

G. W. RIGBY.
BRIQUETING MACHINE.
APPLICATION FILED NOV. 29, 1907.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

951,579.

Fig. 2.

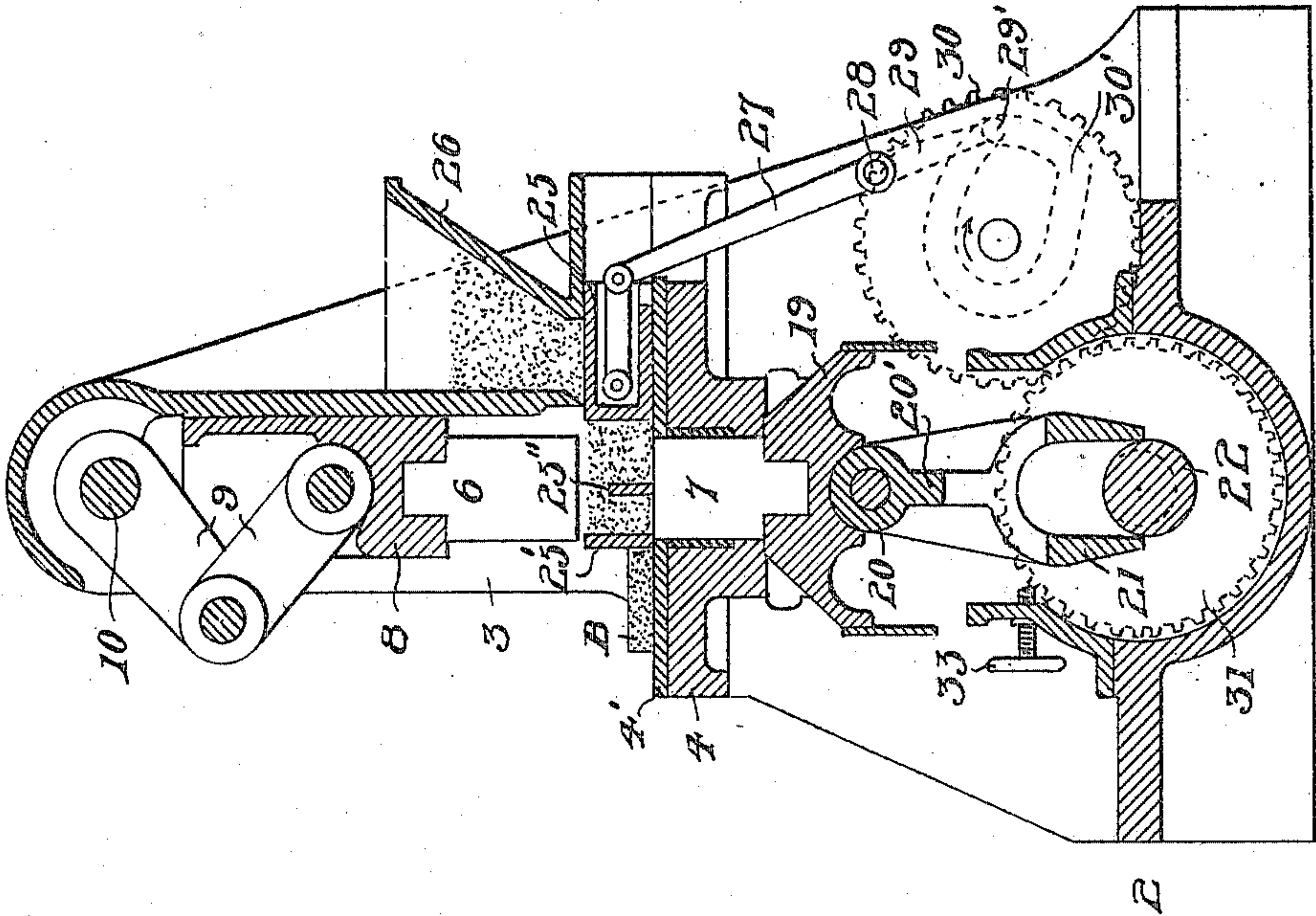
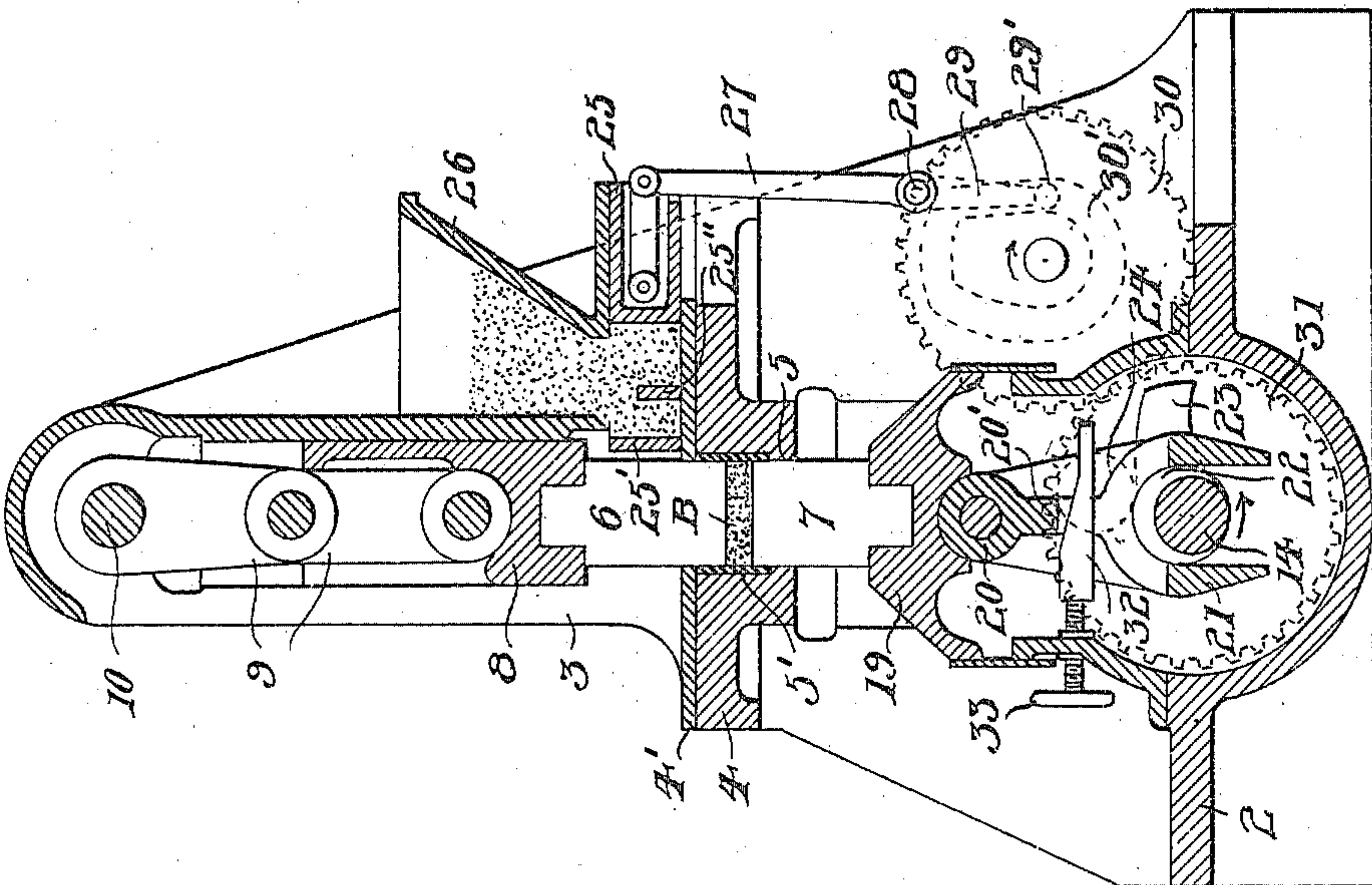


