I. BROOME.

ROTARY PRESS.

APPLICATION FILED JUNE 25, 1907.

899,691.

Patented Sept. 29, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

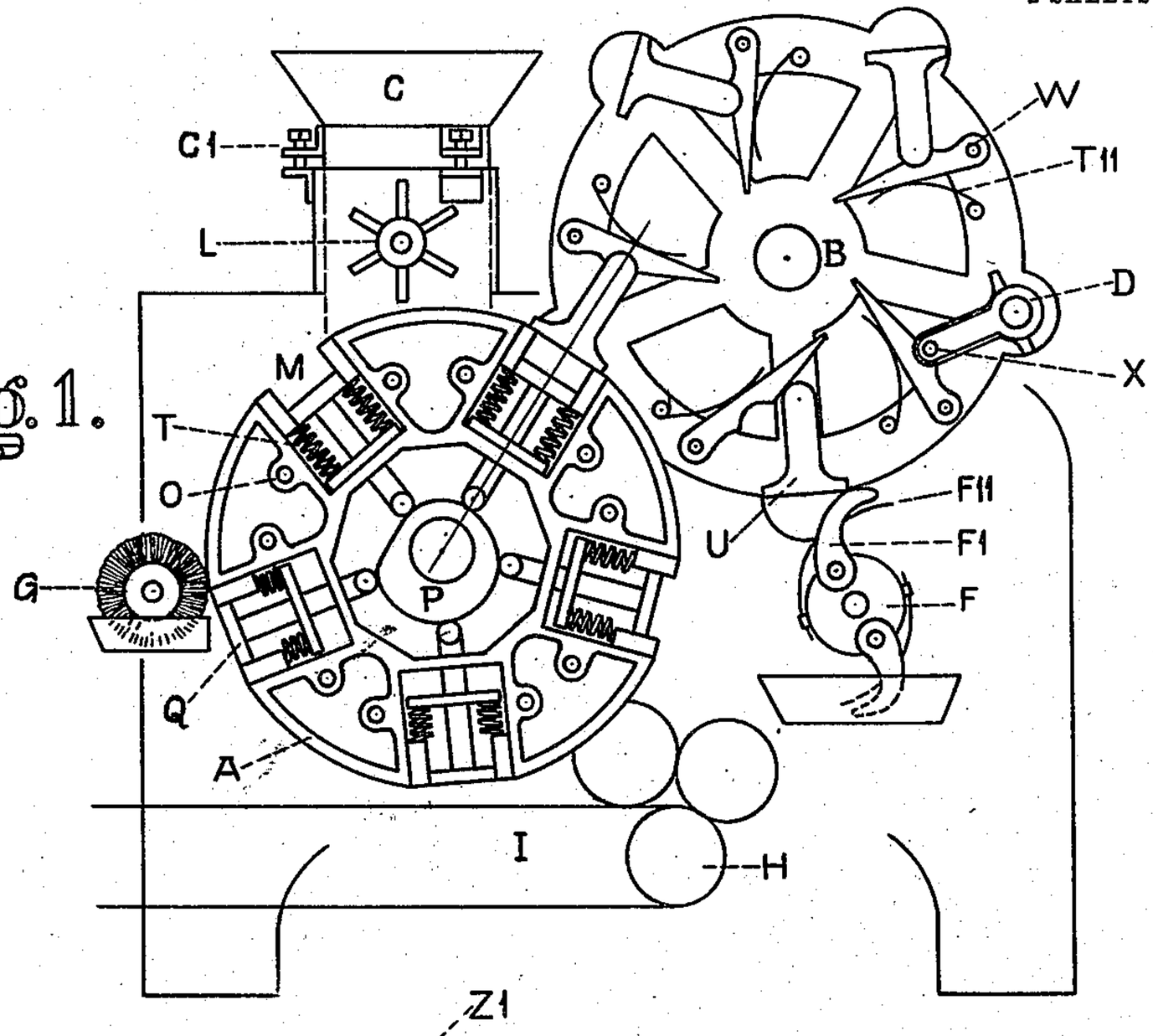
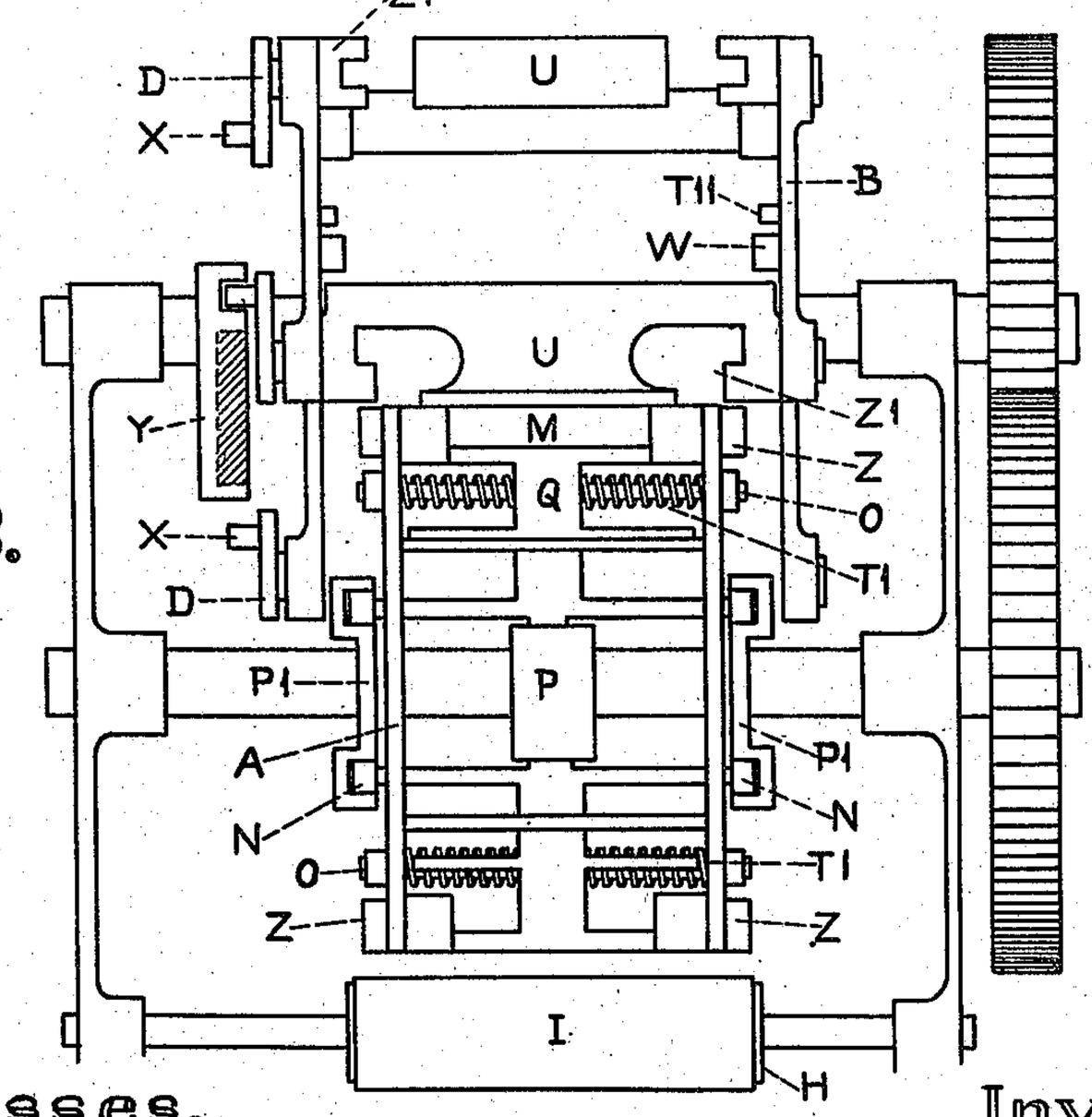


