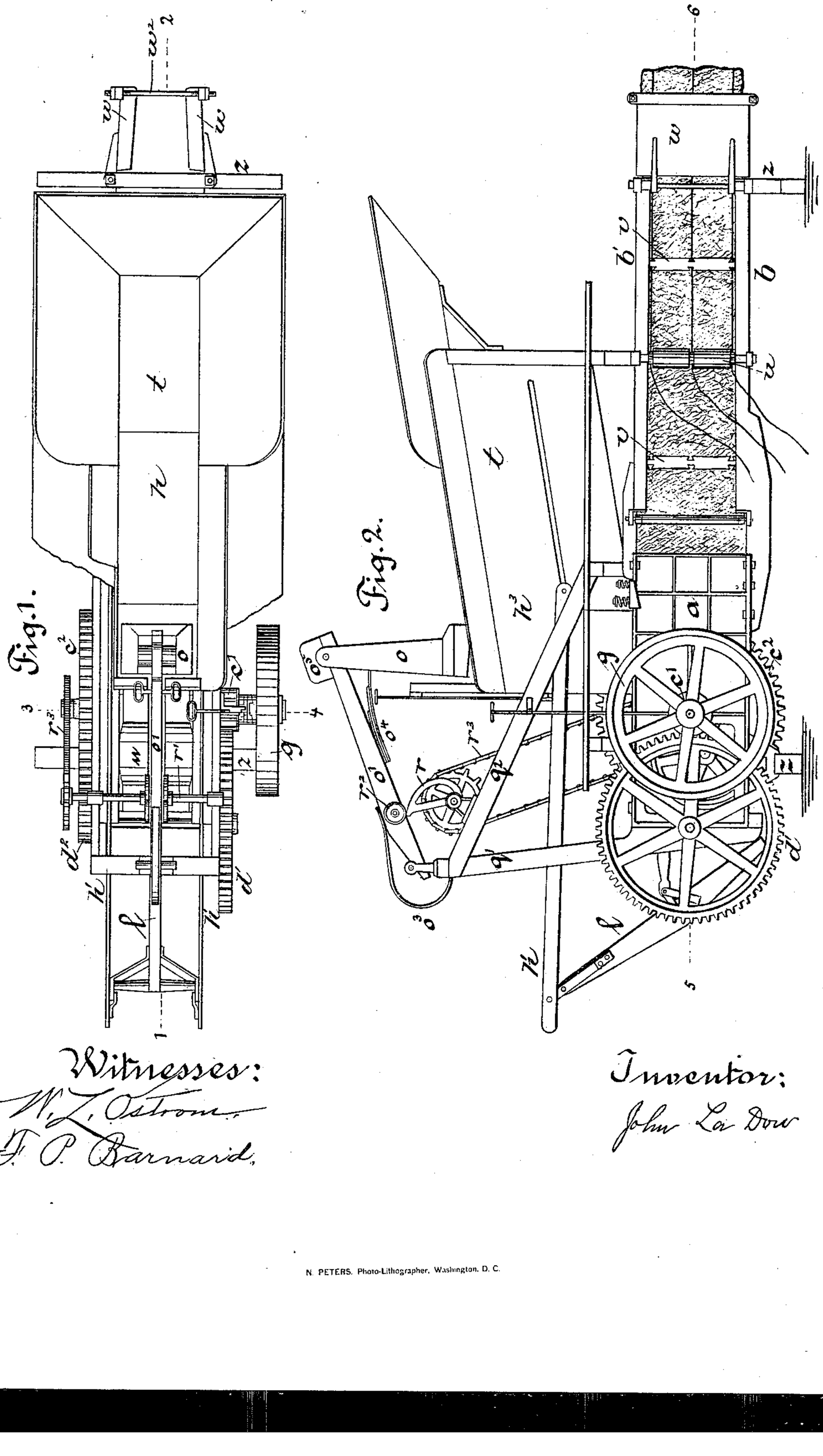
(No Model.) 4 Sheets—Sheet 1.

J. LA DOW.

BALING PRESS.

No. 335,290. Patented Feb. 2, 1886.



Witnesses:
W. L. Ostrom.
F. P. Barnard.

Inventor:
John La Dow

(No Model.)

4 Sheets—Sheet 2.

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Fig. 3.

