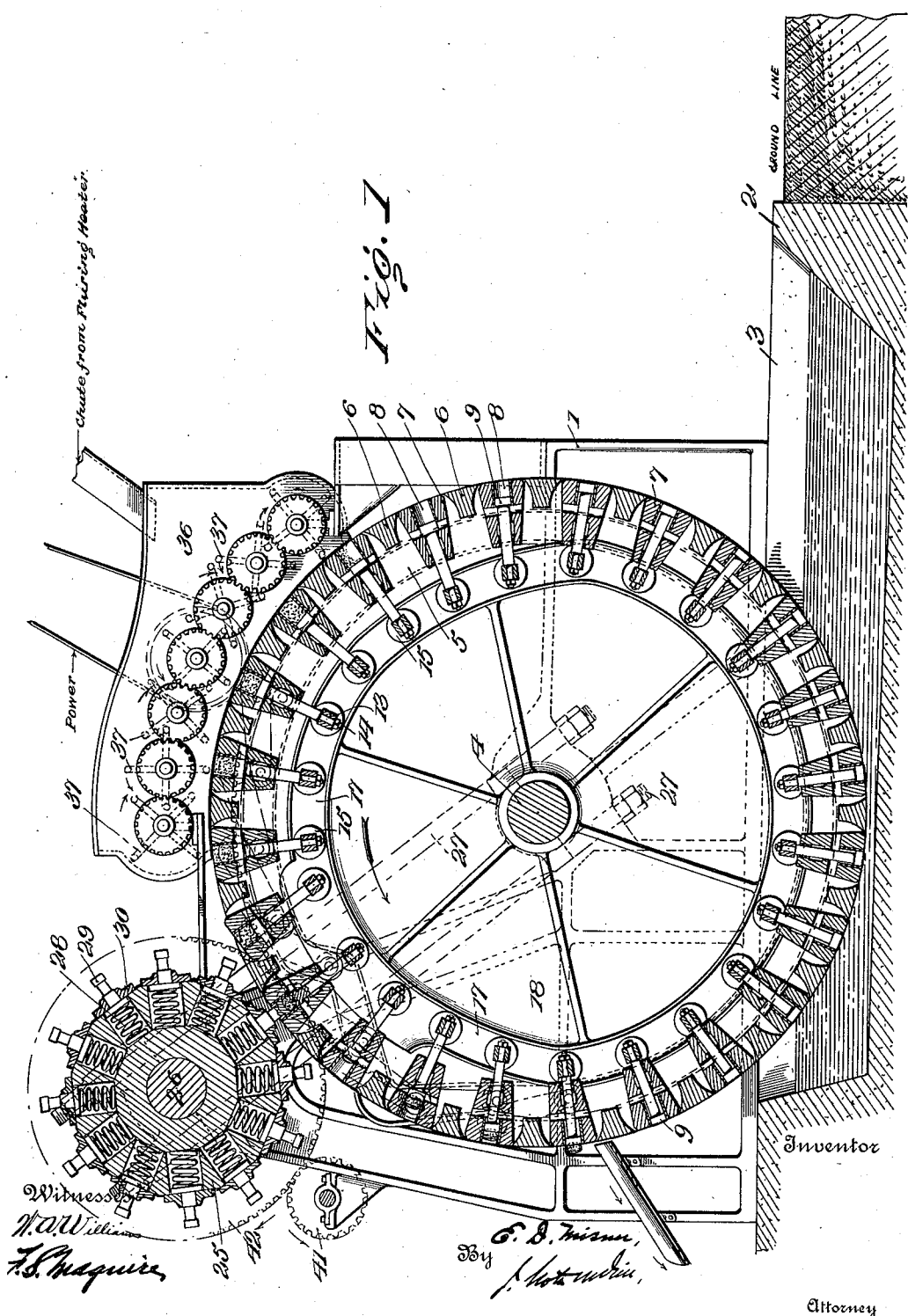




E. D. MISNER.
MOLDING MACHINE.

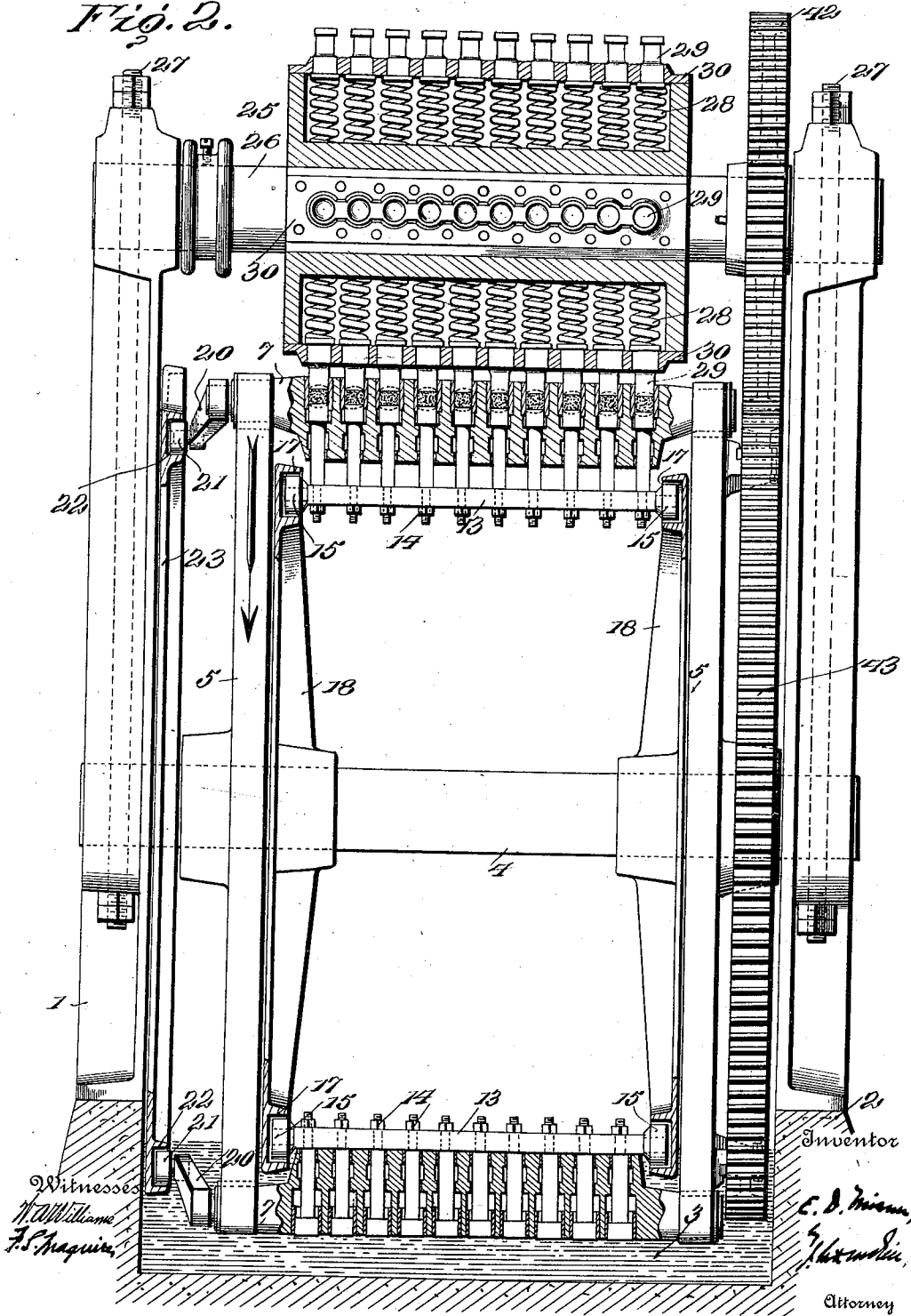
APPLICATION FILED JUNE 20, 1910.

1,015,576.

Patented Jan. 23, 1912.

4 SHEETS—SHEET 2.

Fig. 2.