Fig. 2.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 3.

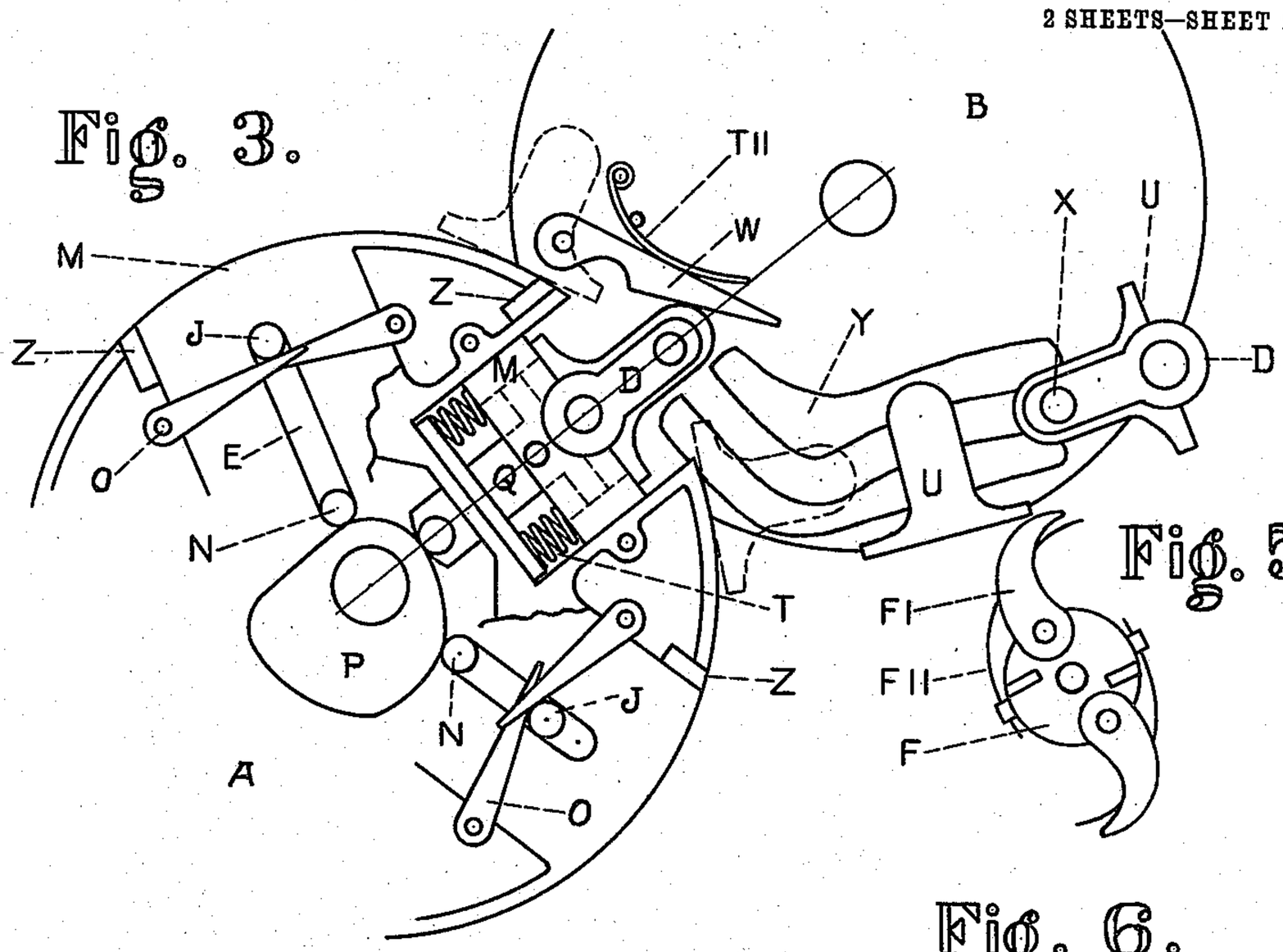


Fig. 4.

