

No. 685,838.

Patented Nov. 5, 1901.

G. D. HAYES.
BALING PRESS.

(Application filed Apr. 11, 1901.)

(No Model.)

2 Sheets—Sheet 1.

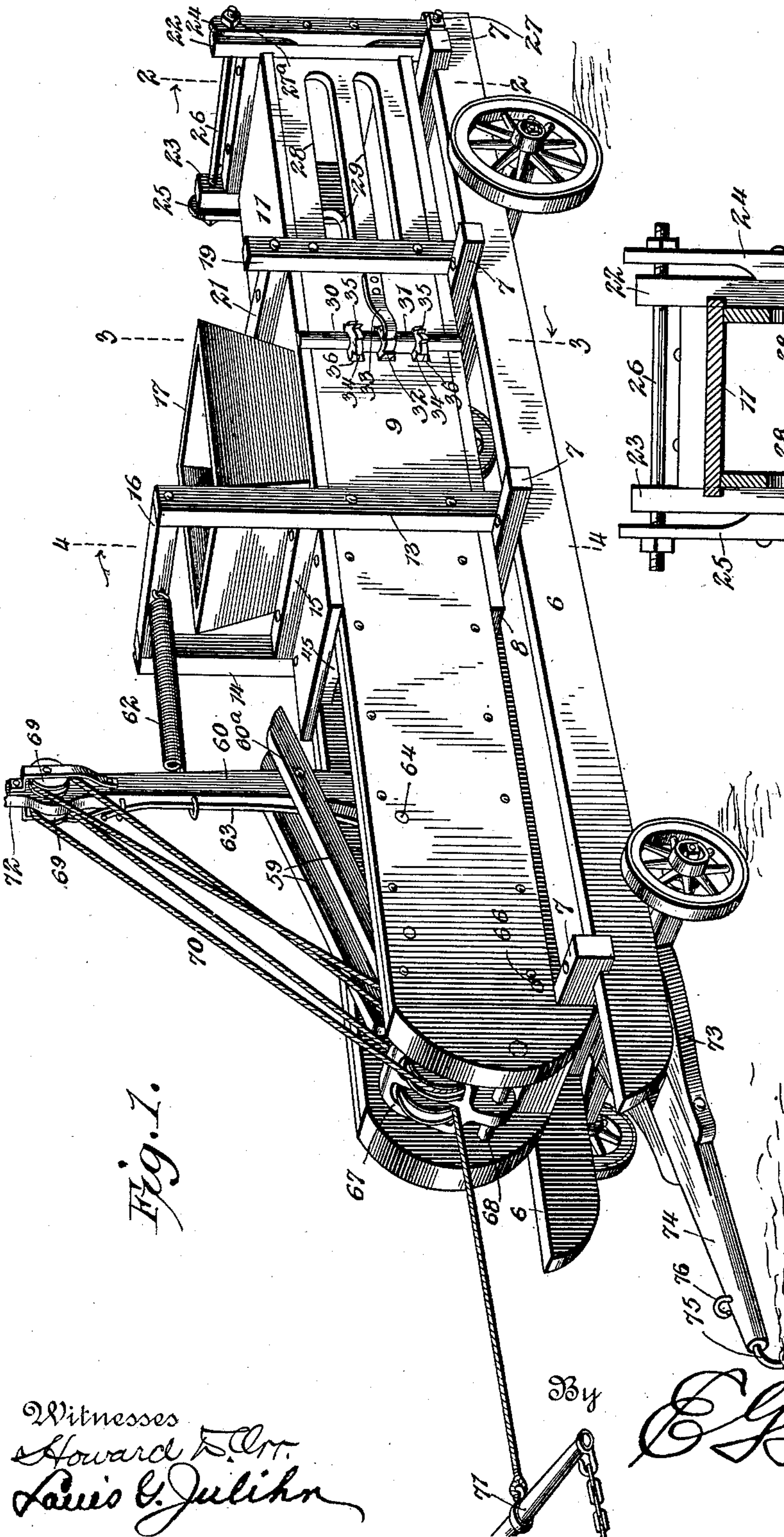


Fig. 1.