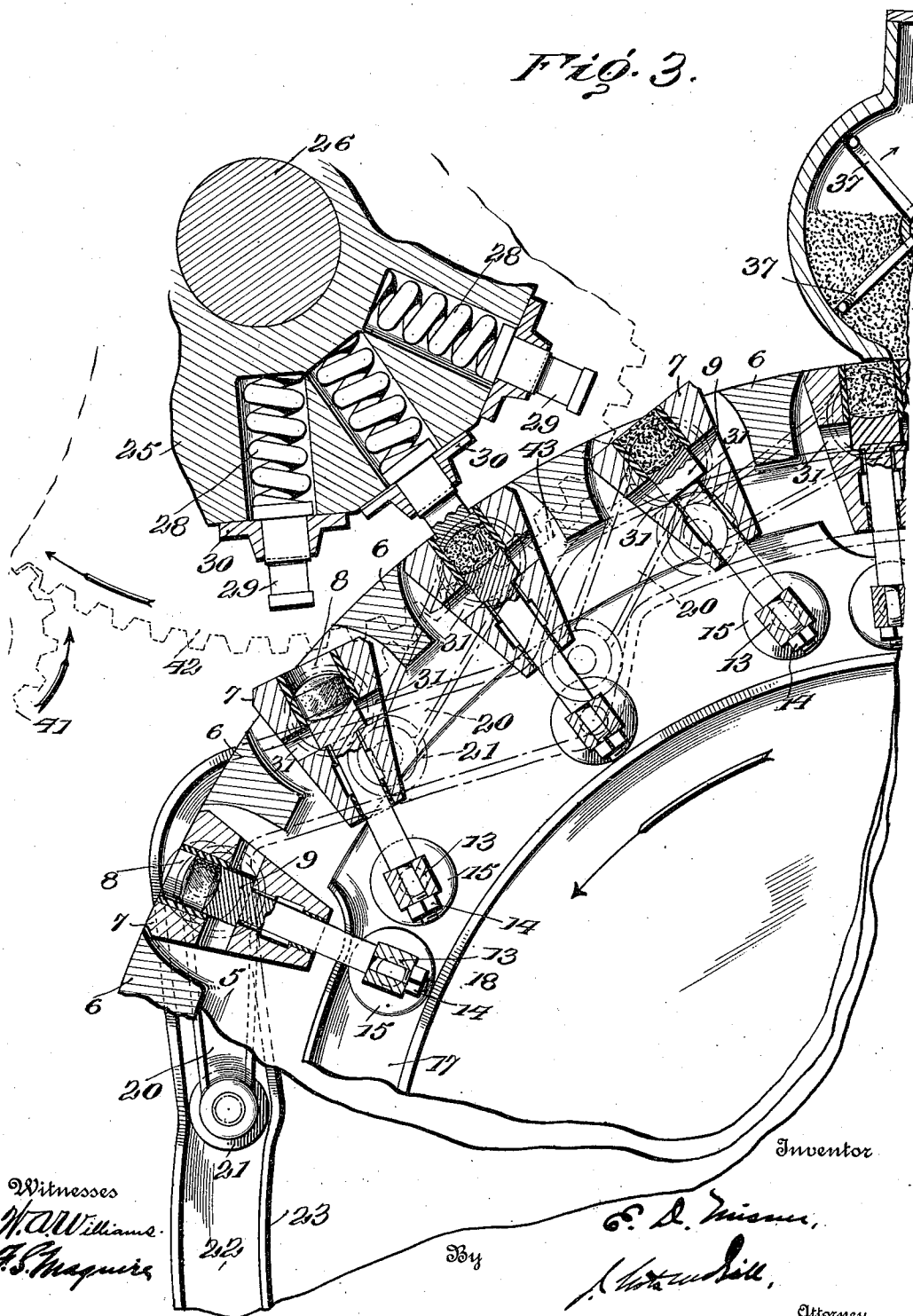
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4 SHEETS—SHEET 3.

Fig. 3.