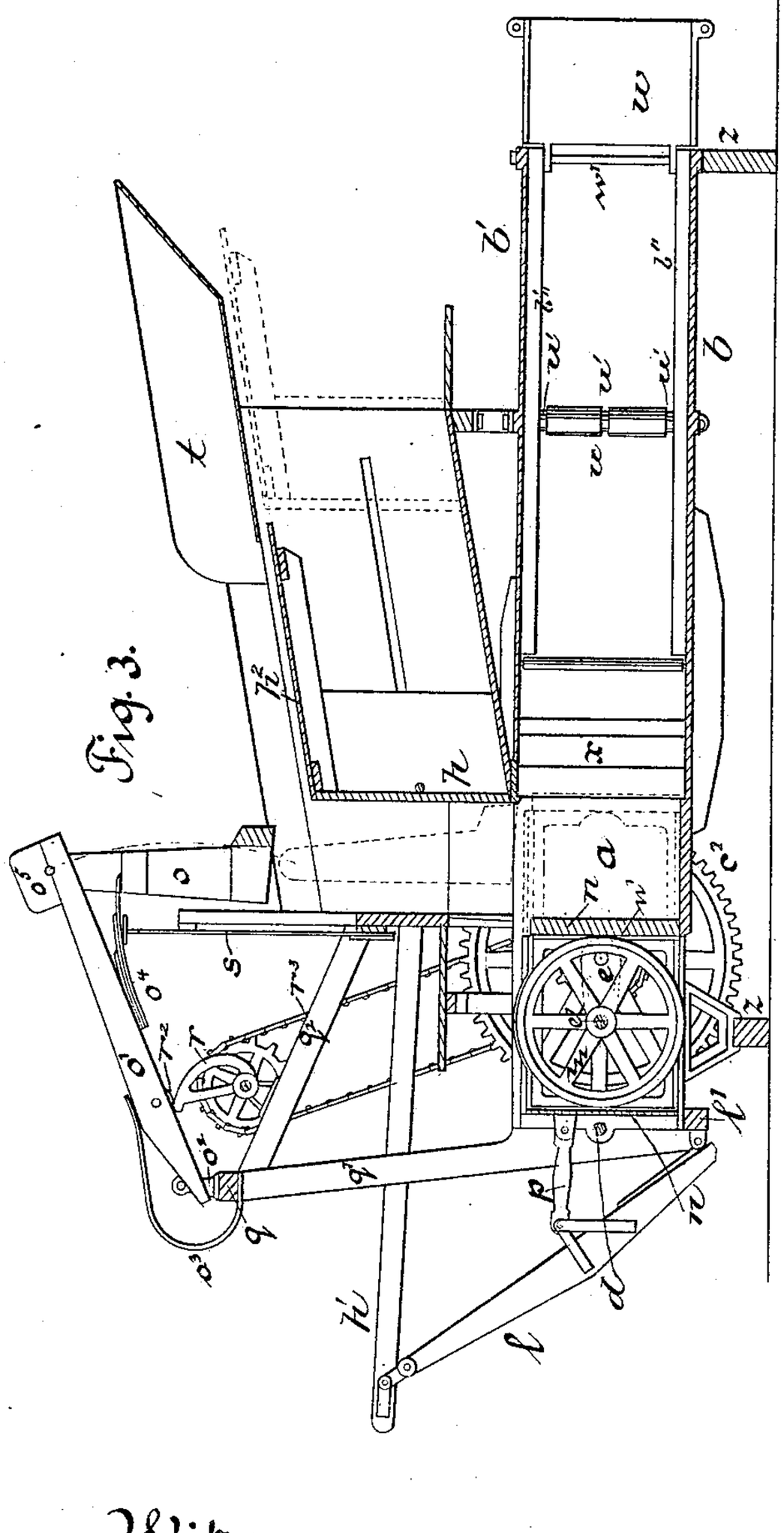


Fig. 2.

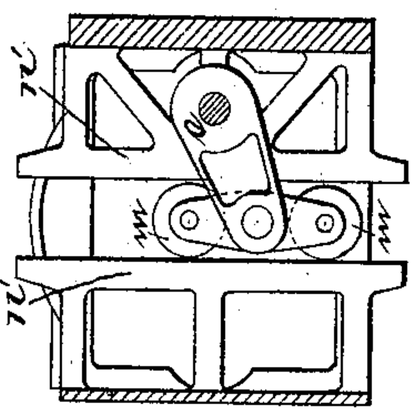


Fig. 5.

