No. 818,779. PATENTED APR. 24, 1906.

M. C. NIXON.

BALING PRESS.

APPLICATION FILED JAN. 5, 1901.

2 SHEETS—SHEET 1.

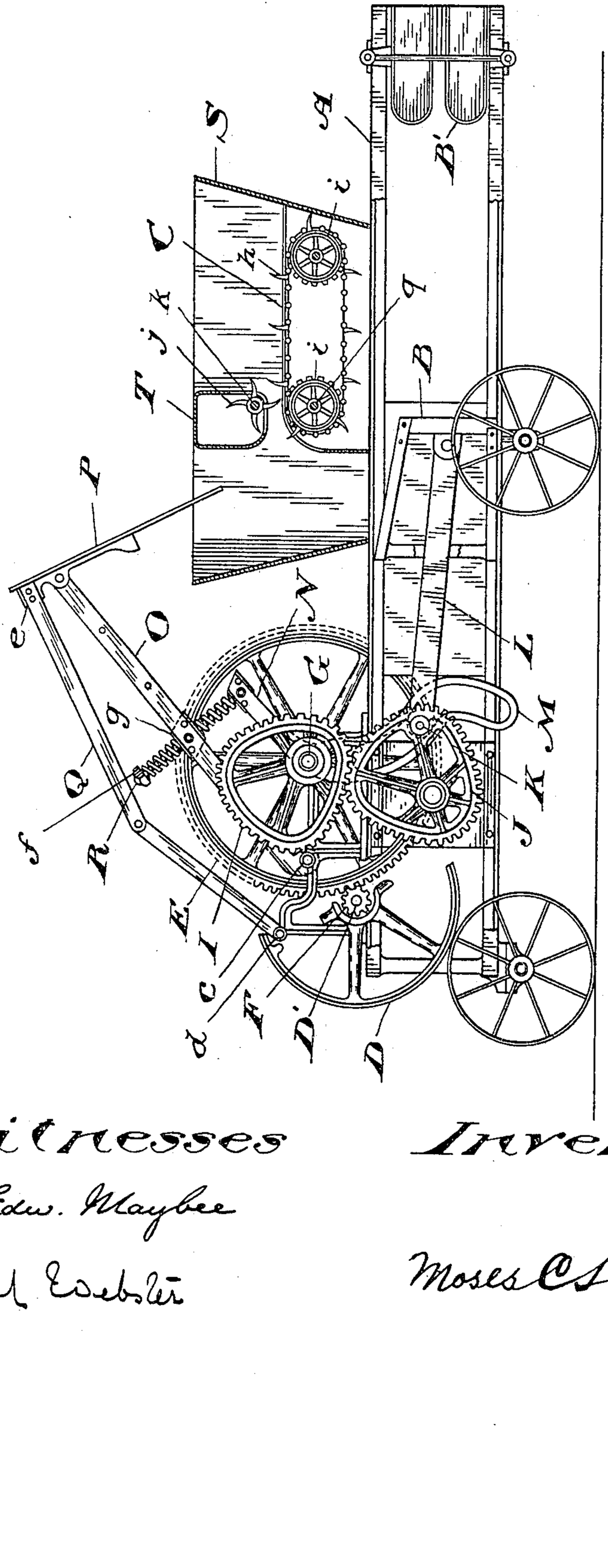

Fig. 1.

