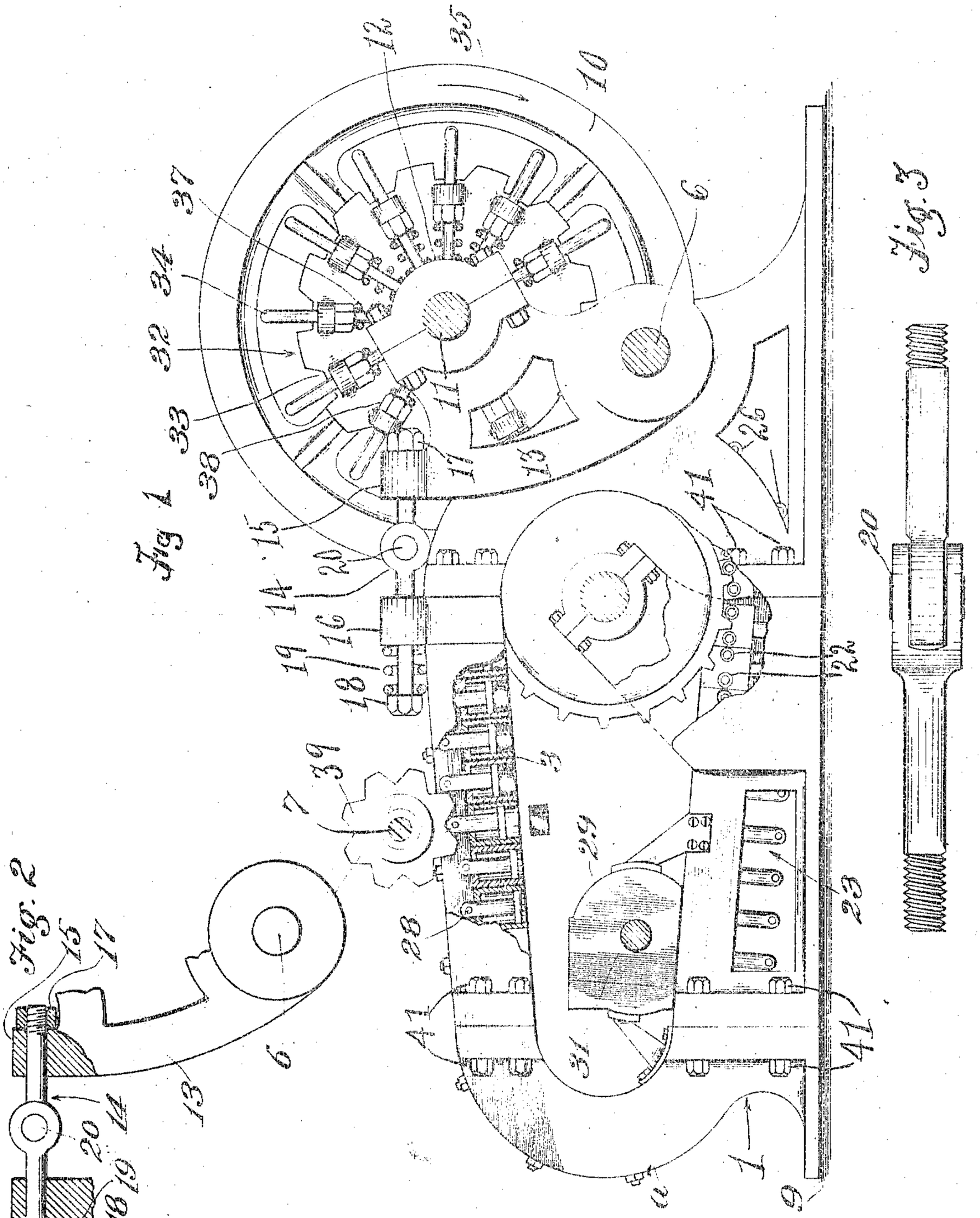
No. 811,860. PATENTED FEB. 6, 1906.