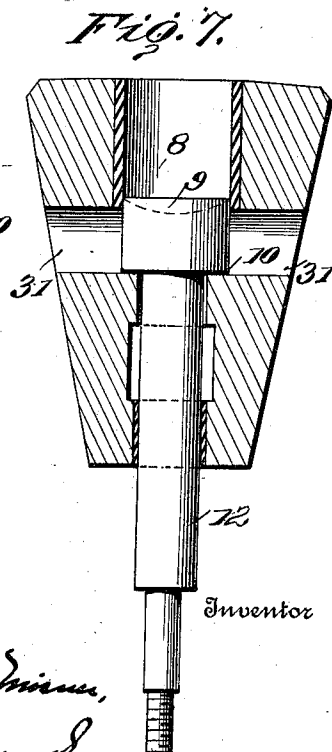
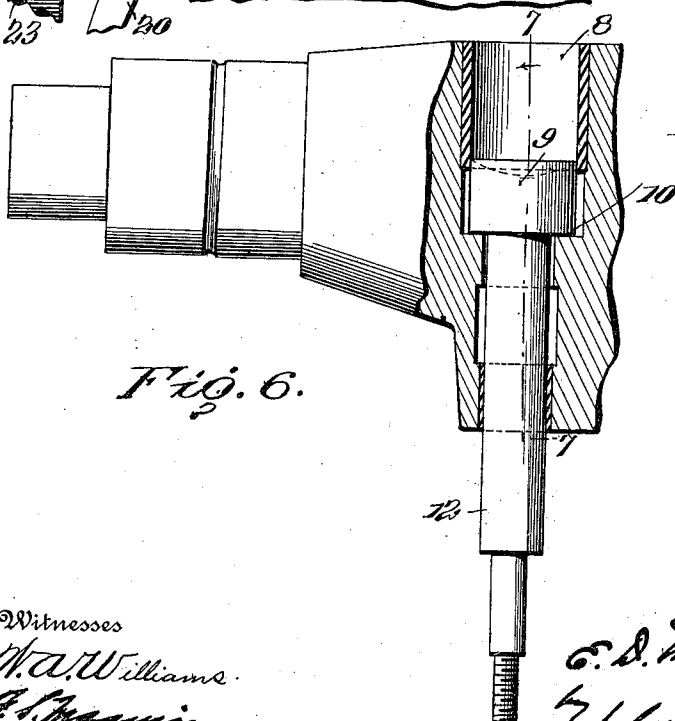
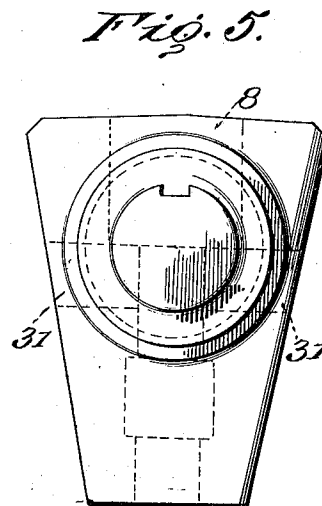
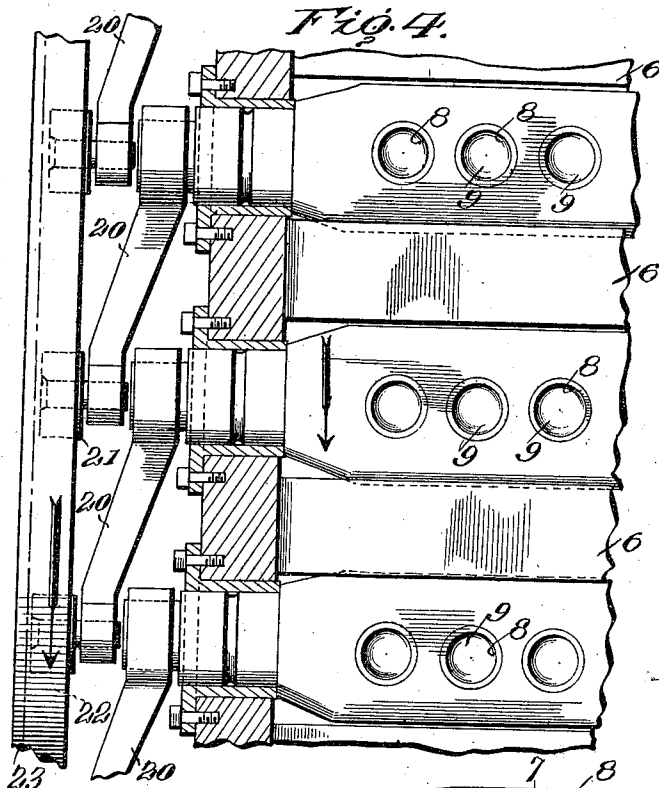


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4 SHEETS—SHEET 4.