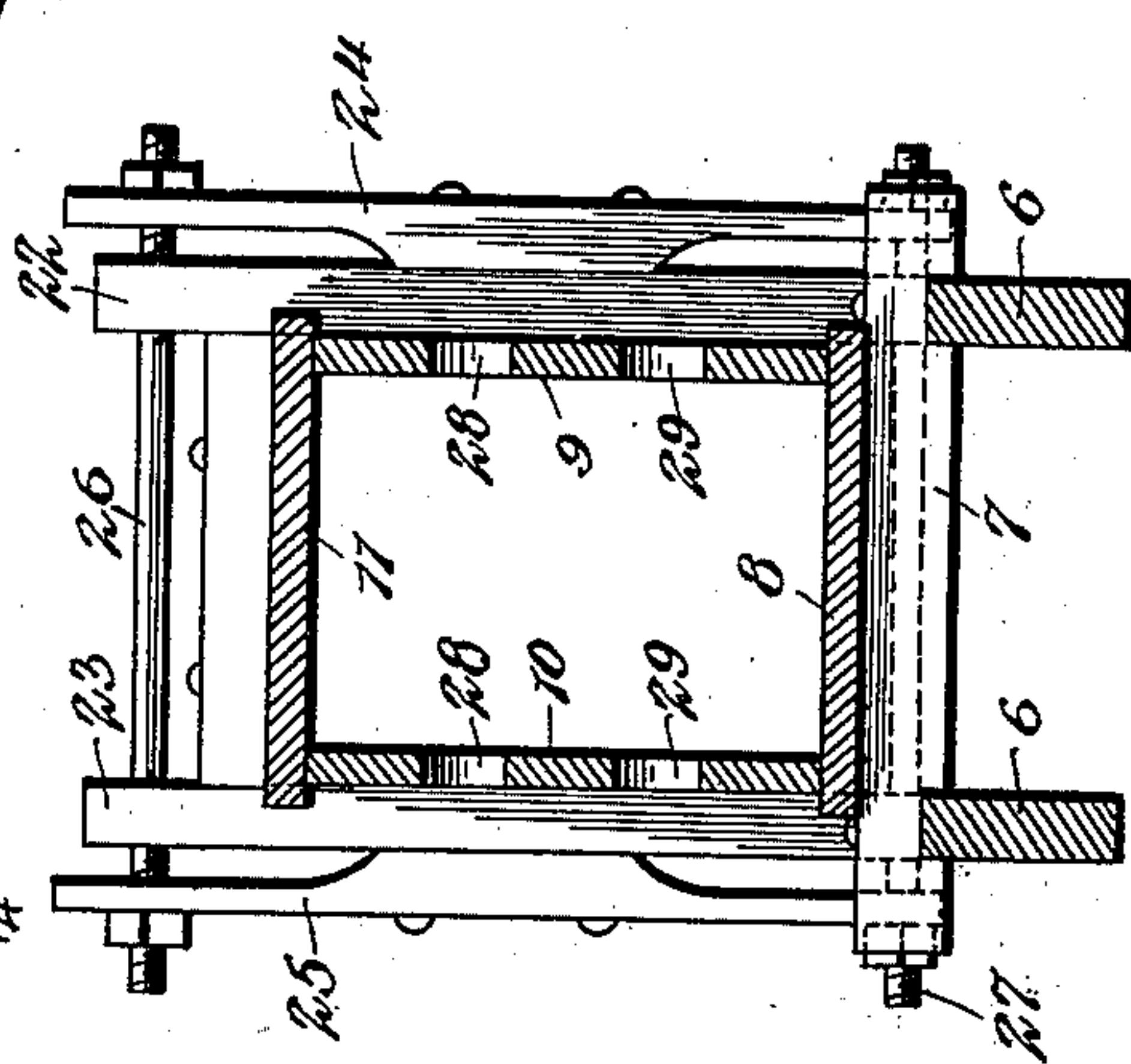


Fig. 2.

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2 Sheets—Sheet 2.