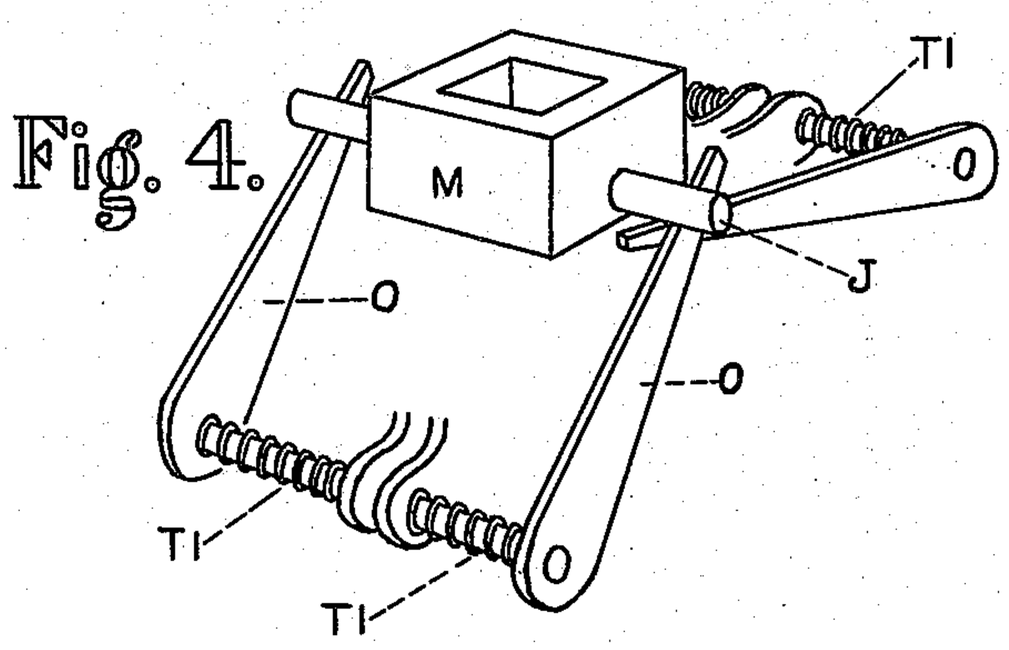


Fig. 5.

Fig. 6.

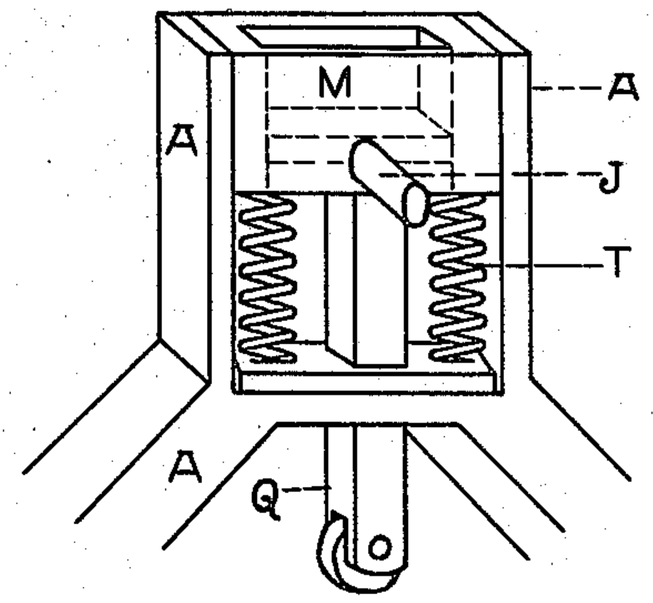
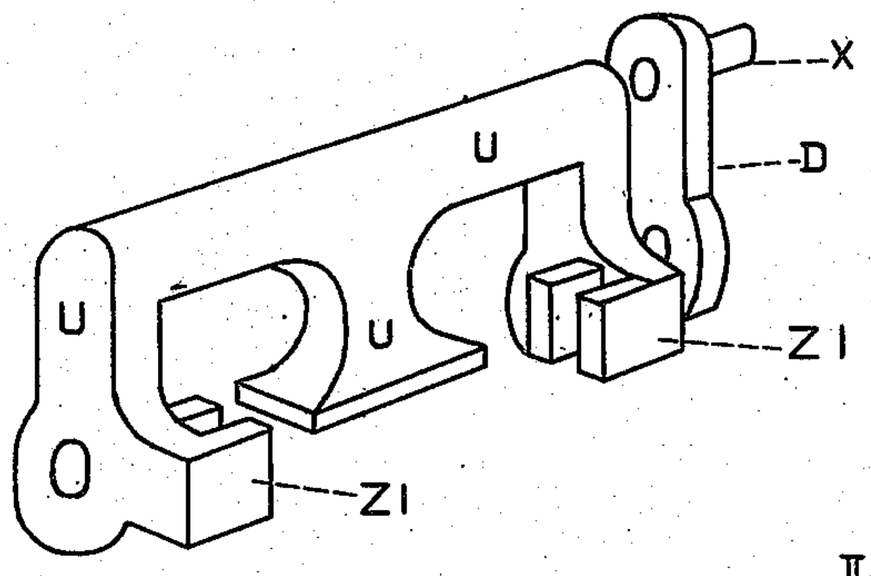