Witnesses

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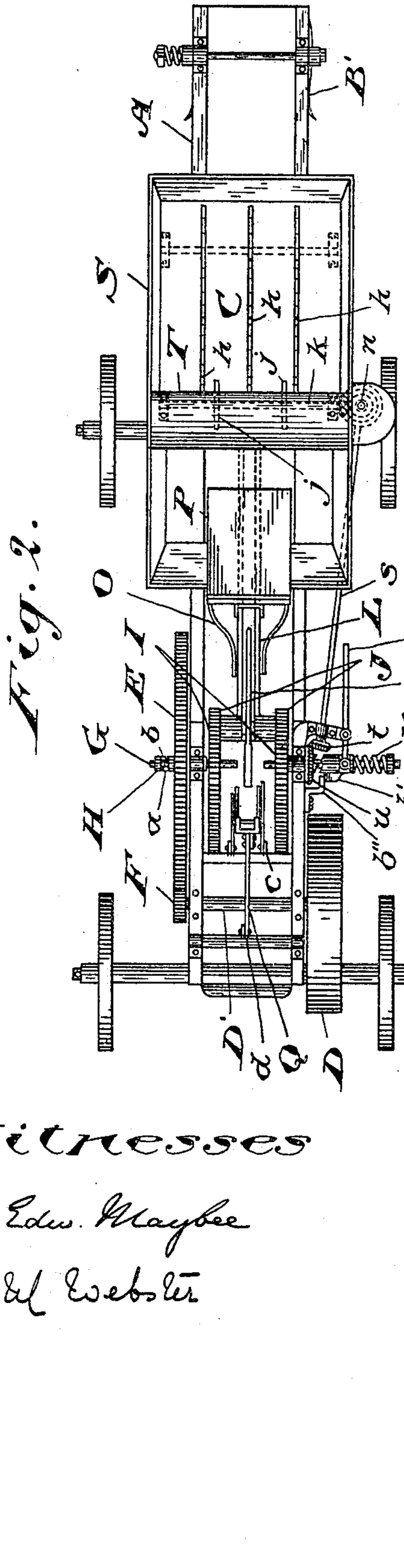

Fig. 2.

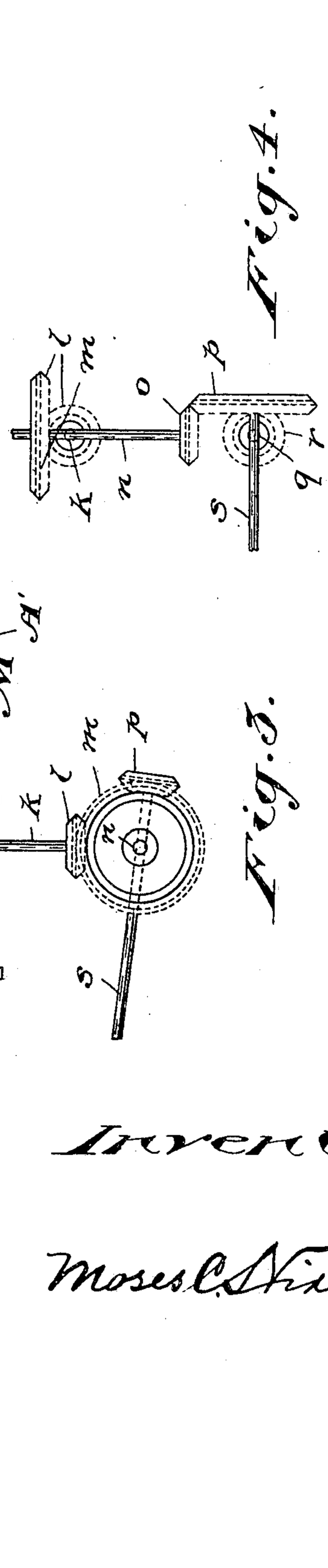

Fig. 4.

Fig. 3.

Witnesses

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MOSES C. NIXON, OF FORT WAYNE, INDIANA.

BALING-PRESS.

No. 818,779. Specification of Letters Patent. Patented April 24, 1906.

Application filed January 5, 1901. Serial No. 42,224.

To all whom it may concern:

Be it known that I, MOSES C. NIXON, of the city of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Baling-Presses, of which the following is a specification.

My invention relates to that class of baling-presses commonly known as "continuous" or "perpetual" presses; and the objects of my invention are to improve the gear by means of which the plunger is operated, to improve the means of operating the feeder, to provide improved means for conveying the material beneath the said feeder, and to otherwise improve the machine; and it consists, essentially, in the construction hereinafter more specifically described and then definitely claimed.

Figure 1 is a side elevation of my improved press, parts being broken away to better show the interior construction. Fig. 2 is a plan view of the same, also partly broken away. Figs. 3 and 4 are details of the gearing operating the mechanism for conveying the material to the feeder.

In the drawings like letters of reference indicate corresponding parts in the different figures.