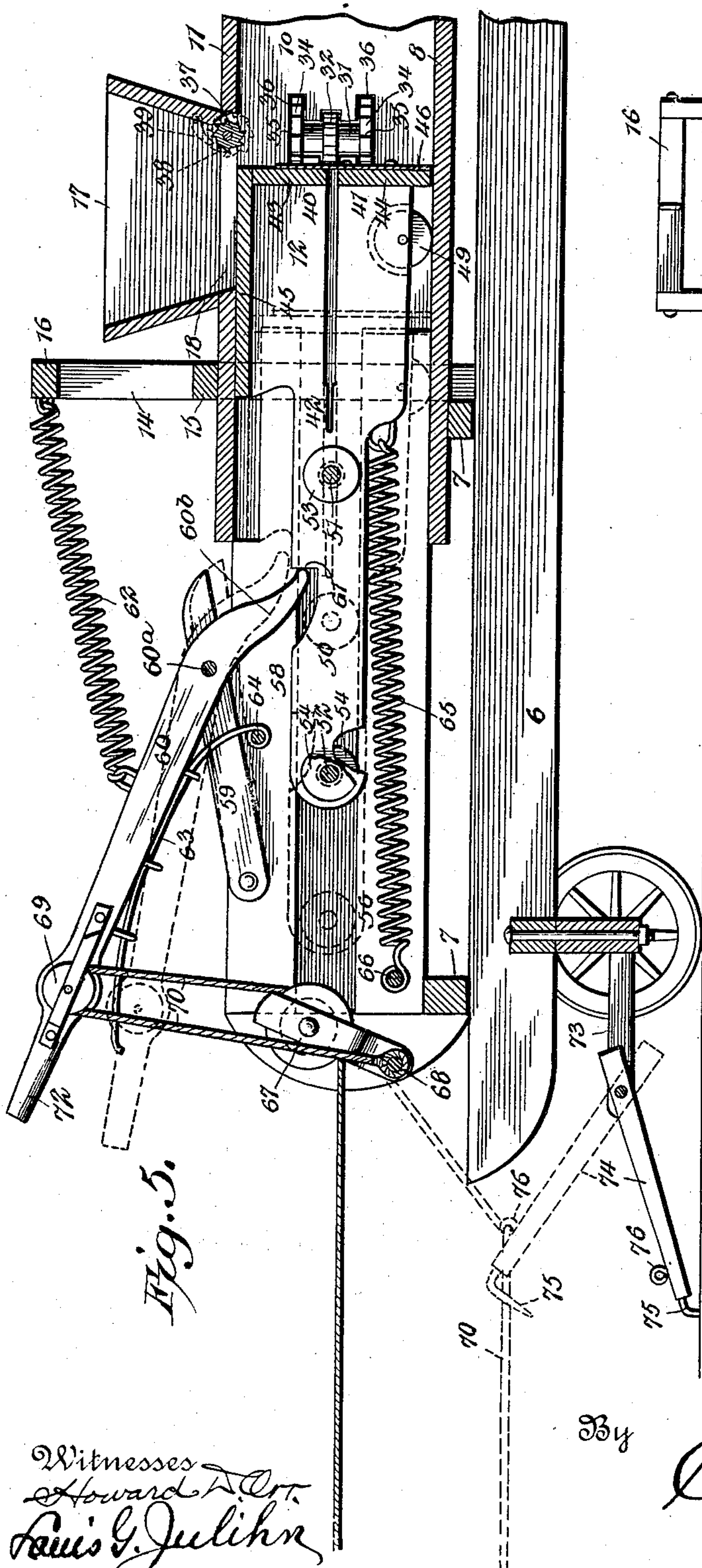


Fig. 5.

