extreme outer end of the arm 25; but as the stroke advances the point of engagement between the pitman is rapidly transferred toward the inner end, until it finally reaches the hub 21^a, and the last compression of the bale is produced by the engagement between the round hub and the blunt end of the arrow-head of the pitman, and as this can be brought very close to the center (within three or four inches) it is apparent that at this point, where the most force is needed and where speed of action can be dispensed with, almost any amount of power can be applied.

Forward of the mechanism described for actuating the pitman and plunger is a strong heavy frame composed of any suitable material—as, for instance, timbers 26, 27, 28, and 29. At the point where the plunger recipro-

eates this is housed in on the sides. On the
 upper side is a hopper 30 and on the lower
 side a grating 31. Beyond the housed-in part
 the frame extends for a distance somewhat
 5 longer than the bale that is to be made, and
 at the outer end the frame-pieces are con-
 nected by vertical rods 32 and 33, which are
 provided with screw adjustments, by means
 of which the upper and lower frame-pieces on
 10 either side can be drawn or sprung toward
 each other. Between the upper and lower
 frame-pieces, on each side, is a spring-stand-
 ard 34, that bellies inward when the frame-
 pieces are drawn toward each other, thus con-
 15 stricting the opening sidewise, and across the
 spring 34 (and there are two such springs,
 one on either side) is a guard 35, that prevents
 the end of the bale from catching on the edge
 of the spring 34. I couple the nuts on the
 20 upper ends of the rods 32 and 33 by a sprocket-
 chain and furnish one of them with a hand-
 wheel. Thus the adjustment of the exit-open-
 ing is produced by the turning of the single
 hand-wheel, and the adjustment of all the
 25 movable parts correspond the one with the
 other. At the front side of the hopper 30 is
 an ordinary hinged folder 36. At the rear of
 the plunger 24 and on its upper side is a
 short rack 37, and at the rear of the frame is
 30 journaled a rock-arm 38, on one end of which
 is a rack 39, so arranged as to engage with
 the rack 37 during the last part of the with-
 drawing motion of the plunger 24.

The extreme end tooth 40 of the rack 39 is
 35 longer than the regular teeth of the rack to
 insure the proper engagement between the
 two racks. The end of the rock-arm opposite
 the rack 39 is curved or bent in a long arm
 that strikes down into the hopper 30, and,
 40 through the hopper 30, pressing down into the
 cavity in front of the plunger the material
 that has been thrown into the hopper and is
 to be formed into the bale. On the front
 face of the packer-arm 41 is an adjustable
 45 piece 42, which I call the "tucker," and this is
 arranged to press down that part of the ma-
 terial which is at the extreme forward end of
 the hopper. It serves to tuck the material
 down under the edge of the folder 36, giving
 50 to the upper surface of the bale an appear-
 ance equally as smooth and regular as that
 which is given to it by the frame at the un-
 der side.

It will be understood that when material
 55 such as hay or straw is thrown into a hopper
 it is naturally folded one forkful at a time
 by the sides of the framework through which
 it travels, so that the under side of each
 small bundle of material becomes somewhat
 60 rounded and is free from ragged projecting
 ends. The tucker which I have added to the
 packer folds in the upper ends also and gives
 to the upper side of the bale that same fin-
 ished smooth appearance which has hereto-
 65 fore been found only on the under side. The
 tucker 42 is adjustably held to the packer 41,
 so that the depth of its penetration into the

cavity can be regulated to conform to the
 character of the material being treated. If
 the material is light, the tucker is set to pene- 70
 trate more deeply than if it is heavy in char-
 acter.

On the shaft 38 is a holding-arm 43, (seen in
 Fig. 1,) and this is actuated by a reach-rod and
 spring-latch 44, located at any point that will 75
 be convenient for the workmen, generally im-
 mediately contiguous to the hopper.

Around the shaft 38 is a coiled spring, from
 which a projecting loop engages with the arm
 46 and tends to rotate the shaft and arm to 80
 lift the long tooth 40 out of the path of the
 rack 37 and prevent the actuating engage-
 ment between the two racks. Such engage-
 ment will be prevented unless the long tooth
 40 is forced downward by a power sufficient 85
 to overcome the tension of the spring 47, and
 this is done by the engagement between the
 reach-rod 48 and the arm 43 whenever it is de-
 sired to bring the two racks into engagement.