Fig. 1.



witnesses:

J. P. Hoffman,
Attorney

Inventor

G. W. Rigby
By J. W. Kubit
Attorney

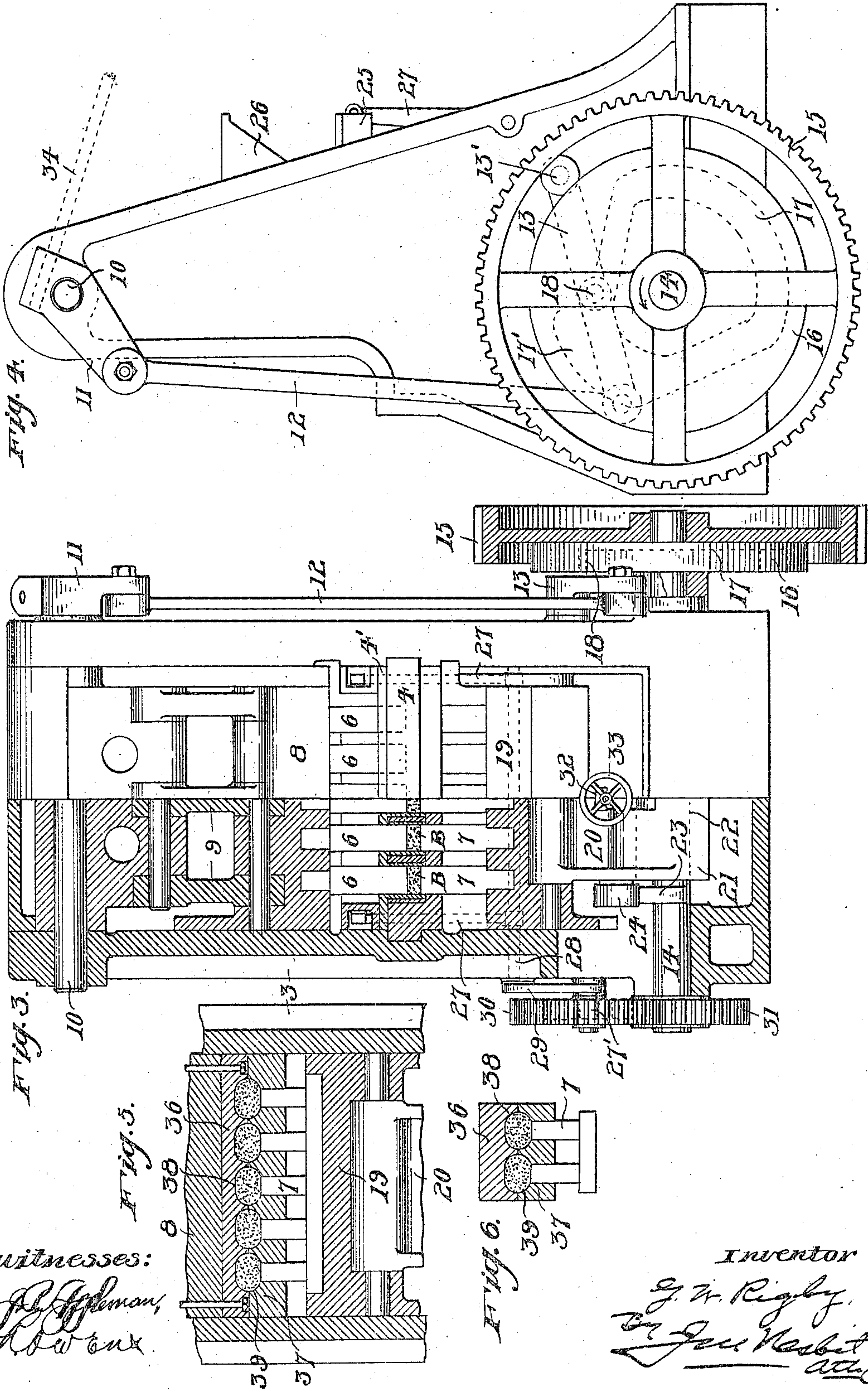
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2 SHEETS—SHEET 2.



witnesses:
J. P. Hoffman,
Howe

Inventor
G. W. Rigby,
By Geo. Nesbit

UNITED STATES PATENT OFFICE.

GRANT W. RIGBY, OF PITTSBURG, PENNSYLVANIA.

BRIQUETING-MACHINE.

951,579.

Specification of Letters Patent.

Patented Mar. 8, 1910.

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To all whom it may concern:

Be it known that I, GRANT W. RIGBY, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Briqueting-Machines, of which the following is a specification.

The machine of this invention is designed primarily for pressing ore, coal and other comminuted material into briquets, though its use is not thus restricted as it may be utilized in the manufacture of brick and other pressed and molded articles.

One purpose of the invention is to provide improved means for supplying the requisite pressure at opposite sides or ends of the forming cavity.

A further purpose is to utilize the lower pressing member for lifting the pressed articles from the forming cavity; and a further object is to provide means for automatically removing the article when thus lifted.

Further objects are to provide improved means for feeding charges of materials to the forming cavity, and to provide for varying the downward limit of movement of the lower pressing member, thereby adapting the forming cavity to receive more or less material to be pressed into each briquet or other article, the amount being determined by the nature of the material, the compression required, etc.

A further purpose is to provide improved means for operating the pressing members, including mechanism whereby one of the members may be released and retracted in case the machine becomes stalled, as by slipping of a driving belt.