Fig. 7.



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UNITED STATES PATENT OFFICE.

ISAAC BROOME, OF TRENTON, NEW JERSEY.

ROTARY PRESS.

No. 899,691. Specification of Letters Patent. Patented Sept. 29, 1908.

Application filed June 25, 1907. Serial No. 380,746.

To all whom it may concern:

Be it known that I, ISAAC BROOME, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented a new and useful Rotary Press, of which the following is a specification.

My invention relates to improvements in a rotary apparatus for pressing loose or pulverulent substances into more or less solid form; and the object of my invention is to provide a rotary machine that will achieve this purpose without the rigidity common to such machines, the mechanism of my invention being so arranged that its operations are elastic. This I attain, firstly, by providing a direct parallel pressure on the faces of movable dies placed in chambers in a rotating cylinder by means of oscillating plungers placed in the periphery of rotating disks. Secondly, by the plungers following the descending and changing position of the dies and maintaining their direct line of pressure by means of guides during the rotary movement. Thirdly, by lapping the periphery of the disks over the periphery of the cylinder to the depth required for pressure, as illustrated in the accompanying drawings and specifications.

Figure 1, is a side elevation of the machine with frame and casing omitted, displaying its principal parts. Fig. 2, is a vertical cross section of the same, with frame, bearings and parts more fully indicated. Fig. 3, shows in further detail the working parts of the cylinder, disks, plungers cams, lift-up and oiler, and their situation during operation. Fig. 4, shows in perspective view a detached die with arms, levers and exterior springs. Fig. 5, a sectional view of the oiler. Fig. 6, a detached box with arms, inside springs and lift-up. Fig. 7, a view of the plunger with its slides and turn-over.

Similar letters and figures refer to similar parts throughout the several views.

The following is a description of my invention.

Briefly stated, it consists of a vertically arranged rotating cylinder, or drum, containing dies arranged peripherally and operating radially downward by pressure upon their surfaces, and upwards to a level with the peripheral face of the cylinder, the dies operating between partitions forming chambers, which are part of the cylinder, placed at convenient intervals. The bottom of the chambers constitutes the bearing surface for the plunger, preferably termed the lift-up, which receives the pressure upon its upper end, placed within the die. The so called lift-up serving not only to receive the pressure on the material contained within the die, but also, by means of cams, arms and springs attached to, or acting upon its lower part operates within the die to eject the pressed material.

In conjunction with the rotating cylinder, or drum, provided with chambers and having movable dies set therein are vertically arranged rotating disk plates of the same diameter as the cylinder, placed so as to span and overlap the cylinder, that is to say, the disk plates and cylinder overlap each other to the depth requisite to press the material within the dies. Between these disk plates, which are braced together and mounted upon a shaft, are placed oscillating plungers pivoted by their arms at the periphery of the disks. These press upon the faces of the spring supported dies contained in the cylinder causing them to descend in their chambers to the given depth of pressure, after which the pressing plungers are guided by means of a fixed cam to be set in position to meet the parallel faces of the dies as the disks and cylinder rotate together. Mainly, this is the operation achieved in conjunction with several requisite and indispensable mechanical parts to successfully complete and function this system of obtaining an elastic pressure and to avoid the rigidity common in the action of this class of machines.