The body or case of the press is lettered A and is mounted upon a running-gear, such as is usual in this type of machine. Mounted upon the shaft D′ a belt-pulley D is shown, which is adapted to receive and transmit power to the gear-wheel E by means of gear-pinion F. The gear-wheel E is loose upon the shaft G and its hub is provided with a lug *a*. Secured to the shaft G is a collar H, provided with a similar lug *b*. By the rotation of the gear-wheel these lugs may be caused to engage and the shaft driven; but the form of connection permits the shaft at any time to run ahead of the gear-wheel. Upon the shaft G are secured the gear-wheels I, meshing with the gear-wheels J, journaled upon stud-shafts projecting inward from the frame of the machine. The gear-wheels I and J are similar and of peculiar construction, as shown. The opposite ends of each gear are arcs of circles struck substantially from a common center, but with different radii. In each arc the number of teeth is the same, and the teeth between the ends of these arcs are struck on a suitable curve to enable the gear-wheel to mesh properly with the teeth of the gear-wheel with which it is expected to engage. The proportions shown in the drawings are substantially correct; but in any case a skilled mechanic would be able, when given the number, size, and pitch circles of the end teeth of the gear, to fill in the sides in a satisfactory manner. It is not the intention to limit the invention in these gears to the exact construction herein described, for the ends could be varied somewhat from an exact arc struck from a common center and still obtain practically the same results. The purpose of so constructing these gears will be more particularly described when the general construction of the machine has been more fully set out. The power-crank is formed by connecting the gear-wheels J by the wrist-pin K.

The pitman L is suitably connected with the plunger B and the wrist-pin K and is constructed of parallel parts to permit of the cam M of the operating-lever N passing between its two parts. This cam M is shaped substantially as shown, its middle part being curved forward toward the plunger to meet the upward stroke of the wrist-pin K or other suitable connection with the power. The shape of the cam and movement of the wrist-pin transmitting the power causes the motion of the feeder to be slow at the upper and rapid at the lower portion of its stroke, thus enabling it to enter the press-chamber after the plunger has been withdrawn and escape out of the way as it again advances. The feeder-arm O is pivoted on the frame of the machine at *c*, as shown in Fig. 1. As the pivot *c* is preferably at or below the level of the shaft G, the feeder-arm is bent, as shown, to permit of it descending to a horizontal position without interfering with the shaft. P is a feeder of ordinary construction and preferably pivotally connected to the end of the feeder-arm O. Q is a jointed arm pivotally secured at *d* to the frame of the machine and fast at *e* to the feeder P. To the end of the operating-arm N is pivoted a rod R, which passes through a block *g*, pivotally connected to the feeder-arm O. The end of this rod R extends above the feeder-arm and has a nut *f* or other spring-retaining device secured thereto.

Between the end of the operating-arm and the feeder-arm is placed a coil-spring, and a similar coil-spring is placed between the feeder-arm and the nut *f* or other spring-retaining device. The purpose of this connection is that when the feeder is brought

down by the action of the crank wrist-pin K on the cam-arm M its operation will not be rigid; but by the yielding connection shown no damage will be done by the feeder striking solid lumps of material or being otherwise prevented from reaching to the full ordinary limit of its stroke. The yielding connection below the feeder-arm serves as a cushion to ease the jar when the feeder having reached the lowest part of its stroke is rapidly thrown upward by its operating mechanism.

Other arrangements of the yielding connection may be made without departing from the spirit of my invention.

The yielding spring connection below the feeder-arm acts as a cushion and also forms a pushing connection, as the operating-arm by its means pushes up the feeder-arm and the similar connection above the feeder-arm forms a pulling connection, as by its means the operating-lever pulls down the feeder-arm.

Another advantage of the feeder being operated by the arm N is that the swing or stroke of the feeder can be regulated by making the said operating-arm longer or shorter, and other well-known flexible connections between the operating-arm and the feeder-arm might be employed.

The rear part of the receiving and feed hopper S is provided with a slotted bottom or feed-platform C. Through the slots work the teeth *h*, carried by endless chains running on sprocket-wheels *i* on shafts with suitable journal-bearings on the frame of the machine. The forward end of this slotted bottom or platform is curved downward, as shown, and serves as a stripper for the teeth. Above the front end of this slotted bottom is located a hollow partition T, suitably slotted at its lower rear side and bottom to permit of the passage of the projecting teeth *j* of the revolving shaft *k*. Between this partition T and the bottom C is a suitable opening through which the material to be pressed is conveyed beneath the end of the feeder P. As the teeth on the revolving shaft *k* travel at a higher rate of speed than those carried by the endless chain, they serve to tear apart the material that is being fed into the machine, thus preventing the machine from choking and also helping to facilitate the feeding.