With these and other objects in view, as will presently appear, the invention consists in the novel features of construction, and in the combination of parts hereinafter fully described and claimed and illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical cross sectional view of the improved machine showing the parts in position when pressing a briquet, and Fig. 2 is a similar view showing the parts out of pressing position and with the lower pressing member raised as when discharging the pressed article. Fig. 3 is a view of the machine partly in side elevation and partly in longitudinal section. Fig. 4 is an end elevation. Figs. 5 and 6 are detail

views illustrating pressing members and molding cavities of modified form.

Referring to the drawings, the frame of the machine is here shown consisting of the base portion 2 and the opposite upright end members 3. Between the end members is the horizontal mold table 4 formed with a series of vertical forming cavities 5 open at the top and bottom, and each provided with a lining sleeve 5'. At the top of table 4 is the face plate 4'. The forming cavities may be of any desired cross-sectional shape, either rectangular, round or oval, with the upper pressing members or plungers 6, and the lower pressing members or plungers 7, of corresponding shape.

The upper plungers 6 (a series of four being here shown) are secured to a crosshead 8 which is slidable vertically between the upper portions of frame uprights 3, and which is connected by toggle levers 9 with horizontal shaft 10, journaled in the top of the frame. A crank 11 of this shaft is connected by rod 12 with one end of lever 13, the opposite end of the lever being fulcrumed at 13' to the frame.

14 is a power shaft arranged horizontally in the lower portion of the frame, and secured to one end thereof is the large driving gear 15. At the inner face of this wheel is disk 16 formed with the cam groove 17 which embraces a roller 18 carried by lever 13, whereby movement is imparted through said lever and rod 12 to actuate shaft 10 for raising and lowering toggle levers 9.

19 is a crosshead slidable in the frame beneath mold table 4, with the lower plungers or pressing members 7 secured to the upper side thereof. Pivoted to and depending from this crosshead is pitman 20, having its lower end forked at 21 to embrace cam 22 on power shaft 14, the arrangement being such that the cam raises the pitman and crosshead and imparts the final upward pressure through plungers 7, this while the upper plungers 6 are held locked in lowermost position by toggle levers 9. By this means a maximum pressure is imparted to briquets B. Following this final compression, and the subsequent raising of the upper plunger 6, the lower plungers are raised by cams 23 on shaft 14 engaging rollers 24 at opposite ends of pitman 20. Plungers 7 are thus raised into the position shown in Fig. 2, with their upper

ends in the planes of the tops of the molding cavities, whereupon the pressed articles may be moved laterally on the molding table and out of the way. The automatic means
 5 provided for thus moving the briquets and entering charges of material for the next pressing operation consists of a box-like slide 25 movable over the top of table 4 and beneath hopper 26, the slide being open at
 10 its top to receive, when in outer position, material from the hopper as shown in Fig. 1, the slide being also open at the bottom for discharging the material into the molding cavities when in inward position as in Fig. 2,
 15 this after plungers 7 have lowered. Thus, while the front end 25' is moving the pressed articles out of the way, the slide rearward from said end is conveying inward the material requisite for the next charge. Within the
 20 slide is preferably arranged a cross rib 25'' which divides the material so that all of it is not dependent on the rear portion of the slide for the inward moving pressure.

Slide 25 is actuated by arms 27 on horizontal rock shaft 28, the latter carrying at
 25 one end arm 29 provided with roller 29' which plays in cam groove 30' of gear wheel 30. This wheel meshes with wheel 31 on the end of power shaft 14. By this means
 30 slide 25 is reciprocated the proper distance and at the required periods for charging the forming cavity and displacing the pressed briquets.

Plunger 7 constitutes a movable bottom
 35 for the forming cavity 5, and for stopping movement thereof irrespective of cam 22, a wedge-shaped slide 32 is adjusted by screw device 33 through a transverse slot in pitman 20, the wedge being engaged by pro-
 40 jection 20' at the upper end of the slot. By changing the position of wedge 32 the throw of plunger 7 is varied, and thereby the forming cavity 5 is made larger or smaller according to the amount of material required
 45 for each briquet.

From the foregoing description it will be seen that all of the operating mechanisms are controlled by a power shaft 14. If for any
 50 reason the machine should become stalled, as by the slipping of a driving belt, with toggle levers 9 in the locked position of Fig. 1, the mechanism may be unlocked by inserting a bar 34 in an aperture in crank 11 and turning shaft 10 and lifting crosshead 8
 55 and the upper plungers. The enlargement or offset 17' in cam groove 17 permits roller 18 and lever 13 to rise in response to such movement so that when stalled the mechanism is not locked by cam 16.