H. E. MARSH.

BRIQUETING PRESS.

APPLICATION FILED JUNE 27, 1905.

3 SHEETS—SHEET 1.



Witnesses:
C. C. Kelly
A. Townsend.

Inventor:
Howard E. Marsh.
By James P. Townsend
his Atty.

No. 811,860. PATENTED FEB. 6, 1906.

H. E. MARSH.

BRIQUETING PRESS.

APPLICATION FILED JUNE 27, 1905.

3 SHEETS—SHEET 2.

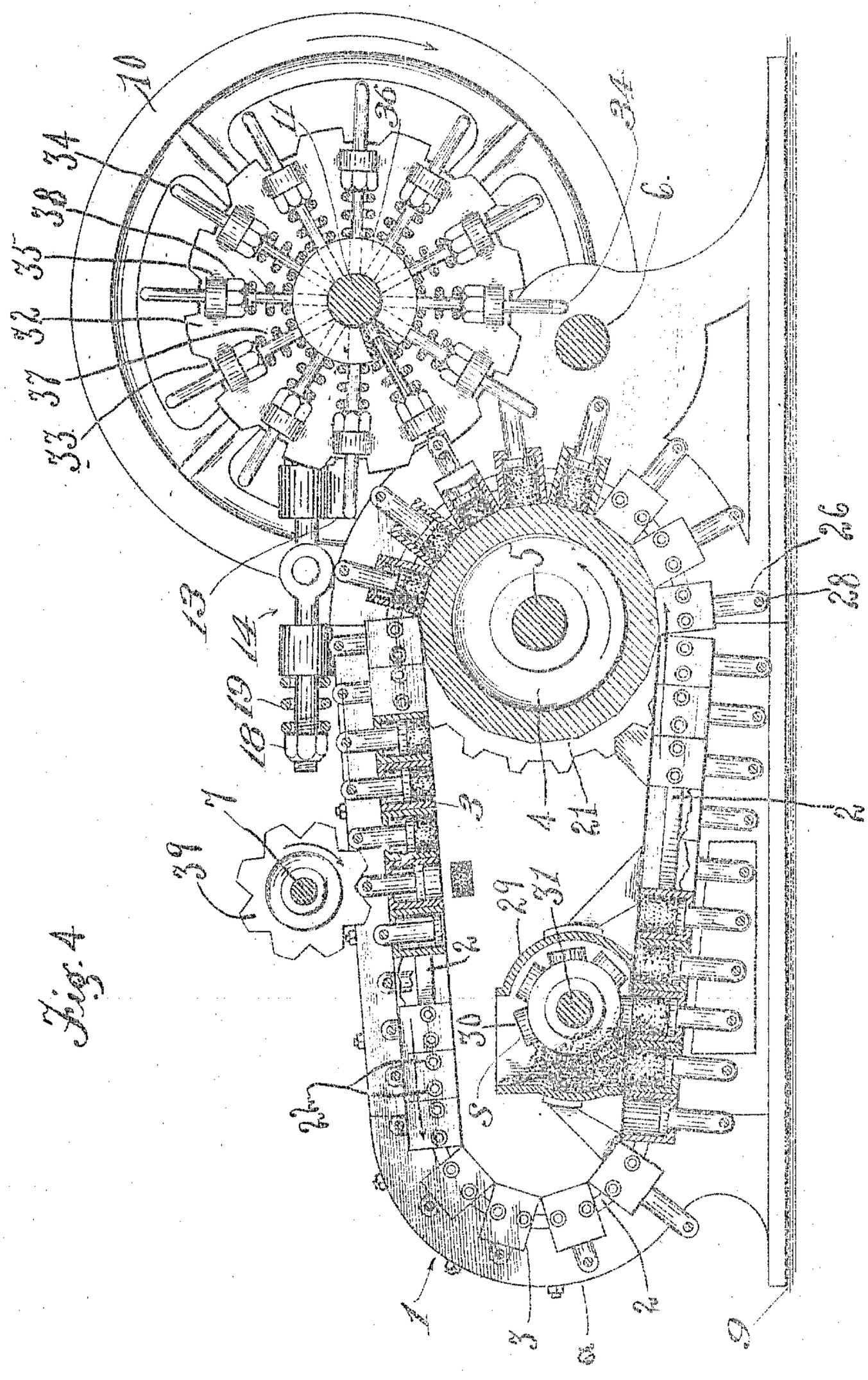


Fig. 4.