Of course other well-known forms of conveyers might be employed to carry the material to the revolving teeth *j* and under the feeder P. The mode of operating this mechanism is as follows: To the end of the shaft *k* is secured a bevel gear-wheel *l*. (See Figs. 3 and 4.) With this bevel gear-wheel meshes the bevel gear-wheel *m*, secured to the vertical shaft *n*. The lower end of this vertical shaft bears a bevel-pinion *o*, which meshes with the bevel gear-wheel *p*, secured to the end of the shaft *s*. With the bevel gear-wheel *p* meshes the bevel-pinion *r*, secured to the shaft *q* of the forward sprocket-wheels *i*. The shaft *s* is journaled upon suitable bearings, and its other end is provided with a bevel-pinion *t*, which meshes with the bevel gear-wheel *u*, loose on the shaft G. *v* is a spring operating the sliding half of a clutch of any suitable description, by means of which the bevel gear-wheel *u* may be put into driving connection with the shaft G. The clutch is operated automatically by means of a cam *b'*, affixed to the sliding and revolving half of the clutch coming into contact with a suitably-carried stationary cam *b''*, which is so placed as to be engaged once every revolution by the cam *b'*. Thus once every revolution the bevel gear-wheel *u* is thrown out of driving connection with the shaft G and the mechanism conveying the material to the feeder is stopped just at the moment the feeder P is descending into the hopper to force the feed down in front of the plunger and the conveying mechanism does not resume operations until the feeder again rises out of the way on its upward movement, it being the intention to provide automatic means to cause the conveyer to cease delivery of material to the feed-opening during the time the feeder is in the feed-opening to prevent accumulation of material against said feeder. The lever A' is pivotally connected with the clutch in the ordinary manner and also to a fixed bearing and is used for the purpose of holding the clutch out of contact and thus stopping the material from being carried into the feed-opening at the time it is desired to place division-blocks in the machine or for other purposes. There is nothing particularly novel in the discharge end B' of the press, as this is shown and described in prior patents, and detailed description is here unnecessary.

Having now described the construction of the machine, it is possible to explain more fully the peculiar advantage of the particular construction of the gear-wheels I and J already described, which is that the forward stroke of the plunger is rapid, while there is but little resistance. Then as it advances it slows down and the power increases until it reaches a maximum, which is maintained to meet the uniform resistance during the remainder of the stroke, when it is very rapidly returned for the next forward stroke. Though the power of the gearing is as described the toggle action of the pitman L somewhat increases the power toward the end of the stroke. This increase is, however, not at all objectionable. It is of course well understood by any mechanic that when the short radii of the gear-wheels I engage with the long radii of the gear-wheels J the motion of the plunger will be slow and power great, while when the reverse is the case the power is small and the speed great.

The elliptic gear-wheels or other mechan-

ism for decreasing the speed and increasing the power increase the power up to a certain point and then immediately commence to decrease, so when it is desired to maintain a great maximum power during a part of the stroke the advantage of my improved gear-wheels is obvious.

What I claim as my invention is—

1. In a baling-press of the class described, a frame; a power-transmitting gear operating a driving-shaft; a pair of gears carried by the said shaft and each distinguished by the following characteristics, the teeth at opposite ends of the gear are equal in number and are struck substantially from a common center but with different radii and the teeth at the sides are formed on curves suitably described to connect the arcs of the end teeth, in combination with a pair of coöperating gears, of similar form to the former gears, mounted upon stud-shafts fixed on the frame; a wrist-pin carried by the said second pair of gears; a compressing-plunger and a pitman connecting the wrist-pin and plunger.

2. In a baling-press of the class described, a frame; a power-transmitting gear operating a driving-shaft; a gear carried by the said shaft and distinguished by the following characteristics, the teeth at opposite ends of the gear are equal in number and are struck substantially from a common center but with different radii and the teeth at the sides are formed on curves suitably described to connect the arcs of the end teeth in combination with a coöperating gear of similar form mounted upon a shaft fixed on the frame; a wrist-pin carried by the said second gear; a compressing-plunger and a pitman connecting the wrist-pin and plunger.