Witnesses
W. A. Williams
F. S. Maguire

E. D. Misner,
by [Signature]

Inventor

Attorney

UNITED STATES PATENT OFFICE.

EDGAR D. MISNER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE MISNER BRIQUETTE MACHINE COMPANY, A CORPORATION OF MISSOURI.

MOLDING-MACHINE.

1,015,576.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed June 20, 1910. Serial No. 567,802.

To all whom it may concern:

Be it known that I, EDGAR D. MISNER, of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Molding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to simplify the construction and mode of operation of molding machines, and particularly those of the type designed for the manufacture of fuel briquets.

According to my present invention molds or die-housings are circumferentially arranged on a circular carrier between spaced apart cross members so as to present an approximately unbroken surface in passing beneath an open bottom hopper. These cross members permit the die housings to be oscillated on their respective bearings as they approach rotary plungers, and while moving with and away from them, so as to insure proper coöperation without the necessity of having the number of plungers correspond with the number of housings. Each housing has a series of die-openings which accommodate movable dies and receive the plungers. The pressure of the plungers against the material is taken up by shoulders of the dies bearing against shoulders of the die-housings, thus relieving the die actuating cams of the compressing strain. The dies of each housing are connected by a common yoke, and the latter is provided with rollers which travel on cams which force the dies outwardly to eject the material and to hold them in their extended positions as the die-housings are passed through a water bath, whereupon the cams restore the dies to their normal positions. Each die-opening is provided at its inner end with lateral relief openings to allow of the free reciprocation of the dies.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation. Fig. 2 is a view at right angles to Fig. 1, showing the plunger carrier and two of the die-housings in section, the other die-housings being omitted. Fig. 3 is a fragmentary view on an enlarged

scale. Fig. 4 is a fragmentary plan view on an enlarged scale of some of the molds. Fig. 5 is an enlarged end view of a die-housing. Fig. 6 is a view of one end of a die-housing partly in section. Fig. 7 is a transverse sectional view on line 7-7, Fig. 6.

Referring to the drawings, 1 designates a stationary frame which I have shown as mounted on a base 2, which is preferably of concrete formation and formed with a water trough 3. In frame 1 is mounted a fixed shaft 4, upon which are two rotary carriers 5 which are shown in the form of circular disks connected by spaced-apart cross pieces 6.

7 designates a series of circularly-arranged molds or die-housings mounted between and journaled in carriers 5. These die housings normally fill the spaces between cross pieces 6 so that the mold has an approximately smooth unbroken periphery. These cross pieces permit the die housings to be oscillated on their bearings, but when in their normal positions the die housings are flush with the outer faces of the cross pieces. Each housing is provided with a series of circular openings 8 wherein are located dies 9 having shoulders 10 at their inner ends which are designed to abut against stops at the inner ends of the openings. Each die has a rod 12 projecting from its inner end and extended through and beyond the inner end of the housing, and these rods are fitted loosely to a yoke 13, being held by nuts 14. Each yoke carries rollers 15 which travel in cam grooves 17 of two disks 18 fixedly mounted on shaft 4. The cams 17 actuate the dies to eject the molded material and hold the dies at the outer ends of the die-openings while traveling through the water bath, and these cams also return the dies to their normal positions.

Each die-housing has at one end a lever 20 which carries a roller 21 which travels in a cam groove 22 of a fixed disk 23 mounted on shaft 4. The purpose of these levers is to successively oscillate the several die-housings while revolving.