Further details of the invention and the relation and function of the several adjunctive parts are set forth and explained in the following specifications.

Figs. 1 and 2. (A) represents a vertically arranged rotating cylinder, or drum, radially partitioned into a series of boxes, or chambers peripherally arranged within the cylinder. Between these are open spaces covered by the peripheral face of the cylinder. Within the chambers are fitted dies (M) supported to the face of the cylinder by springs (T) underneath them, permitting a radial movement of the dies within their chambers by pressure upon the springs (T). (Figs. 1, 2 and 3). Lateral arms (J) project from the dies (M) and pass through a slot (E) in the sides of the cylinder (A). Levers (O) act exteriorly upon the arms (J) to press upward the dies (M) by the tension of springs (T′) upon the pivotal rods of

the levers (O) placed transversely in the open spaces of the cylinder (A). (Fig. 4.)

Fitted within the open dies (M) (Fig. 6) and forming the bottom of the same are plungers, or lifts-up (Q) seated by a flange upon their stems on the bottom of the chambers in the cylinder (A) the lower parts of their stems passing through apertures in the bottom of the chambers permitting the stems to be raised or lowered in the dies (M) by the anti-friction rollers in the ends as they rotate with the cylinder (A) around the face of a fixed cam (P).

In addition to the action of the cam (P) upon the end of the lift-up (Q) are lateral arms (N), provided with anti-friction rollers. Said arms N extend from the lift-up (Q) through the slots (E) in the ends of the cylinder (A) and fit into the groove of the fixed cams (P′) placed adjacent the sides of the cylinder (A) and attached to the frame of the machine. Said arms (N) operate the lift-up upwards and downwards conjointly with the cam (P) by following the cam groove in (P′) as the cylinder (A) rotates. Perfect bearing upon the bottom of the chamber M is secured by the springs (T) underneath the die (M) pressing upon the flange on the stem of the lift-up (Q). (Figs. 3 and 6.)

Disk plates (B) of the same diameters as the cylinder (A) are mounted upon a shaft and separated so that their peripheries will span and lap over the face of the cylinder (A). Between the disks (B) are placed transversely a series of oscillating plungers (U) pivoted by their arms to the periphery of the disks (B), their faces exactly parallel with the pivotal centers. (See Fig. 7.) The faces of these plungers (U) contact with the faces of the dies (M) by the simultaneous rotary movement of disks (B) and cylinder (A) and press the dies (M) downwards upon the springs (T) and lift-up (Q) to the depth of the overlap of the diameters of the disks and cylinder.

It is evident that to accomplish the parallel meeting of the faces of the dies (M) with the faces of the plungers (U) at a point distant from a line connecting the shafts of the disks and cylinder, the plungers must assume a chordal position upon the disks (B) at the point of contact, which position is changed by the rotating movement to a direct line with the center of the cylinder and disks, and again to a reversed chordal position upon the disks after the central line of pressure is past, the plungers following the radius of the cylinder. To securely control this movement of the oscillating plungers (U) slotted projections, or guides (Z′) are placed upon the arms of the plungers (U) which engage in their slots projections (Z) placed on the exterior sides of the cylinder (A) parallel with its radius, and guide the oscillating motion of the plungers (U) during pressure upon the dies (M) in parallel line with the radius of the cylinder (A).

Upon the pivotal shaft of the plunger (U) which extends through the disk plate (B), at its peripheral line, is fixed a crank (D) provided with a wrist pin (X) (Figs. 2, 3 and 7). At the central line of pressure of the plungers (U) upon the dies (M) the wrist pin (X) enters the groove of a fixed cam (Y), attached to the frame of the machine, guiding by its control of the crank (D) the position of the face of the plunger (U) to receive during its passage the cleansing and lubricating arms of the rotating oiler (F), (Fig. 5) after which the plunger (U) is set by the cam (Y), acting upon the wrist pin (X), into its chordal position upon the disks (B) to meet squarely the face of the die (M) during rotation.