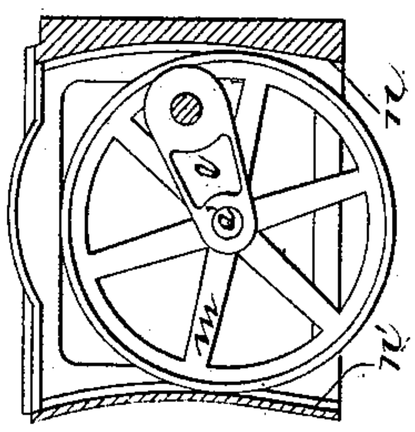
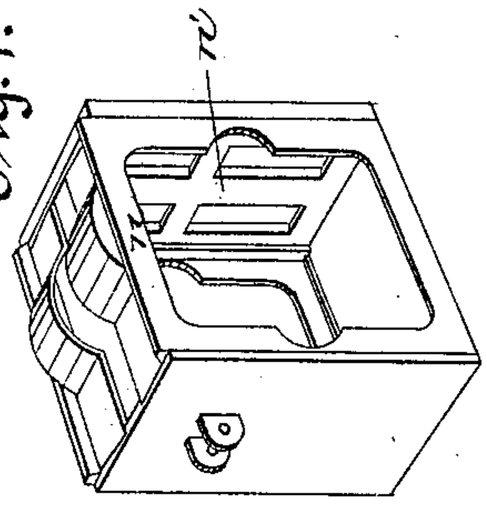


Fig. 4.



Witnesses:
W. L. Ostrom,
F. P. Barnard

Inventor:
John La Dow

(No Model.)

4 Sheets—Sheet 3.

J. LA DOW.

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Fig. 6.

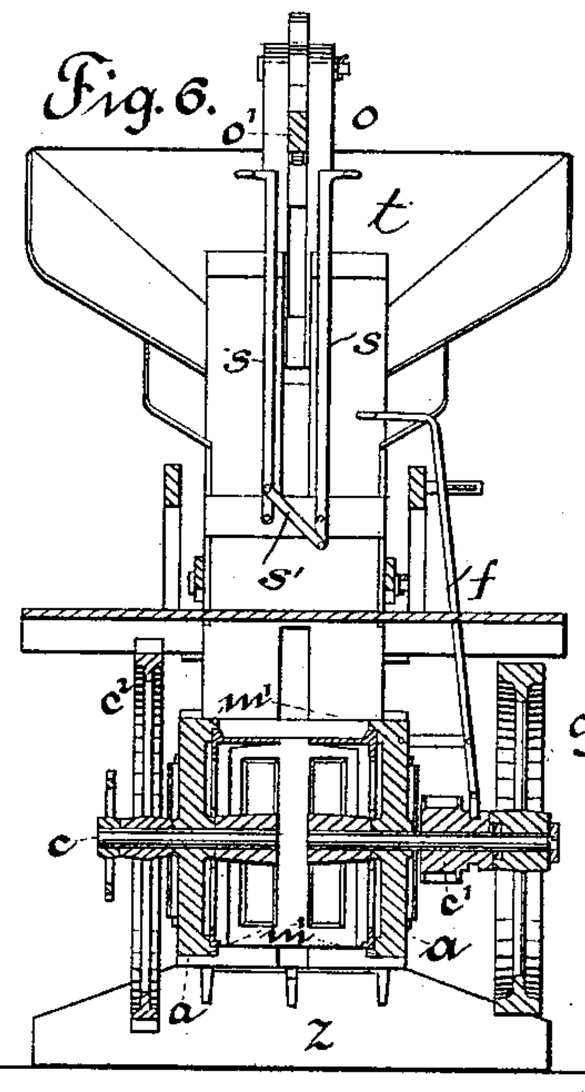


Fig. 8.