Witnesses:
C. C. Holly.
I. Townsend

Inventor,
Howard E. Marsh.
by James P. Townsend
his Attz

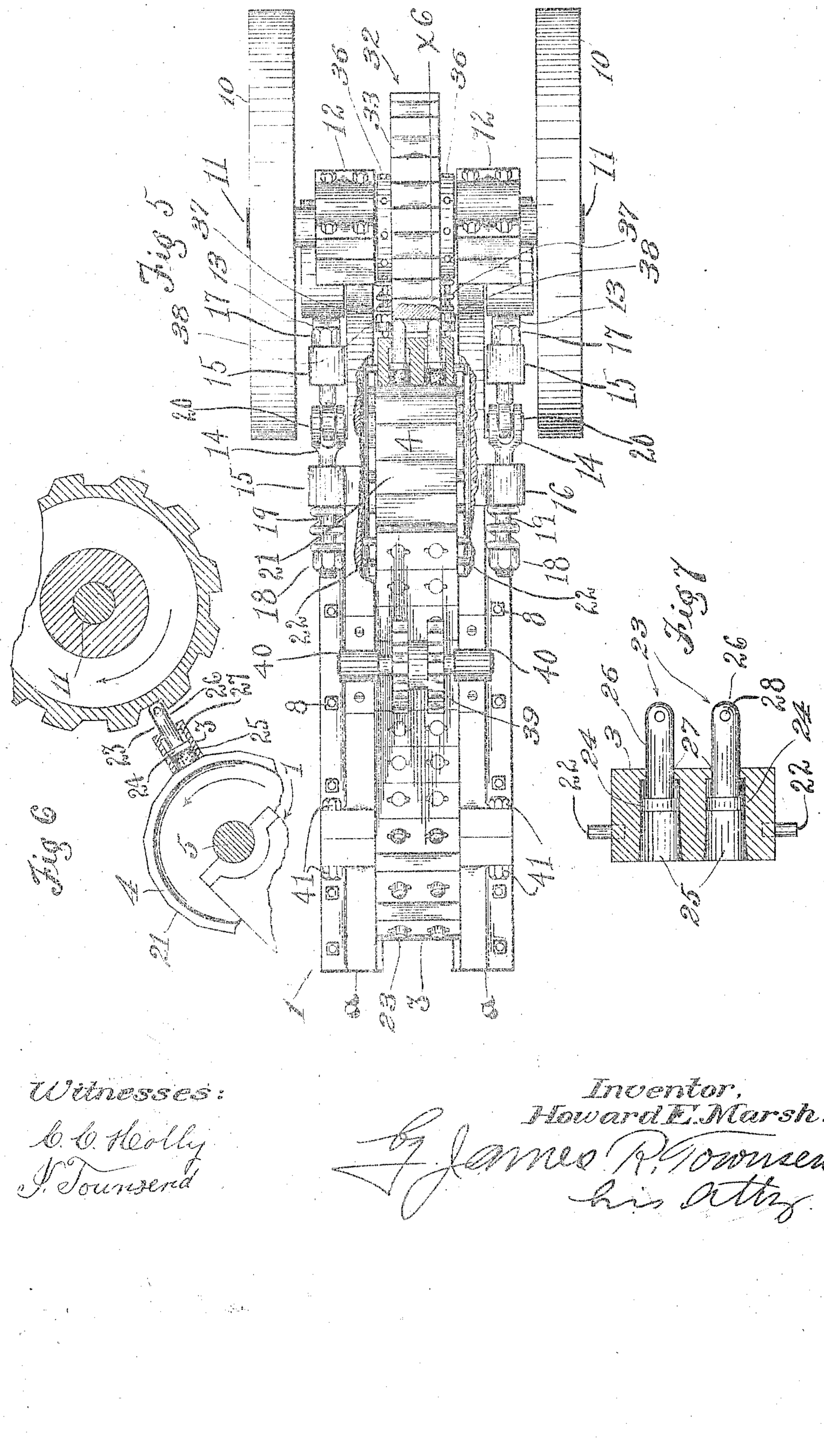
No. 811,860. PATENTED FEB. 6, 1906.