To maintain the plungers (U) in position during the rotating movement of the disks, a series of notched latch grips (W) are placed upon the inner sides of the disks (B) and pivoted, near the periphery, to the disks. The latches (W) grip in their notches the top of the plungers (U) at their temporary chordal position on the disks and retain them by pressure of the springs (T″), also attached to the disks, upon the upper edges of the latch grips (W). At the moment of contact of the plungers (U) with the dies (M) the slots of the slides (Z′) engage with the projections (Z) and ease the plungers (U) out of the notches of the latch grips (W) permitting the plungers to be guided, during pressure, in a line with the cylindrical radius and their faces parallel with the faces of the movable dies (M).

A rotating oiler (Fig. 5) placed beneath the disks (B) is provided with arms (F′) pivoted upon the ends of a cylinder (F) bearing transverse bars between the arms parallel with the cylinder to which are attached springs (F″) that extend outwardly to and underneath the bars of the arms (F′) and furnish elastic pressure, while rotating, upon the faces of the plungers (U) to cleanse and oil them, the faces of the plungers being guided into proper position to receive the action of the lubricating arms of the oiler by means of the crank (D) and cam (Y).

To cleanse and lubricate the peripheral face of the cylinder (A) and the face of the lift-up (Q) a rotating brush oiler (G) is attached to the frame of the machine in front of the cylinder (A).

A hopper (C), placed above the cylinder (A) and maintained in position by a casing, or box, fixed to the table of the machine, feeds material into the dies (M) contained in and maintained level with the face of the cylinder (A). The lower end of the hopper (C) is curved to fit the peripheral face of the cylinder (A) and is prevented from resting on the cylinder by set screws (C′) attached to

the sides of the hopper and at the upper end of its receiving box. The material so fed to the dies (M) after undergoing pressure by the plungers (U) is deposited upon the carrier belt (I) operated by the pulley (H).

Details of scrapers, brushes and surface cleaning arrangements common to all machines are considered unnecessary, not being vital to my invention.

I claim as follows:

1. In a continuous rotary mold, of the character described, the combination of a drum having a plurality of radial mold chambers formed therein, movable mold cores mounted within said chambers and forming the sides thereof, expressing plungers mounted within said chambers and forming the base thereof and having rigid extensions in the rear of said cores, spring connections between said plunger extensions and said cores, a cam mounted to move said plungers forwardly to deliver the mounted material, and means to limit the outward movement of said mold cores, substantially as described.

2. In a continuous rotary press of the character described, the combination of a rotatable drum having a plurality of radial mold chambers formed therein, a plurality of compressing plungers mounted adjacent said drum to travel in a circular path about a central axis and against said mold chamber, a cleaning and lubricating device arranged adjacent the path of movement of said compressing plungers, and means for moving said plungers to an angular position to receive said device thereagainst, substantially as described.

3. In a continuous rotary press of the character described, the combination of a rotatable drum having a plurality of radial mold chambers formed therein, a plurality of compressing plungers mounted adjacent said drum to travel in a circular path about a central axis and against said mold chamber, a cleaning and lubricating device arranged adjacent the path of movement of said compressing plungers, and means for moving said plungers to an angular position to receive said device thereagainst, said means being adapted to subsequently return said plungers to their normal positions, substantially as described.

4. In a continuous rotary press of the character described, the combination of a rotatable drum comprising side plates having a plurality of radial mold chambers mounted therebetween, movable mold cores mounted within said chambers and forming the sides thereof, a second drum mounted adjacent said first named drum and comprising side plates overlapping the side plates of said first named drum to a selected degree, a plurality of compressing plungers mounted between said side plates of said last named drum to enter said mold chambers and bear against said cores, and means to maintain direct parallel engagement of said plungers with said mold cores for a distance upon each side of a line drawn through the axes of rotation of said mold and compressing drums, comprising elements carried by said compressing drum for loose engagement with said plungers to hold the same at an angle for initial direct parallel engagement with said mold cores, and elements carried by said mold drum for subsequent engagement with said plungers to maintain said direct parallel engagement, substantially as described.

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Witnesses:
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ROBERT R. VOLK.