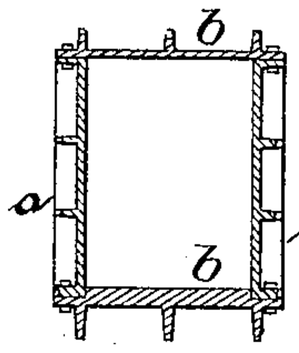
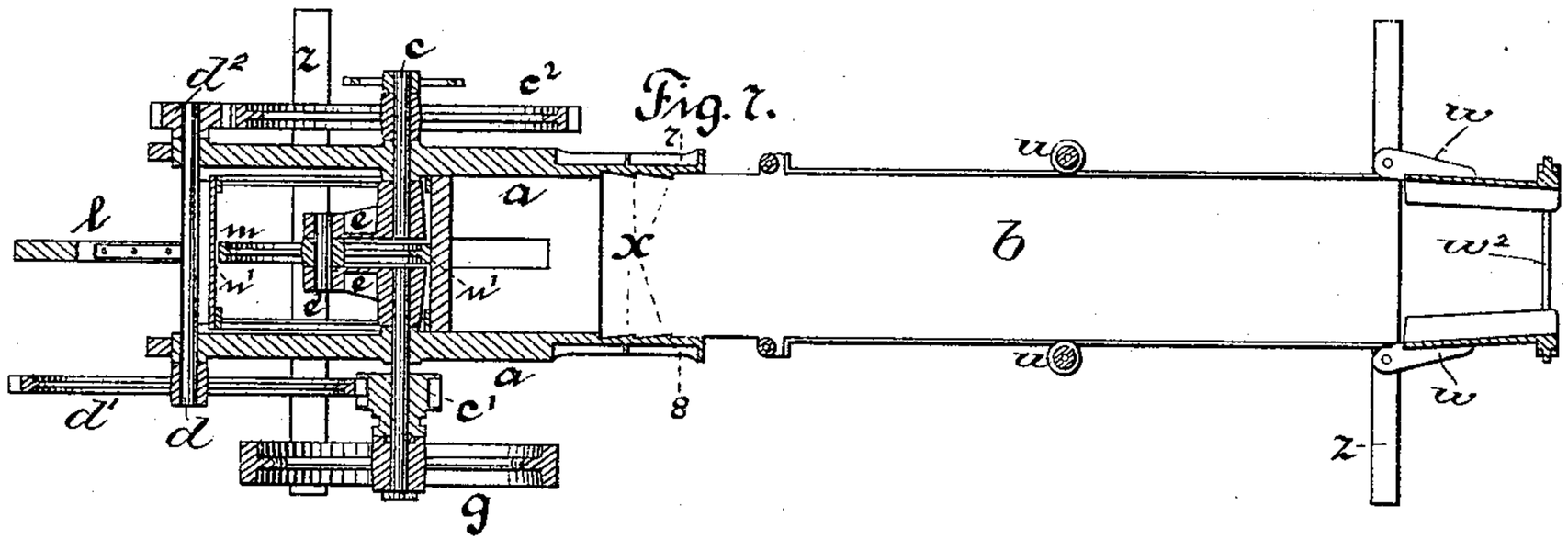


Fig. 7.



Witnesses:
W. L. Osborne,
F. P. Barnard

Inventor:
John La Dow

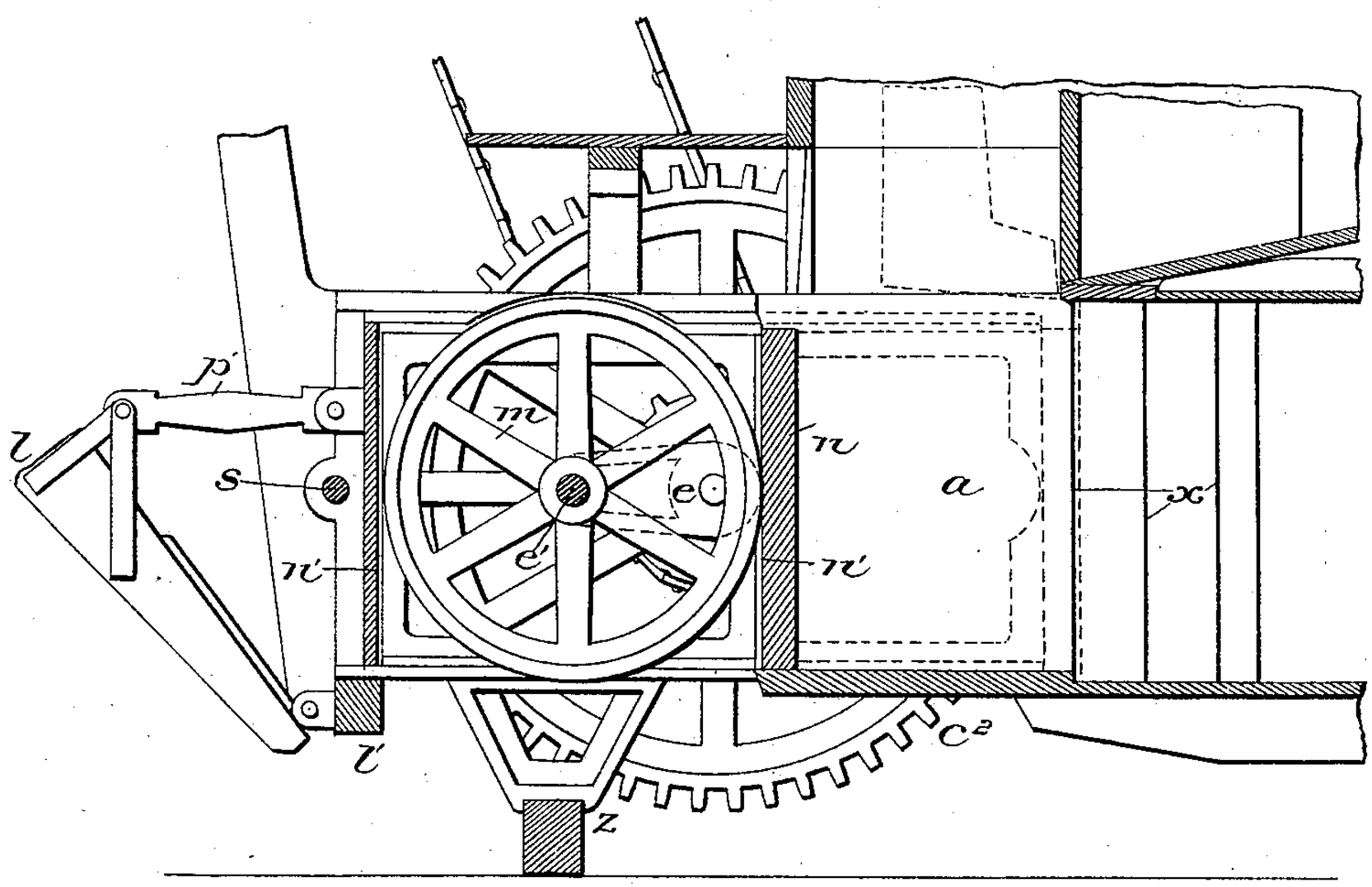
(No Model.) 4 Sheets—Sheet 4.