H. E. MARSH.

BRIQUETING PRESS.

APPLICATION FILED JUNE 27, 1905.

3 SHEETS—SHEET 3.



Witnesses:
C. C. Kelly
F. Townsend

Inventor,
Howard E. Marsh.
By James P. Townsend
His Attys.

UNITED STATES PATENT OFFICE.

HOWARD E. MARSH, OF PALMS, CALIFORNIA, ASSIGNOR OF ONE-HALF TO WILLIAM P. WAGY, OF LOS ANGELES, CALIFORNIA.

BRIQUETING-PRESS.

No. 811,960. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed June 27, 1905. Serial No. 267,168.

To all whom it may concern:

Be it known that I, HOWARD E. MARSH, a citizen of the United States, residing at Palms, in the county of Los Angeles and State of California, have invented a new and useful Briqueting-Press, of which the following is a specification.

This invention relates to means for compressing plastic or powdered substances into a solid body.

An object of this invention is to provide a briqueting-press having superior capacity and great economy of power.

A further object of this invention is to provide a briqueting-press which will be continuous in its operation and in which none of the rotating or revolving parts will at any time come to rest during the operation of the press.

Another object of the invention is to make provision against any liability of breakage in case an incompressible substance should be fed to the press in place of the powdered or plastic charge.

Another object is to provide a flexible noiseless compressing-gear which will transmit the power for driving the molding-boxes through their orbit and for compressing the briquets with maximum economy and minimum friction and with direct action and rolling contact.

The invention comprises the combination, with molding means moving in a determined path, of rotary means for directly operating the molding means as it moves in said path. By this construction the operation of compressing the charge is more efficiently and rapidly effected than heretofore possible.

In carrying out the invention I employ a compressing-gear constructed with notched or offset faces, and the molding-boxes are arranged to travel in a path which is circular adjacent the compressing-gear, and the molding-boxes are provided with plungers which project from said boxes and are engaged by the offset faces of the rotary gear, so that said rotary gear has a double function of both advancing and operating the molding means, and this construction and arrangement constitutes a continuously-operating toggle means for effecting the compression in the molding-boxes successively. By this construction I provide means for continuously moving the molding-boxes and adapt said means to act as a unit to perform the operation of compressing the charge in said boxes individually and respectively while the same are moving. The object of such construction is compactness and simplicity, as well as superior operation. I employ the compressing-plungers for both moving the boxes and compressing the charges therein. The rotary gear and the respective plungers act as unitary means for performing this double function.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of a briqueting-press embodying this invention, one of the balance-wheels being removed to expose interior construction. Fig. 2 is a fragmental sectional detail of the flexible connection between the compressing-gear and frame. Fig. 3 is a plan of one of the adjustable links connecting the frame and the rock-bars which carry the compressing-gear and balance-wheels. Fig. 4 is a side elevation, one side of the frame being omitted to expose the press mechanism. Fig. 5 is a plan of the press, parts being broken away to expose working parts, all except two of the bolts, together with their guide-lugs and springs, being omitted to avoid confusion. A molding-box is shown in section. Fig. 6 is a fragmental sectional detail on line x^6, Fig. 5. Fig. 7 is a sectional detail of one of the molding-boxes.