25 designates a rotary carrier, and 26 a shaft therefor supported by frame 1, the bearings for this shaft being strengthened by brace rods 27 so as to hold shafts 4 and 26 in fixed relation to each other. The carrier 25 is provided with circumferentially

arranged spaced-apart openings, arranged in rows, and wherein are located heavy coiled springs 28 which act against the inner flanged ends of plungers 29, which latter are held by retaining plates 30.

I have shown a series of twenty-four die-housings, but the exact number is immaterial, and they are spaced 15° apart. I have shown a series of twelve plungers spaced 30° apart. In consequence of this difference between the number of plungers and the number of die-housings, and to avoid any cessation in the rotation of either the die-housings or the plungers, I provide for successively oscillating each die-housing as it is brought into coöperative relation to the plungers to allow the latter to enter the molds on straight lines and to effectively compress the material before separation, the die-housings and the plungers being revolved without cessation. The dip in the cam groove is such that each mold or die-housing will be turned first in one direction, prior to compression, and in the opposite direction, after compression, and after the respective levers pass out of the inwardly extended portion of the cam groove the die-housings will successively resume their normal positions. The compression strain is not taken up by disks 18, but wholly by the shoulders at the inner ends of the die-openings. After compression the dies will be forced outwardly by cam grooves 17 acting on yokes 13 to eject the briquets, and the dies will be drawn inwardly after the housings have passed from the bath. To insure the free reciprocation of the dies each die-housing has lateral openings 31 at the inner ends of openings 8, as clearly shown in Fig. 7, and it is the walls of these relief openings which form stops for the shoulders of the dies.

36 designates an open-bottom hopper mounted on frame 1 and extending over a portion of the revolving series of molds to supply material to the openings of the several die-housings. Within this hopper I locate a series of rotary agitators 37, which are preferably in the form of arms having T-ends. The shafts of the several agitators are geared together, and power is applied to one of them and by it communicated to the others. The material is supplied to the hopper from a fluxing heater which may be of any preferred construction and provided with a suitable agitator and means for controlling the outlet to the hopper.

Although the rotary series of molds and plungers may be actuated in any preferred manner, the gearing shown comprises a driving pinion 41 in mesh with a gear wheel 42 on plunger-carrier shaft 26, said gear wheel 42 communicating power to the mold carriers through gear wheel 43 affixed to one of the carrier disks 5.

The operation is manifest from what has been stated, and it is not necessary to recite the same with further detail.

The advantages of the invention will at once suggest themselves to those skilled in the art. By oscillating each mold as it approaches the rotary plungers a lesser number of plungers is required, and the entrance of the plungers into the die-openings on straight lines is insured, and furthermore although the plungers are less in number than the housings the time necessary for effecting compression is not interfered with notwithstanding the fact that both the plungers and the housings continue to revolve while in engagement. Then, too, it will be noticed that the pressure of the plungers on the material is not communicated to the cams by which the dies are operated, but is taken up wholly by the coöperating shoulders of the dies and housings.

I claim as my invention:—

1. In a briquet machine, in combination, an open bottom hopper, a rotary support, a series of oscillating die housings carried by said support, spacing members filling the spaces between said die housings at the periphery of the support to form, in conjunction with the die housings, an approximately smooth surface at such periphery, in passing beneath the open bottom hopper, dies movable in said housings, a rotary series of plungers for coöperating with such die housings, the number of die housings being in excess of the number of plungers, means for positively oscillating the die housings as they approach and leave said plungers to insure proper coöperation of the plungers with each die housing, and means for imparting a continuous rotary motion to said plungers and support.

2. In a briquet machine, in combination, an open bottom hopper, a rotary carrier having spaced apart members at its periphery, die housings journaled in said carrier at points inwardly from its periphery, the outer surfaces of said die housings being normally flush with the outer surfaces of said spaced apart members, forming an approximately unbroken surface in passing beneath the open bottom hopper, dies movable in said housings, a rotary series of plungers for coöperating with such die housings, the number of die housings being in excess of the number of plungers, means for positively oscillating the die housings as they approach and leave said plungers to insure proper coöperation of the plungers with each die-housing, and means for imparting a continuous rotary motion to said plungers and support.