J. LA DOW.

BALING PRESS.

No. 335,290. Patented Feb. 2, 1886.

Fig. 10.



Witnesses:
W. L. Ostrom
F. P. Barnard

Inventor:
John La Dow

UNITED STATES PATENT OFFICE.

JOHN LA DOW, OF TRUMANSBURG, NEW YORK, ASSIGNOR TO GREGG & CO., OF SAME PLACE.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 335,290, dated February 2, 1886.

Application filed June 25, 1885. Serial No. 169,791. (No model.)

To all whom it may concern:

Be it known that I, JOHN LA DOW, a citizen of the United States, residing at Trumansburg, in the county of Tompkins and State of New York, have invented a new and useful Baling-Press, of which the following is a specification.

My invention relates to improvements in baling-presses in which a reciprocating follower successively compresses the charges against the yielding end of the forming bale; and the principal objects of my invention are to provide an improved frame whereby iron may advantageously be largely used in its construction; to provide a simple, compact, and effective mechanism for actuating the follower; the simplification of the mechanism for decreasing the angular velocity and increasing the propelling force from the initial driving-wheel to the crank-shaft; to provide the condenser with a larger reciprocating movement than the follower; to apply during the upward stroke of the feeder the energy necessary to operate it and afford means of retaining the feeder near the top of its stroke while the press is in operation; to provide means for holding the baling-wires in position for tying; to afford improved means for adjusting the resistance to the longitudinal movement of the bales; to provide an inclined hopper and condenser for facilitating the work incident to feeding the press; to afford facilities for readily stopping and starting the press. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the press, with a portion of the platform and condensing-chamber flange broken away; Fig. 2, a side elevation of the same; Fig. 3, a vertical section of the machine on the line 1 2, Fig. 1. Fig. 4 is a perspective view of the follower; Fig. 5, a vertical section of a modified form of the same; Fig. 6, a vertical section of the press on the line 3 4, Fig. 1; Fig. 7, a horizontal section of the same on the line 5 6, Fig. 2; Fig. 8, a vertical section of the baling-chamber on the line 7 8, Fig. 7; Fig. 9, a vertical section of a modified form of the reciprocating mechanism. Fig. 10 is an enlarged view of a portion of Fig. 3.

Similar letters refer to similar parts throughout the several views.