1 is a frame having a spline 2 to support mold-boxes 3, forming a continuous ovaloid encircling a compressing-drum 4. The frame comprises two complementary side members *a*, held together by compressing-drum shaft 5, the rock-bar shaft 6, and ejector-shaft 7 and also by bolts 8, into the concrete foundation or other base 9.

10 designates the balance-wheels, through which the power is transmitted to the press by means of belts or other transmission means. (Not shown.)

11 is the balance-wheel shaft, mounted in bearings 12 on the rock-bars 13, which are mounted on shaft 6 and connected with the frame 1 on the outside of the side members *a* of the frame 1 by adjustable links 14, held by the lugs 15 16, nuts 17 18, and springs 19. The adjustable links are jointed at 20 to allow bar 13 to rock freely. Shaft 11 is mounted with its axis rearwardly of a vertical drawn from the axis of shaft 6, in order that the weight of the balance-wheels 10 and

their connections may normally exert a constant tension on the springs 19. The compression-drum 4 has molding-faces 21 to form bases for closing the ends of the molding-boxes 3, which are provided with roller-pins 22, which move in the splines 2 of the frame, between the sides *a* of which the molding-boxes travel.

23 designates reciprocating compressing means in the form of plungers having heads 24 fitted in the molding-chambers 25 of the molding-boxes and having stems 26 extending outward through holes 27 in the ends of the molding-boxes.

28 designates pins which keep the plungers from dropping out of the chamber of the molding-boxes when the ejector has acted upon the stems and displaced the briquet, as indicated in the sectioned portions in Figs. 1 and 4.

29 is a hopper, and 30 a rotating feeder therein formed of radial arms or shoes *s* mounted on a shaft 31 and spaced apart to enter the open ends of the compression-chambers as the molding-boxes travel therebeneath in the operation of the press in the direction indicated by the arrows in Fig. 4.

32 is the compressing-gear, having faces 33, and which travels in the direction of the arrows on the fly-wheel in Figs. 1 and 4 and meshes with the reciprocating compressing means or plungers 23 to drive them inward and also onward along their orbit, together with the compressing-boxes, and to also drive the compressing-drum 5.

34 designates tension-bolts mounted on the compressing-gear 32 and moving in guides 35 36 and held outward by springs 37, engaging adjustable nuts 38, by which the tension of the springs may be regulated. The pins 34 engage the molding-boxes 3, holding them firmly against the drum and also acting as yielding teeth or cogs for assisting in driving the molding-boxes forward through their orbit.

39 is the ejector-gear for acting on the compressing-plungers at a convenient point in their orbit to eject the finished product from the chambers of the molding-boxes.

40 designates bearings on the side members *a* of the frame, which support shaft 7 of the ejector. Desirably the side members of the frame are cast in sections held together by bolts 41.

The points of the feeder-shoes *s* are spaced apart to correspond to the spaces between the mouths of the compressing-chambers, and said mouths have an appropriate draw to facilitate the feeding and ejecting operations.

In practical operation the material to be compressed will be fed in plastic or disseminated form into the hopper or other feeding appliance and power will be applied to drive the balance-wheels 10 in the direction indicated by the arrows in Figs. 1 and 4. The compressing-gear is thus driven and the faces 33 successively engage and drive forward the compressing-plungers, thus driving the molding-boxes 3, respectively, and the tension-bolts 34 in turn engage the molding-boxes 3 and perform a double office by holding said boxes firmly against the compressing-drum, to which rotary motion is imparted by the moving molding-boxes. Said boxes are in loose engagement with and are advanced by each other and by the force of gravity and also by engagement with the faces 21 of the compressing-drum, the momentum of which, the boxes and their plungers, equalizes the motion of said boxes.

It will be noted by reference to Fig. 4 that a rolling contact is effected to transmit power from the compressing-gear to the plungers, the boxes, and other moving parts. The power is applied from the compressing-gear to lift the mold-boxes during the ascending portion of their orbit, the weight of the boxes insures their proper descent at the other end of their orbit, and motion is thus transmitted from each end of the guide to the intermediate boxes. It will thus be seen that by employing a series of disconnected but contacting mold-boxes arranged to travel in an endless guide it is possible to form the mold-boxes independently of each other and not as integral parts of a wheel or other larger member, so that if a box is broken or damaged by wear it may readily be replaced without renewing other parts of the apparatus.