The reach-rod 48 is free from but engages 90
 with the arm 43 and acts as a stop to limit
 the movement of the packer under the ten-
 sion of the spring 47, but does not prevent
 the free movement of the packer under the
 actuation of the rack 37. 95

On each side of the cavity below the hop-
 per are the ordinary retaining-forks found in
 presses of this character. The entire frame
 of the machine is mounted on wheels for trans-
 portation, and the power is also mounted on 100
 wheels, which I have not thought it desirable
 to show.

What I claim is—

1. A means for converting rotary into recip-
 rocating motion comprising a suitable frame 105
 and axle, a wheel on said axle, a sweep cross-
 ing the axle, means for locking the wheel to
 the axle during part of its revolution, a means
 for throwing the lock out of engagement dur-
 ing another part of the revolution: an offset 110
 stud and a rock-arm thereon, one branch of
 which is arranged to contact the sweep, the
 other branch of which is linked to a wrist pin
 on the wheel, the contact arm of the rock arm
 being located normally in the path of a con- 115
 tact stud on the sweep and being adapted to
 contact said stud and to swing out of contact
 therewith alternate with the locking engage-
 ment between the wheel and the shaft.

2. In a baling press, in combination with 120
 the frame pieces forming the upper and lower
 walls of the passage way, vertical screw ad-
 justing rods adapted to regulate the vertical
 extent of the opening, vertically disposed
 spring side pieces bending with their convex 125
 sides inward and adapted to regulate the hori-
 zontal extent of the opening, the side pieces
 being adapted to be flexed by the adjustment
 of the frame pieces, substantially as described.

3. In a baling press in combination with a 130
 reciprocating plunger and pitman therefor, a
 vibrating wheel, a means for driving the same,
 a curved arm reaching from the axle of said
 wheel and engaging the end of the pitman and

adapted to drive said pitman with a variable motion substantially as described.

4. In a baling press the combination of a plunger and pitman therefor, a vibrating wheel and means for giving motion thereto, an arm extending in a curve from the axle of the wheel adapted to engage the end of the pitman, an arrow head terminating the pitman, the said curved arm being adapted to reciprocate the end of the pitman across the axle of the wheel during the last part of the forward motion and the first part of the withdrawing motion of the plunger, substantially as described.

5. In a baling press in combination with a plunger and a rack thereon a vibrating feeder, a rack on the rock shaft of said vibrating feeder adapted to engage the rack on the plunger, and a tucking blade on said feeder arranged to strike into the hopper of the press substantially as described.

6. In a baling press, in combination with a vibratory feeder, a means for actuating the same, a hopper, a folder hinged to the hopper, dropping into the path of the plunger and adapted to yield in front of the same, and a tucking blade mounted on the feeder and acting therewith and adapted to strike close down against the folder and tuck in the ends of the material to be packed, substantially as described.

7. In a baling press, the combination of a reciprocating plunger, a pitman, a curved arm engaging therewith, an axle adapted to engage

the pitman, means for actuating the axle and the curved arm, said arm being adapted to actuate the pitman through the greater part of its travel, and to force the end of the pitman into engagement with the axle during a part of its travel, substantially as described.

8. In a press, the combination of a plunger and pitman, a curved arm adapted to actuate said pitman, and having a lifting arm adapted to lift the end of said pitman during the return stroke, and means for actuating the curved arm, substantially as described.

9. In a baling press, the combination with a plunger and pitman of a curved arm adapted to reciprocate the pitman, a friction roll carried by the pitman and journaled in a slot the axis of which lies across the axis of the pitman, whereby said roll is adapted to shift across the axis of said pitman, and means for actuating said curved arm, substantially as described.

10. In a baling press, the combination with a plunger and pitman of a curved arm adapted to reciprocate the pitman, friction rolls carried by the pitman and adapted to engage alternately on the opposite sides of the curved arm, and means for actuating the curved arm, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES H. COLES.

Witnesses:

F. CLOUGH,

VIRGINIA M. CLOUGH.