The main frame, which is made of iron, consists of the sides *a a* and arms *b b'*. The arm *b*, which is securely bolted to the sides, as shown in Figs. 2 and 8, forms the bottom of the baling-chamber and acts as a flexion-beam to support such portions of the machine as lie between the skids *z z*. The arm *b'*, which is bolted to the upper flanges of the sides *a a*, forms the top of the bale-chamber, and, acting as a girder, supports the superstructure. Both arms project beyond the ends of sides *a a*, and are provided with flanges b^2 at their edges, which strengthen them and form guides for the bales.

The vertical sides *a a*, which form the walls of the portion of the baling-chamber in which the follower operates, and in which the successive charges are compressed, are provided with bearings for the crank-shaft *c*, counter-shaft *d*, and ways or guides *m'* for the follower, also with flanges or ribs at their upper and lower edges, to which the arms *b b'* are securely attached by bolts passing through said arms and flanges, as shown in Fig. 8. Instead of these flanges, lugs cast on the sides might serve the same purpose. On the end of crank-shaft *c* the pinion *c'* and balance-wheel *g*, which is also the initial driving-wheel, are so hung that they may turn freely on said shaft.

The hubs of the driving wheel and pinion are provided with a claw-clutch, which can be thrown in and out of operation by the longitudinal movement of the pinion toward or from the driving-wheel. For operating this clutch the pinion *c'* is connected in the usual manner with lever *f*, which is bent at its upper end, so as to be conveniently operated from either side of the press. Gear *d'* and pinion d^2 are rigidly attached to the ends of counter-shaft *d*, and are adapted to mesh into pinion *c'* and gear c^2, respectively. The latter gear is rigidly attached to the crank-shaft. The angular velocity and propelling force of the crank-shaft are, respectively, decreased and increased to the required amount by transmitting the power from the driving-wheel to the crank-shaft through the simple mechanism consisting of the counter-shaft and four gears above named.

Aside from the constructive advantages of hanging the driving-wheel *g* and pinion *c'* loosely on the crank-shaft, the efficiency of the press is thereby increased, since the driving-wheel and pinion revolve in the same direction as the crank-shaft, therefore the loss by friction at this point, being proportional to the difference of their angular velocities, is thus reduced.

The crank-shaft *c* consists of two parts connected by the double crank *e*, on the crank-pin of which is hung the anti-friction wheel *m*, whose diameter is large enough to include the whole of the crank within its periphery.

The follower *n*, which is delineated in Fig. 4, is constructed by securely bolting the ends to the sides. The ends are provided on their inner sides with tracks *n' n'* for the wheel *m*. These tracks, as shown in Figs. 3 and 4, are plane and parallel surfaces, whose distance apart is equal to, or a little greater than, the diameter of the wheel *m*. The openings in the sides of the follower, through which the shaft *c* passes, are sufficiently large to allow the follower to reciprocate without interfering with the shaft. The follower is restrained from all but longitudinal motion by guides *m'*, which are a part of or attached to sides *a a*. The wheel *m*, which is hung so that it may turn freely on the crank-pin *e'*, and is carried by the crank in a circular course, rolls on the tracks *n' n'*, successively, and thus imparts a reciprocating motion to the follower.