What I claim is—

1. A briquet-press provided with a series of disconnected molding-boxes, an endless guide for said boxes, reciprocating compressing means for said boxes, and means constructed to operate said reciprocating compressing means to compress the charge in said boxes and for simultaneously moving said reciprocating means and their boxes through their orbit.

2. A frame provided with an endless guide, a series of molds adapted to move along said guide, compressing means for moving said molds along said guide and for compressing material in said molds, and means for discharging material therefrom.

3. A frame provided with an endless guide extending in a vertical plane, a series of contacting molds adapted to move along said guide, and compressing means engaging the ascending molds to move the same forward.

4. A frame provided with an endless guide, a series of disconnected molds adapted to move along said guide, a compressing-drum closing the mouths of said molds during a portion of their travel, means for moving said molds and for compressing material against said drum in said molds, and means for emptying said molds.

5. A frame provided with an endless guide,

a series of disconnected contacting molds adapted to slide in said guide, compressing means for moving said molds and for compressing material thereinto, and means for emptying said molds.

6. A compressing-drum, a molding-box, means for guiding the molding-box with its open mouth on the compressing-drum, a plunger in said box, means for engaging the plunger and forcing it inward and at the same time onward, to move the box along its orbit, and means for simultaneously engaging the box to hold it against the drum.

7. A drum, a molding-box, means for guiding the molding-box with its open mouth against the drum, a plunger in the box, rotary means for engaging the plunger to move it inward and onward, and resilient means for engaging the box to hold it against the drum.

8. A drum, a molding-box, means for guiding the molding-box with its open mouth against the drum, a plunger in said box, a gear having a face to engage said plunger and move it inward and onward, and tension-bolts carried by said gear to engage said box and hold it against the drum.

9. A molding-box, means for closing the mouth of the box, means for guiding the box in a path, a plunger in the box, rotary means for engaging the plunger to force it inward as the box moves onward in its path, and means on said rotary means for engaging the box at the same time that the rotary means engages the plunger.

10. A frame, molding means, means for guiding said molding means in a path in said frame, and rotary means yieldingly mounted on the frame and arranged to simultaneously advance and operate said molding means.

11. In a press, a frame, a series of disconnected molds arranged to move in a determined path in said frame, a rock-bar mounted on said frame, rotary compressing means mounted on said rock-bar and constructed to operate said molds, and tension means for holding toward the molds said rotary compressing means.

12. In a press, a frame, molding means arranged to move in a determined path in said frame, a rock-bar mounted on said frame, rotary compressing means mounted on said rock-bar and constructed to operate said molding means, and tension means for holding toward the molding means said rotary compressing means, the center of gravity of the rock-bar and its attachments being rearward of the vertical drawn from the shaft of the rock-bar to cause gravity of the compressing means to hold the tension means normally at a constant tension.

13. A briqueting-press provided with a series of disconnected molds, rotary means for operating said molds, rocking means carrying said rotary means, link means for connecting the rocking means with the frame of the press, and yielding tension means for holding said rotary means toward the molds.

14. A frame, molding means moving in an orbit therein, a molding-drum closing the mouths of the molding means at a portion of said orbit, rocking means, a shaft journaled therein, balance-wheels fixed on the shaft, a compressing-gear fixed on the shaft and constructed to operate and advance the molding means successively.

15. Disconnected molding-boxes moving in an orbit, plungers in said boxes respectively having projecting stems, and a rotary ejector-gear arranged to engage said stems to depress the same.

In testimony whereof I have hereunto set my hand, at Los Angeles, California, this 19th day of June, 1905.

HOWARD E. MARSH.

In presence of—
JAMES R. TOWNSEND,
W. P. WAGY.