The means illustrated in Figs. 5 and 6, for forming either oval or spherical briquets, consists of an upper forming member 36 se-
 60 cured to crosshead 8, together with a mold 37 which displaces mold table 4 of the construction above described. In this adapta-

tion, the lower face of the upper pressing member 36 is provided with semi-oval or semi-spherical cavities 38 which, when part 36 is lowered, register with similar cavities 39 in mold 37, thus forming a complete
 70 molding cavity of the shape desired. Cavities 39 open downwardly through the bottom of mold 37 to receive the lower plungers 7 which operate as in the construction above described, first to press the briquets and then
 75 to lift them so that they may be readily removed.

I claim:—

1. The combination of a mold having a forming cavity open from below, a verti-
 80 cally movable forming device cooperating with the bottom opening of the cavity, a pitman pivotally connected to and depending from the forming device and provided with a cam-receiving recess, a shaft, a cam
 85 on the shaft within the pitman recess for imparting forming pressure to the forming device, and larger cams on said shaft for raising the forming device and moving the pressed article upward out of the mold. 90

2. The combination of a mold having a forming cavity open at its top and bottom, a vertically movable pressing device cooperating with the upper open end of the
 95 forming cavity, means for raising and lowering said device, a vertically movable pressing device cooperating with the lower end of the forming cavity, a pitman pivotally connected to and depending from the lower
 100 forming device and having a cam-receiving recess, a shaft, a cam on the shaft within said recess, shaft operating means turning the cam to raise the pitman and the lower pressing device when the upper pressing de-
 105 vice is in lowered position, and larger cams on the shaft operating to continue the upward movement of the lower pressing device after the upper pressing device has been raised from lowered position.

3. The combination of a mold, a plunger, 110
 levers for holding the plunger in pressing relation with the mold, cam mechanism operatively connected to the levers for actuating the latter to move the plunger toward
 115 and from the mold, and means independent of the cam mechanism for moving the levers without disturbing the operative relation between the levers and the cam mechanism.

4. The combination of a mold having a forming cavity open at its top and bottom, 120
 a pressing device for cooperating with the upper end of the cavity and means for actuating said device, a crosshead slidable vertically beneath the forming cavity, a forming device thereon for cooperating with the
 125 lower open end of the forming cavity, a pitman pivoted to and depending from the crosshead, and cam mechanism cooperating with the pitman for raising and lowering
 130 the crosshead.

5. The combination of a mold having a forming cavity open from below, a vertically movable forming device cooperating with the bottom opening of the forming cavity, a pitman pivotally connected to and depending from the forming device, the pitman being recessed to embrace a cam, a shaft, and a cam on the shaft and within the pitman cavity.

6. The combination of a mold having a forming cavity open at its top and bottom, a pressing device cooperating with the upper open end of the forming cavity, means for raising and lowering said device, a crosshead movable vertically beneath the forming cavity, a pressing device on the crosshead cooperating with the lower end of the forming cavity, a pitman pivoted to and depending from the crosshead and forked at its lower end, a shaft, a cam on the shaft embraced by the fork, and cams on said shaft for raising the crosshead independently of the first mentioned cam.

7. The combination of a mold having a forming cavity open at its top and bottom, a pressing device cooperating with the upper open end of the cavity, means for raising and lowering said device, a pressing device carried by the crosshead for cooperating with the lower open end of the forming cavity,

ity, a cam-embracing pitman pivoted to and depending from the crosshead, a shaft, a cam on the shaft cooperating with the pitman for raising the crosshead and lower pressing device when the upper pressing device is in lowermost position, and additional cams on the shaft for raising the lower pressing device into the plane of the open top of the forming cavity when the upper pressing device is raised.

8. The combination of a mold having a forming cavity open at its top and bottom, a pressing device cooperating with the upper open end of the cavity, a shaft, toggle levers connecting the shaft and pressing device, lever mechanism connected to said shaft, a power shaft, a cam on said shaft cooperating with said lever mechanism, the cam having an offset for releasing said lever mechanism when the toggle levers are in set position, a pressing device for the lower open end of the forming cavity, and means for actuating said lower pressing device.

In testimony whereof I affix my signature in presence of two witnesses.

GRANT W. RIGBY.

Witnesses:

ISAAC WEIL,
G. F. KINTEN.