The condenser *h*, which is adapted to reciprocate in the inclined condensing-chamber, is connected by rods *h'* to the upper end of lever *l*, which is connected at a point nearer its fulcrum to the follower *n* by the connecting rod *p*, and is hinged at its lower end to the cross-bar *l'*. The motion of the follower in being transmitted to the condenser through the lever *l* is increased by said lever, so that the condenser has a longer stroke than the follower. The feeder *o* is hung to the arm *o'*, which is hung in the hangers o^2, supported by cross-bar *q*. Said cross-bar is supported by posts *q'* and braces q^2, which are securely attached to the main frame. The feeder is operated by cam *r*, which is rigidly attached to shaft *r'*, which is hung in hangers supported by braces q^2. The cam is driven by link-belt r^3, which runs on equal sprocket-wheels rigidly attached to the ends of shafts *c* and *r'*, respectively. The cam *r* acts upon rollers r^2, pivoted to the feeder-arm *o'*, and is set so that it raises the feeder during the backward stroke of the follower. Spring o^3, which is attached to the under side of the bar *q*, acts upon the upper side of the feeder-arm, thus accelerating its downward stroke. The spring o^4 relieves the feeder from any jar at the bottom of its stroke, by coming in contact with the bottom of the slot in the head of the condensing-chamber. Weight o^5 is added to the arm *o'* to increase the force of the downward stroke to the required amount. Levers *s s*, Fig. 6, which are pivoted to the condensing-chamber head, are connected at equal distances above and below their fulcrums by straps *s'*, so that a movement of one will impart an opposite movement to the other. Said levers are bent outward at their upper ends and provided with handles, so as to be conveniently operated from either side of the press. When they are thrown toward each other they form a support for the feeder, thus preventing its operating. When thrown outward they allow it to fall and operate again. An inclined hopper, *t*, for receiving the hay preparatory to being fed into the condensing-chamber, is provided just above and back of said chamber. The hay, while being fed in front of the condenser, is prevented from falling back of the same by the shield h^2, attached to the condenser. Rollers *u*, provided with grooves *u' u' u'*, corresponding in position with grooves in the follower-boards *v*, are hung on stay-bolts which connect the arms *b b'* near their middle. As the follower-boards pass the rollers *u*, the baling-wires that have been passed through the grooves in them are received by grooves *u' u' u'*, and as the bale is forced along the bale-chamber the wires are held in the position shown in Fig. 2 by said grooves. The grooved rollers thus facilitate the work of tying off the bales. The wings *w*, which are hung on the stay-bolts which connect the ends of the arms *b b'*, are connected at their ends by the threaded bolts w^2, by which they can be adjusted, so that the surfaces they present to the bale will be more or less inclined to each other, thus causing more or less resistance, as may be required, to the longitudinal movement of the bale. When the press is not in operation, as a convenience in storing away, these wings may be turned backward against the arms *b b'*, thus reducing the length of the press. The dotted lines in Fig. 3 show the position of the follower, condenser, and feeder at the outer end of their stroke.

In operation, the material to be pressed is first thrown upon the hopper *t*, from which, when the condenser has nearly reached the back end of its stroke, it is fed down the sloping trough and into the condensing-chamber, where it is pressed during the advanced stroke of the condenser, at the completion of which the feeder drops and transfers the partially-compressed charge to the baling-chamber. The feeder remains at the bottom of its stroke and forms the top of the baling-chamber, while the follower compresses the charge against the forming bale. When relieved by the follower the charges are held in position in the usual manner by the retainers *x*. At suitable intervals follower-boards *v*, for separating the bales, are placed in the baling-chamber. During this operation the feeder may be retained at the top of its stroke by levers *s*, thus avoiding all danger to the operator. The bales are tied and delivered in the usual manner.

It may be observed that the power necessary

to operate perpetual presses varies with the position of the crank, the most power being required during the forward stroke of the follower, noticeably near the end. In my press the parts are adjusted and connected so as to diminish this variation, to wit: The work for operating the condenser (while compressing) and the feeder is done during the backward stroke of the follower, and, further, the extra work imposed upon the condenser by its long stroke correspondingly diminishes the work that remains for the follower to do during its forward stroke.

Among the modifications to which some of the parts of my press are susceptible, I would mention the following: While the diameter of wheel *m* is such that the periphery of the wheel barely includes the crank, it may be either larger or smaller. The latter change, however, necessitates tracks for wheel *m*, constructed so as to pass between the crank-arms and not interfere with the motion of the follower. Such tracks are shown in Fig. 9. In the place of an anti-friction wheel hung directly on the crank-pin, two or more such wheels may be hung on a head, which is hung on the crank-pin, as shown in Fig. 9, while, as above described, the tracks *n'* are plane parallel surfaces, they may be curved in the plane of the wheel *m*. Fig. 5 illustrates a set of curved tracks, whereby the force exerted by the crank against the follower during the forward end of its stroke may be much increased. This modification still further equalizes the power necessary to operate the press during a revolution of the crank. Instead of straight guides *m'*, the follower may be paired with curved guides, or, what is equivalent, be hung so as to rock about a distant axis. The movement of the pinion *c'*, for throwing the press in and out of operation, may be restrained, and the driving-wheel *g* afforded a corresponding movement and be connected with lever *f* for the same purpose. The skids *z z* may be replaced by axles, and the whole mounted on wheels and made portable.

What I claim as new, and desire to secure by Letters Patent, is—

1. A baling-press frame consisting of vertical parallel metallic sides provided with bearings and guides for the reciprocating mechanism, and forming the walls of the compressing-chamber, in combination with horizontal metallic arms which lap by and are securely bolted to the top and bottom edges of said sides, and which, by projecting beyond the ends of said sides, form the top and bottom of the bale-chamber and support the machine, substantially as hereinbefore described.