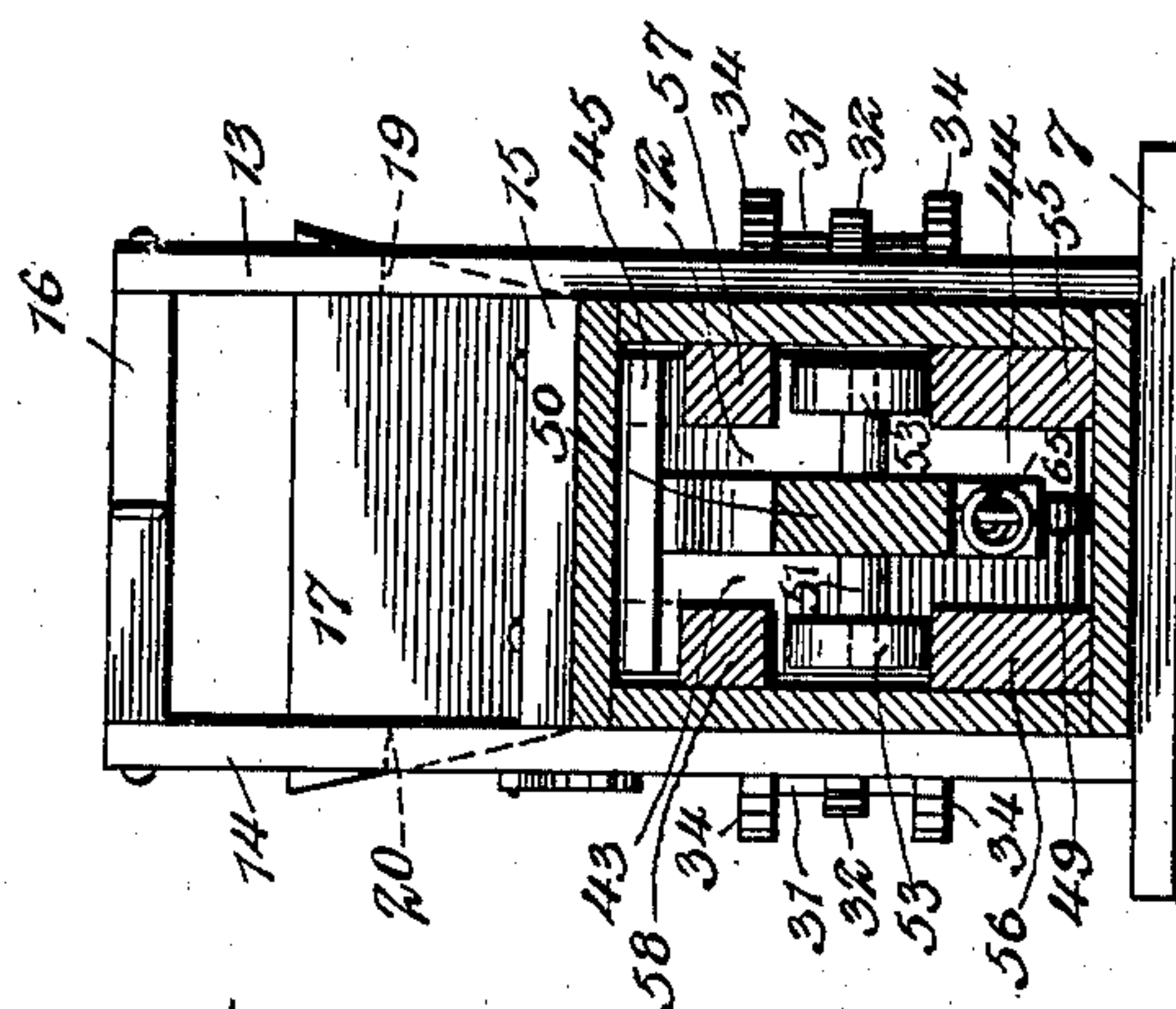


Fig. 4.

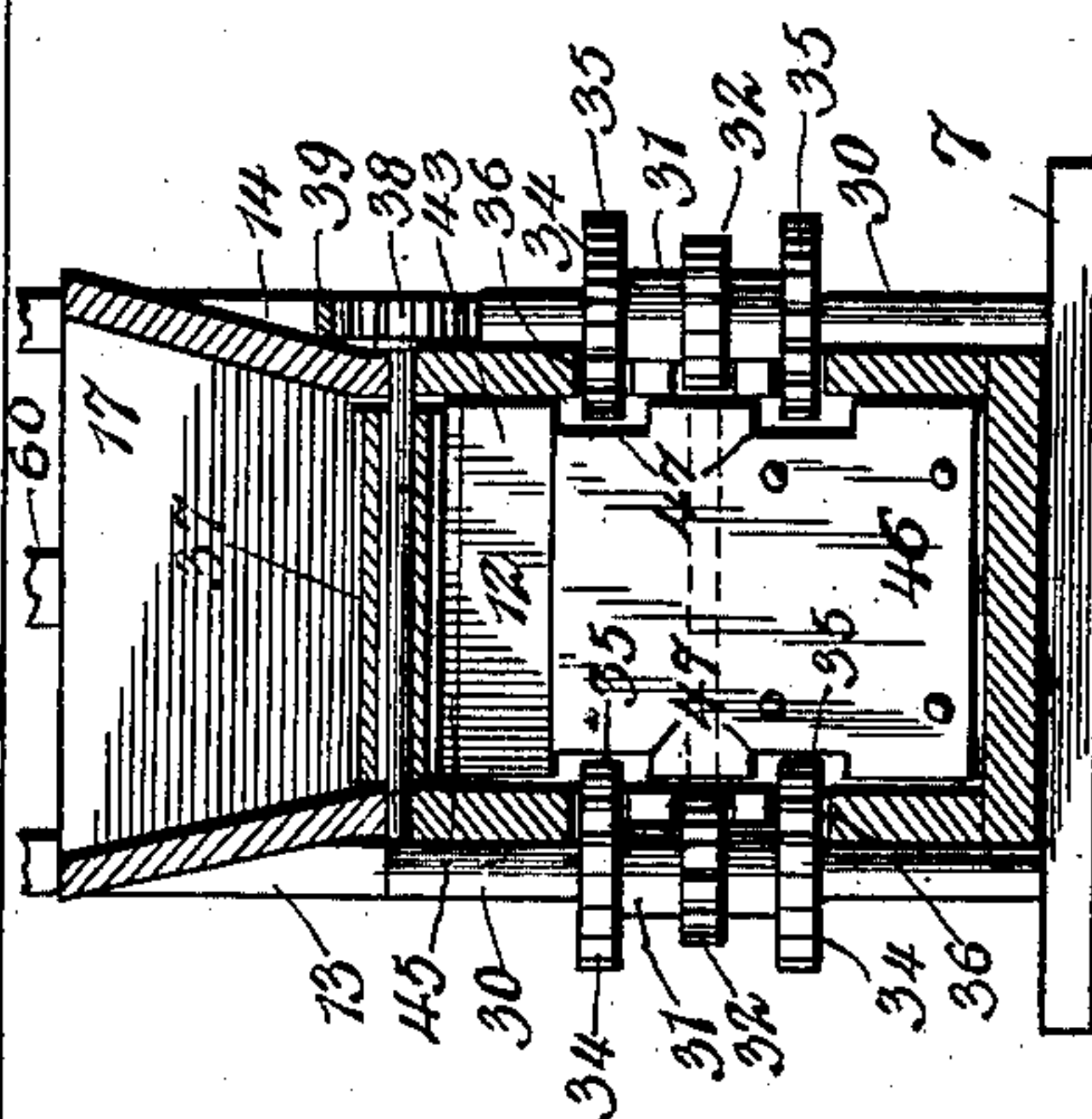


Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE DANIEL HAYES, OF HILLSBORO, TEXAS.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 685,838, dated November 5, 1901.