3. In a baling-press of the class described, a frame or body and a plunger reciprocating therein, in combination with a hopper communicating therewith; an oscillating feeder adapted to push in material in front of the plunger; a bottom within the hopper behind the feeder; endless conveyers suitably arranged and driven to convey beneath the feeder material dropped on the bottom; a shaft rotating once for every full stroke of the plunger; a loose gear-wheel on the said shaft; a spring-actuated sliding clutch connection between the said shaft and gear-wheel; a lug on the sliding part of the clutch; a cam secured to some stationary part so that it is engaged by the said lug once every revolution of the shaft; and a driving-shaft arranged to drive the endless conveyers and geared to the said loose gear-wheel.

4. In a baling-press of the class described, a frame or body with a feed-opening in the top and a plunger reciprocating within the body, in combination with an oscillating feeder working through the feed-opening; conveying mechanism suitably arranged and driven to supply material beneath the feeder; a shaft rotating once for every full stroke of the plunger; a loose gear-wheel on the said shaft; a spring-actuated sliding clutch connection between the said shaft and gear-wheel; a lug on the sliding part of the clutch; a cam secured to some stationary part so that it is engaged by the said lug once every revolution of the shaft; and a driving-shaft arranged to drive the endless conveyers and geared to the said loose gear-wheel.

5. In a baling-press of the class described, a frame or body with a feed-opening in the top, and a plunger reciprocating within the body, in combination with an oscillating feeder working through the feed-opening; a slotted feed-platform adjacent to the feed-opening and having a portion extending downwardly toward the feed-opening; toothed chains carried by suitably-supported and driven sprocket-wheels so as to work through the said slots; a hollow slotted partition arranged across the machine above the forward end of the feed-platform, and suitably supported and driven rotating teeth working through the slots in the said partition.

6. In a baling-press of the class described, a frame or body with a feed-opening in the top and a plunger reciprocating within the body, in combination with an oscillating feeder working through the feed-opening; a slotted feed-platform adjacent to the feed-opening and having a portion extending downwardly toward the feed-opening; toothed chains carried by suitably supported and driven sprocket-wheels so as to work through the said slots; a hollow slotted partition arranged across the machine above the forward end of the feed-platform, and suitably supported and driven rotating teeth working through the slots in the said partition; and automatic means for stopping the drive of the chains and rotating teeth while the feeder is in its down position.

7. In a baling-press of the class described, a frame or body with a feed-opening in the top and a plunger reciprocating within the body, in combination with an oscillating feeder working through the feed-opening; a slotted feed-platform adjacent to the feed-opening and having a portion extending downwardly toward the feed-opening; toothed chains carried by suitably supported and driven sprocket-wheels so as to work through the said slots; a hollow slotted partition arranged across the machine above the forward end of the feed-platform, and suitably supported and driven rotating teeth working through the slots in the said partition and driven at a greater speed than the teeth of the chains.

8. In a baling-press of the c'ass described, a frame or body with a feed-opening in the top thereof, and a plunger reciprocating therein in combination with a hopper com-

municating therewith; a suitable conveyer for conveying material from said hopper to said feed-opening; means to drive said conveyer; a feeder adapted to push the material in front of the plunger; and automatic means for throwing the conveyer out of gear when the feeder enters the feed-opening and again throw said conveyer in gear when the feeder escapes therefrom.

9. In a baling-press of the class described, a frame; a driving-shaft; a gear carried by said shaft and distinguished by the following characteristics, the teeth at opposite ends of the gear are equal in number and struck substantially from the axial center but with different radii and the teeth at the sides are formed on curves suitably described to connect the arcs of the end teeth, in combination with a suitably-supported coöperating gear of similar form; a compressing-plunger; and driving connection between the plunger and said coöperating gear.

10. In a baling-press of the class described, a frame having in connection therewith suitable driving mechanism; a feeder-arm pivoted at one of its ends to the frame and having a feeder secured to the outer end; and a pivoted operating-lever having oscillating motion, and connected to said driving mechanism to be actuated thereby, and having driving connection with the feeder-arm at a point between the pivotal point thereof and the feeder.