2. In a baling-press, the combination, with a follower or division board provided with a series of narrow grooves through which the tying-wires may be passed, of rollers hung at the sides of the bale-chamber, so as to roll closely against the formed bale, and provided with a like series of narrow grooves, each of which lies in the same longitudinal plane as the corresponding groove in the follower-board, whereby wires passed through the grooves in the follower-board are received by the corresponding grooves in the rollers and held in position for tying as the bale is forced along the bale-chamber, substantially as hereinbefore described.

3. In a baling-press, the combination of a bale-chamber having open sides with wings hinged to the ends of arms forming the said bale-chamber, said wings being connected at their ends by threaded bolts, whereby the surfaces they present to the bale may be more or less inclined to each other, thus causing and affording means of adjusting the frictional resistance to the movement of the bale, substantially as hereinbefore described.

4. In a baling press, the driving-wheel *g* and pinion *c'*, both hung loosely on the crank-shaft, which revolves in the same direction, but at less velocity, whereby the loss by friction is reduced, said pinion and driving-wheel being provided with a claw or friction-clutch in combination with a shifting-lever, whereby the press can be thrown in or out of operation, substantially as hereinbefore described.

5. The train of gearing, consisting of pinion *c'*, hung loosely on the crank-shaft, gears *d' d²*, rigidly attached to counter-shaft *d*, and gear *c²*, rigidly attached to the crank-shaft, in combination with said counter and crank shafts, substantially as and for the purpose set forth.

6. The hollow follower *n*, having ends provided with tracks for anti-friction wheel *m*, and sides provided with openings for shaft *c*, whereby said shaft can operate within and in conjunction with said follower, substantially as described.

7. In a baling-press, an anti-friction wheel hung loosely on the crank-pin and carried in a circular course by the main crank, in combination with a follower restrained to move in a rectilinear or circular course by guides or their equivalent, and provided with tracks or surfaces for said anti-friction wheels to roll upon, whereby said wheel imparts a reciprocating motion to said follower, substantially as hereinbefore described.

8. In a baling-press, a crank-shaft provided with a crank carrying an anti-friction wheel hung loosely on the crank-pin, in combination with an open follower provided with tracks or surfaces for said anti-friction wheel to roll upon, whereby said crank can operate within and actuate said follower, substantially as hereinbefore set forth.

9. In a baling-press, a two-parted crank-shaft connected by a double crank carrying a loose anti-friction wheel upon the crank-pin, in combination with a follower adapted to reciprocate by being paired with guides, and provided with tracks for said anti-friction wheel to roll upon, substantially as and for the purpose hereinbefore set forth.

10. In a baling-press, the combination of a condenser and follower with an intermediate

lever hung to the press-frame, said lever being connected by separate connecting-rods with said condenser and follower, the former being connected to the lever at a more distant point from the fulcrum than the latter, whereby the motion of the follower is augmented as it is transmitted through said lever to the condenser, substantially as hereinbefore described.

11. In a baling-press, an oscillating lever fulcrumed to the press-frame and having a feeder for transferring the partially-compressed charge from the condensing-chamber to the compressing-chamber hung to its free end, and being provided with one or more anti-friction rollers or their equivalent, in combination with a single or double cam-wheel securely attached to a shaft hung to the press-frame, and which is adapted to act upon said roller or rollers or their equivalent and actuate said lever and feeder, substantially as hereinbefore described.

12. In a baling-press, an oscillating lever fulcrumed to the press-frame and having a feeder hung to its free end, in combination with a spring securely attached to the press-frame and acting upon said lever and accelerating its downward stroke, substantially as hereinbefore described.

13. In a baling-press, an oscillating lever fulcrumed to the press-frame and having a feeder hung to its free end, in combination with one or more detent-levers hung to the condensing-chamber head and adapted to retain the feeder at the upper end of its stroke, substantially as hereinbefore described.

14. In a baling-press, an oscillating lever fulcrumed to the press-frame and having a feeder hung to its free end, in combination with two detent-levers connected so that a movement of one imparts an opposite movement to the other, and adapted, by being thrown toward each other, to retain the feeder at the top of its stroke, substantially as described.

15. In a baling-press, a hopper for receiving the material to be pressed, located above and back of the condensing-chamber, in which operates a condenser provided with a shield for preventing the material from falling back of the condenser-head, all of which are constructed so as to be inclined to the baling-chamber, thus providing a sloping hopper and trough, whereby the material is more easily fed from the hopper into the condensing-chamber, substantially as hereinbefore described.

JOHN LA DOW.

Witnesses:
P. G. VANVLEET,
W. L. OSTROM.