Application filed April 11, 1901. Serial No. 55,358. (No model.)

To all whom it may concern:

Be it known that I, GEORGE DANIEL HAYES, a citizen of the United States, residing at Hillsboro, in the county of Hill and State of Texas, have invented a new and useful Baling-Press, of which the following is a specification.

My present invention relates to improvements in baling-presses, and has for its object to provide a press of this character with a plunger operated by mechanism actuated either manually or by horse-power, or both, and arranged to exert a maximum compression with a minimum expenditure of power from whatever source supplied.

A further object of the invention is to apply the power to the plunger in a manner to gain speed at the sacrifice of power during the beginning of the plunger-stroke and to accumulate power at the sacrifice of speed at the ending of the stroke, so that the force applied will increase in like proportion as the resistance to the movement of the plunger is increased by the compression of the bale.

A still further object of the invention is to equip the press with a plunger or plunger-head capable of being slightly constricted to prevent the plunger from becoming stuck or wedged in the compression-chamber by the warping or other distortion of the walls thereof or by the wedging of the hay or other material between the plunger and the adjacent wall of the chamber within which it operates.

Another object of the invention is to provide novel check devices for preventing backward movement of the material after it has been forced past the charge chamber or space below the hopper, and still another object is to provide adjustable mechanism for yieldingly retaining the walls of the baling-chamber at the extreme rear end of the press, so that the walls of said chamber at this point will be urged inwardly under any desired pressure, accordingly as a loose or a tightly-compressed bale is required, the application of such yielding resistance permitting slight outward movement of the chamber-walls in the event of the bale becoming chocked, as for instance, when wet or green hay is being handled.

Other objects of the invention subordinate

to those enumerated will be clearly comprehended as the necessity for their accomplishment is developed in the succeeding description of the preferred form of my invention, which I have illustrated in the accompanying drawings and which is embraced within the scope of the appended claims.

In said drawings, Figure 1 is a perspective view of my baling-press complete. Fig. 2 is a transverse sectional view on a somewhat-enlarged scale in the plane of the line 2 2 of Fig. 1. Fig. 3 is a similar view in the plane of the line 3 3 of Fig. 1. Fig. 4 is still another transverse sectional view on the line 4 4 of Fig. 1; and Fig. 5 is a central longitudinal section through a portion of the press, illustrating certain positions of the plunger and plunger-operating mechanism in dotted lines.

For the support of the press as an entirety and in order to facilitate the transportation thereof from place to place I provide a pair of sills or runners 6, which by being equipped with wheels may be transformed into a supporting-truck, as shown in the drawings, although it is evident that the transportation of the press may be effected through the medium of wheels or runners, as may be desired. These sills or runners 6 are retained in spaced relation by cross bars or beams 7, which carry the press proper, comprehending an elongated baling-chamber of the usual form and located approximately midway between the ends of the sills. The baling-chamber is defined between the bottom board 8, side boards 9 and 10, and top 11, the side boards being extended forwardly a considerable distance beyond the front end of the baling-chamber for the purpose of providing a partially-inclosed space for the plunger-operating mechanism, to be hereinafter described, these forwardly-extending portions of the side boards also serving as supporting means for certain of the operating elements.

The plunger 12, constructed in the manner to be described, is mounted for reciprocation, as usual, within the baling-chamber, or at least within that portion usually termed the "charge-chamber," into which the hay is thrown and thereafter forced forward and compressed to form the bale as the plunger

is repeatedly reciprocated. A strengthening-frame, defined by posts 13 and 14 and cross-pieces 15 and 16, is provided upon the exterior of the baling-chamber immediately in advance of the hopper 17, this frame being extended a considerable distance above the top of the press in order to locate the cross-bar 16 at a sufficient elevation to permit the top 11 to be raised upon the release of the cross-bar 15 from the posts, said last-named cross-bar being preferably secured to the top 11. The hopper 17, which is located above a suitable feed-opening 18 in the top of the baling-chamber, is utilized for the purpose of insuring the proper delivery of the hay or other material to the interior of the press in advance of the plunger, and immediately in rear of this hopper the baling-chamber is additionally strengthened by another strengthening-frame, comprising posts 19 and 20, disposed against the sides of the press and connected by a cross-piece 21, imposed upon the top thereof. In a similar manner the extreme rear end of the press is strengthened, but not by rigid frames such as encircle and retain the walls of the baling-chamber proper—that is to say, of that portion of the press within which the plunger operates to compress the material to be baled. Instead of such rigid retention the rear ends of the side walls of the baling-chamber are provided with bars 22 and 23, extending above and below the press and equipped, respectively, with stout springs 24 and 25, secured medially to the bars and having their free ends offset from the outer faces thereof. The contiguous ends of the opposed springs are connected by tension-rods 26 and 27, disposed horizontally above and below the press and preferably guided within the ends of the bars 22 and 23. These tension-rods are preferably in the form of bolts or are provided with nuts 27^a, by means of which the tension of the springs is increased in order to oppose more or less resistance to the separative movement of the side walls of the press as the bale is being forced beyond the constricted portion thereof. By means of this tension mechanism any desired lateral pressure may be exerted upon the bale when the latter is located at the rear end of the baling-chamber, it being understood that those portions of the side walls 9 and 10 located beyond the posts 18 and 19 are provided with suitable openings 28 and 29 to facilitate the tying of the bale prior to its discharge from the press.