11. In a baling-press of the class described, a frame or body with a feed-opening therein; a feeder adapted to move into and out of said feed-opening and push material therein; a conveyer to deliver material to said feed-opening; and automatic means to cause the conveyer to cease delivery of said material during the time the feeder is in the feed-opening.

12. In a baling-press of the class described, the combination of a frame; a feeder-arm pivoted on the frame; a feeder carried by the said arm; an oscillating operating-lever; a rod pivoted at one end to one arm of the operating-lever, and arranged longitudinally movable through the feeder-arm; a spring-retaining device at the free end of the said rod; a coil-spring placed on the rod between the operating-lever and the feeder-arm; another coil-spring between the feeder-arm and the spring-retaining device; and means in constant connection with the other arm of the operating-lever for oscillating the same.

13. In a baling-press of the class described, a frame or body with a feed-opening therein; a feeder working into and out of the feed-opening; a suitable conveyer for conveying material to said feed-opening; driving mechanism having connection with the feeder to actuate the same; a clutch, one member of which has fixed relation with the driving mechanism, and the other member of which has driving relation with the conveyer, the latter member being adapted to be engaged and driven by the former member; and automatic means to disengage one of said clutch members from the other, while the feeder extends into the feed-opening.

14. In a baling-press of the class described, a frame or body with a feed-opening therein and having a feeder adapted to work into and out of the feed-opening, the feeder having in connection therewith suitable driving mechanism to actuate the same; and a conveyer adapted to convey material to the feed-opening and having in connection with said driving mechanism suitable means to actuate the former, except while the feeder is in the feed-opening.

15. In a baling-press of the class described, a frame or body having a feed-opening therein; a plunger operating within the frame, a reciprocating feeder adapted to move into and out of the feed-opening; a conveyer for conveying material to the feed-opening; an intermittently-operated conveyer adapted to convey material to the opening; and suitable driving mechanism for actuating the plunger, feeder, and conveyer, the movement of the conveyer being so timed to the action of the feeder that the former will be idle when the latter extends into the opening.

16. In a baling-press, a compression-chamber having a feed-opening therein; a conveyer for conveying material to the feed-opening; a feeder adapted to force said material through the feed-opening into the compression-chamber; and means for rendering the conveyer inoperative while the feeder extends into the feed-opening.

17. In a baling-press of the class described, a frame or body with a feed-opening in the top thereof, and a plunger reciprocating therein; a suitable conveyer for conveying material to said feed-opening; a feeder adapted to push material in front of the plunger; suitable driving mechanism to actuate said plunger, conveyer and feeder; and automatic means in connection with the driving mechanism for throwing and holding the conveyer out of gear during the time the feeder extends into the feed-opening.

18. In a baling-press of the class described, a frame or body with a feed-opening therein; a feeder adapted to move into and out of said feed-opening and push material therein; a conveyer to deliver material to said feed-opening; driving mechanism in connection with the feeder and conveyer to actuate the same; and automatic means to disengage the driving connection between the driving mechanism and the conveyer when the feeder extends into the feed-opening.

19. In a baling-press, a frame or body with a feed-opening in the top thereof; a feeder adapted to move into and out of said feed-opening and push material therein; a suitable

conveyer to deliver material to said feed-opening; driving mechanism in connection with the feeder and conveyer to actuate the same; and automatic means to cause the conveyer to become inoperative during the time the feeder extends into the feed-opening.

20. In a baling-press, in combination, a compression-chamber; a hopper; a conveyer for delivering material to said hopper; a feeder for forcing the material from the hopper into the compression-chamber; and means for rendering the conveyer inoperative during the action of said feeder.

21. In a baling-press, a compression-chamber with a feed-opening in the top thereof; a conveyer for delivering material to said feed-opening; a feeder for forcing material through said feed-opening into the compression-chamber; and means to cause the conveyer to cease delivery of material to the feed-opening while the feeder extends into said compression-chamber.

Toronto, January 3, 1901.

MOSES C. NIXON.

In presence of—
J. EDW. MAYBEE,
JOHN G. RIDOUT.