I have stated that one of the objects of the present invention is to provide a novel form of check designed to prevent the backward movement of the bale or of the charge after it has been forced beyond the charge-chamber by the reciprocation of the plunger. These checks preferably comprehend shafts 30, mounted beyond the opposite sides of the baling-chamber, preferably at the rear end of the hopper 17, and each serving to rotatably support a check-spool 31, provided at a point

intermediate of its ends with a ratchet-wheel 32, engaging a spring-pawl 33, attached to the press and designed to prevent the rotation of the check-spool in one direction. Each of these spools is provided with terminal check-wheels 34, the check-teeth 35 of which extend through openings 36 in the side walls of the press, the teeth 35 being preferably formed in the manner of ordinary ratchet-teeth, so that the radial faces thereof may be opposed to the hay or other material to prevent the latter from expanding rearwardly into the charge-chamber after having been forced beyond said chamber by the plunger. The action of these check devices is substantially identical with similar appliances now in use; but the specific form of this feature of my press is believed to be patentable, particularly in that aspect in which each of said devices involves a plurality of check-wheels and a retarding device or ratchet mechanism common thereto. For the purpose of similarly preventing or checking the backward movement of the material being compressed and to insure the effective clearing of the plunger as it moves back to its initial position I provide a check-roller 37, located at the rear side of the hopper, at the bottom thereof, and having longitudinally-disposed teeth, as shown, which are engaged by a pawl 39, permitting free rotation of the roller in one direction as the plunger advances and preventing such backward movement thereof as would permit the hay or other material to expand back into the hopper or over the upper side of the rearwardly-moving plunger.

The plunger 12, which has been stated to be another improved feature of the press, is formed with a bifurcated head in order to define relatively movable portions 40 and 41, the rear end of the portion or part 40 being considerably reduced to provide a more or less yielding connection or spring portion, (indicated at 42,) so that when the plunger is subjected to such resistance as might endanger the operation of the press the upper portion or bifurcation 40 of the plunger will yield to permit the plunger to move freely within its chamber. The plunger-head, which is naturally considerably narrower than the press-chamber, is equipped with terminal compression members or plates 43 and 44, extending transversely across the chamber, and a top plate 45, which is sufficiently extensive to prevent the hay or other material fed into the hopper 17 from dropping behind the compression members when the plunger is thrust forward. The members 43 and 44 are secured, of course, to the relatively yielding portions of the plunger-head and are notched, as indicated at 47, for the accommodation of the check-wheels, the space between the compression members being constantly kept closed by a guard-plate 46, secured to the lower member 44 and lying close but loosely against the plate 43. The plunger will thus be observed to comprise the plunger proper,

a bifurcated head, and compressing members carried by the bifurcations of the head and considerably wider than the plunger proper.

By the utilization of the plunger-head having relatively yielding portions and a guard-plate which constantly closes the interval between them I am enabled to secure a plunger which will move freely within the baling-chamber, but the working or compression faces of which will be continuous, so as to preclude the possibility of having the hay caught by the plunger and carried back as the press is operated. The free antifrictional movement of the plunger is further insured by the provision of a supporting-roller 49, carried by the head and traveling upon the bottom of the press, and additional rollers 53 and 54, traveling in ways formed between track-bars 55 and 56 and guide-bars 57 and 58, said rollers being mounted upon trunnions 51 and 52, extending from the opposite ends of an extension or tongue 50, constituting a portion of the plunger. The track and guide bars, constituting supports and keepers for the rollers, are in the present embodiment of the invention fixed upon the inner faces of the side walls of the press; but, if desired, these bars may be eliminated, and the walls of the press might in that event be grooved or otherwise formed with guides for the accommodation of the rollers.

We now come to a consideration of the novel plunger-operating mechanism by means of which, as already stated, I am enabled to operate the press with an economical expenditure of power and in a manner to secure the greatest conversion of energy during the latter portion of the plunger-stroke. The plunger-operating mechanism comprehends a pair of swinging arms 59, supported at their lower ends upon the inner faces of the side walls of the press a considerable distance in front of the baling-chamber and preferably adjacent to the front end of the press. These arms constitute a swinging support for the fulcrum of the plunger-lever 60, designed to be operated to effect a forward reciprocation of the plunger after the charge has been deposited in advance of the compression members through the hopper 17, the shifting fulcrum of the lever 60 being indicated in Fig. 5 of the drawings by the numeral 60^a. The short end of the plunger-lever 60 is formed with a beak 60^b, disposed for engagement with a shoulder 61, formed upon the tongue 50 by notching the upper side of the latter at a point about midway between its ends. In practice the outer or long end of the plunger-lever is drawn down in any suitable manner, and as the plunger is advanced the swinging supports 59 permit the fulcrum 60^a to describe an arc, thereby continuing the operative connection between the beak 60^b and the shoulder 61 for a much greater travel than would be possible if the fulcrum remained stationary and the operative contact were continued only during such an arc as would be

described by the swinging of the beak. The retraction of the lever 60 is effected by one or more reactive elements—as, for instance, a heavy spiral spring 62, connected at one end to the lever 60 at a point above the fulcrum thereof and at its opposite end to the cross-bar 16. This spring is preferably employed when the press is operated otherwise than manually—as, for instance, by horse-power; but when the power available is not sufficiently great to warrant the employment of a spring of this strength a second spring 63 may be employed in lieu of the spring 62, or in some instances both of these springs may be employed at the same time. The spring 63 is of the ordinary strip type and is carried at its lower end upon a pin 64, secured to the press-frame, and is guided by any suitable means to insure its proper operative relation with the lever 60. The retraction of the plunger, as will hereinafter more fully appear, is entirely independent of the retraction of the operating mechanism, because at the limit of the plunger-stroke the operating-lever is automatically disengaged therefrom, and the plunger is returned to its initial position by a sudden movement, so that the charge-chamber may be entirely clear and the operator may be engaged in depositing a new charge before the plunger while the draft-animals are being backed to again position the operating mechanism for a repetition of the compressing operation—that is to say, the plunger is of course advanced as the operating mechanism is moved by the power applied; but as some considerable time is consumed in retracting the operating mechanism or restoring it to its original position this time is utilized for resupplying the charge-chamber, and this economy is practiced by the employment of a reactive element—as, for instance, a spring 65, secured at one end to the plunger and at its opposite end to a pin 66—for the purpose of restoring the plunger to its initial position after its work has been accomplished. The manual operation of the lever 60 is facilitated by the provision of a handle 72 at the outer end thereof; but as the press will ordinarily be power-operated a double-sheaved block 67 is preferably swung over the cross-bar 68 at the front end of the press, and a pair of sheaves 69 are mounted upon the lever 60, these several sheaves, in connection with a rope or cable 70, constituting block-and-tackle-operating mechanism. As illustrated in Fig. 5 of the drawings, the cable is secured at one end to a bar 68 and after being reeved through the blocks in a manner well understood in the art is attached to an operating element—as, for instance, a singletree 71—to which the draft animal or animals are attached.

One of the objects of my invention, which, however, is perhaps subordinate to those already enumerated as being primary, is the arrangement of the press for transportation, or rather for movement for short distances—as,

for instance, from one stack of hay to another—without necessity for disorganizing the power mechanism or without detaching the draft-animals therefrom. To the accomplishment
 5 of this end a pair of hounds 73 are extended forwardly from the running-gear of the press and pivotally sustain a short draft tongue or pole 74, equipped with an upstanding hook 76 adjacent to its front end and with a down-
 10 wardly-disposed pointed anchor-hook 75 at its outer extremity. Ordinarily the anchor-hook 75 is held in engagement with the ground by the weight of the tongue and constitutes a check for preventing the forward movement
 15 of the press when the necessary strain is imposed upon the cable by the draft-animals. Supposing, however, that it is desired to move the press a short distance, it is simply necessary to shift the cable under the hook 76,
 20 when, as will be evident, the forward movement of the draft-animals will first lift the tongue out of contact with the ground and will then move the press until the latter is again permanently located or chocked by the
 25 release of the cable from the hook 76 and the dropping of the tongue to cause a reengagement of the anchor-hook 75 with the ground. When this has been done, the press will be again in condition for operation and the bal-
 30 ing of the hay may be proceeded with.

Briefly, the operation of the press is as follows: The hay or other material fed to the hopper 17 is received within the charge-chamber, and the horses are started forward. The
 35 beak 60^b of the operating-lever 60 by engagement with the shoulder 61 of the plunger will advance the latter until the charge has been forced beyond the check-wheels 35 and check-roller 37, the backward rotation of which
 40 checking device is prevented in the manner pointed out. During the main portion of the plunger travel it will be operated under considerable speed by reason of the fact that
 45 while the lower end of the lever 60 is traveling through the horizontal arc of its movement the fulcrum 60^a will be practically stationary. As soon, however, as the beak 60^b
 50 reaches that point of its movement where, presupposing a fixed fulcrum for the lever, it will begin to travel through a vertical arc, the fulcrum 60^a instead begins to describe a downward arc, due to the downward swinging
 55 of the supports 59. After this point is reached, therefore, the continued forward movement of the plunger is under the action of a toggle defined by the swinging arms 59 and the short
 60 end of the lever 60, the result being that the advance of the plunger during the latter portion of its movement will be due largely to the arcuate movement of the fulcrum 60^a, although, of course, as the power is applied to the
 65 long end of the lever there will also be slight independent forward movement of the beak 60^b aside from that imparted by the shifting of its fulcrum. As soon as the limit of stroke is reached the beak 60^b by reason of its curvature will have been withdrawn to a position

above the shoulder, and the sudden retraction of the plunger will be effected through the medium of the powerful reactive element
 70 65. If now the cable is slackened, the springs 62 or 63, or both of them, will effect the retraction of the operating-lever, the beak of which will again engage the shoulder 61 whenever said beak has been urged rearwardly a
 75 sufficient distance to permit it to drop into the notch formed in the tongue 50, at which time a repetition of the operation may be effected. In like manner the various other features of the invention are made manifest
 80 in the operation of the press—as, for instance, the yielding of the bifurcated plunger-head will prevent the sticking thereof in the baling-chamber, the novel checking devices will prevent the rearward movement of the hay
 85 after the charge is thrust forward and compressed, and by means of the springs 24 and the tension-rods 26 and 27 the sides of the baling-chamber may be urged inwardly with
 90 sufficient pressure to effect any desired lateral compression of the bale immediately prior to the discharge thereof from the press.

From the foregoing it will be observed that I have produced a simple, durable, and efficient
 95 baling-press designed to be manually or power operated and to accomplish the compression of hay or other suitable material into bales with a minimum expenditure of power from whatever source it may be obtained; but while the illustrated embodiment
 100 of the invention appears at this time to be preferable I wish to reserve the right to effect such changes, modifications, and variations as may be suggested by experience and experiment, so long as they are properly em-
 105 braced within the scope of the protection prayed.

What I claim is—

1. The combination with a portable baling-press, and a cable connected to said press for
 110 the application of power thereto, of a pivoted tongue provided with an upstanding hook and with a terminal depending anchor, said anchor being designed to engage the ground to hold the press against movement, and said
 115 hook being designed for engagement with the cable, whereby power applied to the latter will first swing the tongue upwardly to disengage the anchor from the ground and will then be exerted to transport the press to an-
 120 other point of use.

2. In a baling-press, the combination with the baling-chamber, a plunger movable therein, and means for retracting the plunger, of a swinging lever-support, a plunger-operating lever fulcrumed upon said swinging support and disposed for engagement with the
 125 plunger and means for effecting the complete automatic disengagement therefrom at one limit of its movement.

3. In a baling-press, the combination with the baling-chamber, a plunger movable therein, and plunger-retracting mechanism, said
 130 plunger being provided with a vertical shoulder

der, of a pair of swinging arms supported by the press-frame, a plunger-operating lever fulcrumed between the free ends of said arms and provided with a curved beak disposed for engagement with the vertical shoulder of the plunger, means for operating the lever to reciprocate the plunger and to automatically disengage the lever from the plunger at one limit of movement of the latter, and a reactive device for restoring said lever to its normal position.

4. In a baling-press, the combination with the baling-chamber, a plunger and plunger-retracting mechanism, said plunger being notched in its upper side to form a vertical shoulder, of a pair of terminally-pivoted supporting-arms, an operating-lever fulcrumed between the free ends of said arms and provided with a curved beak engaging the shoulder, reactive mechanism for restoring the operating-lever to its normal position, and block-and-tackle operating means for operating the lever against the resistance of the retracting devices and for effecting the automatic disengagement of the beak from the vertical shoulder of the plunger.

5. In a baling-press, the combination with the baling-chamber, of a plunger comprising a bifurcated head, the bifurcations of which are disposed to yield laterally, a compression member carried by each bifurcation of the head, and extended horizontally beyond the opposite sides of the plunger proper, a guard disposed to protect the interval between the

compression members, and means for operating the plunger.

6. In a baling-press, the combination with the baling-chamber, and a plunger having a bifurcated head, the upper bifurcation of which is designed to yield laterally, of anti-friction-rollers carried by the plunger and movable in the sides of the press-frame, and other rollers carried by the lower portion of the plunger-head and movable upon the bottom wall of the press-frame, compression members carried by the bifurcations of the plunger-head, a guard-plate secured to the lower compression member and having slidable contact with the upper compression member, and means for operating the plunger.

7. In a baling-press, the combination with the baling-chamber and plunger, of check-spools disposed beyond the opposite sides of the chamber, each of said spools being formed with terminal check-wheels extended into the chamber, and with a ratchet-wheel disposed between and of less diameter than the check-wheels, a pawl disposed for engagement with each of the ratchet-wheels to prevent rearward rotation of the check-spools, and means for operating the plunger.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE DANIEL HAYES.

Witnesses:

GEO. A. NEWTON,
E. T. JOHNSON.