3. In a briquet machine, in combination, an open bottom hopper, a rotary carrier having spaced apart members at its periphery, said members being widened at their outer

ends, die housings journaled in said carrier at points inwardly from its periphery, the outer surfaces of said die housings being normally flush with the widened ends of
 5 said members, to present an approximately unbroken surface in passing beneath the open bottom hopper, dies movable in said housings, a rotary series of plungers for co-operating with such die housings, the number of die housings being in excess of the
 10 number of plungers, means for positively oscillating the die housings as they approach and leave said plungers to insure proper coöperation of the plungers with
 15 each die housing, and means for imparting a continuous rotary motion to said plungers and support.

4. In a molding machine, in combination, an open bottom hopper, a rotary support, a
 20 series of oscillating die-housings, spaced-apart disks having connecting cross members at their peripheries, said housings at their outer ends filling the spaces between said members and journaled in said disks,
 25 said housings and cross members presenting an approximately unbroken surface in passing beneath said hopper, a rotary series of plungers for coöperating with said die-housings, means for oscillating each die-housing
 30 successively as it approaches, while traveling with and in leaving said plungers to insure proper coöperation of the latter with the die housings, and means for rotating said plungers and disks.

5. In a molding machine, in combination, an open bottom hopper, a rotary mold comprising a series of circularly arranged
 35 spaced apart die-housings, carriers for said housings in which they are journaled, spacing members located between said die housings at the outer ends thereof, a rotary series of
 40 plungers for coöperating with said die-housings, levers carried by said die-housings, a fixed cam with which said levers engage for changing the position of each die-housing successively as it approaches the
 45 plungers to insure proper coöperation of the latter, and means for rotating said plungers and carriers.

6. A molding machine comprising, in combination, two rotary disks having spaced-apart cross members at their peripheries, a series of oscillatory molds located between
 50 said cross-members and arranged circularly between said disks, an open bottom hopper beneath which said molds and cross-members are designed to travel, a rotary series of plungers less in number than the circularly-arranged molds, said molds being journaled in said disks, means for positively oscillating each mold successively as it approaches the plungers and while in engagement therewith, and means for imparting a continuous rotation to said disks and plungers.
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7. A molding machine comprising, in combination, two rotary disks having spaced-apart cross members at their peripheries, a series of molds located between
 70 said cross-members and arranged circularly between said disks, a hopper beneath which said molds and cross members are designed to travel, a rotary series of plungers less in number than the circularly-arranged molds, said molds being journaled in said disks, levers
 75 carried by said molds, a fixed cam with which said levers engage for shifting the position of each mold successively as it approaches said plungers and while traveling therewith, and means for imparting a continuous rotary motion to said plungers and disks.
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8. The combination with a main frame, and a shaft supported thereby, of disks loosely mounted on said shaft having
 85 spaced-apart cross members at their peripheries, molds fitted between said members, an open-bottom hopper beneath which said molds and cross members are designed to travel, each mold being journaled in said disks and having a lever at one end, a fixed disk having a cam groove in which said levers travel, a second shaft, a rotary carrier thereon, a series of plungers mounted in
 90 said carrier for coöperating with said molds, the position of each mold being shifted as it approaches and while coöperating with said plungers, and means for continuously rotating said plunger carrier and said disks.
 95

9. In a molding machine, in combination, a series of circularly-arranged die-housings,
 100 each housing having a series of die-openings and relief openings transverse to the die-openings, a series of dies having shoulders at their inner ends for engaging the walls of the relief openings, a rotary series of
 105 plungers for coöperating with said dies, the pressure of the plungers on the material against the dies being taken up by the said walls of the relief-openings, and means for forcing the dies outwardly to eject the material therefrom.
 110

10. In a molding machine, in combination, a series of circularly-arranged oscillatory die-housings, each housing having a series of openings, shoulders at the inner ends
 115 of the latter, a series of dies for each housing, yokes connecting all the dies of each series and designed to oscillate with said die-housings, rollers carried by said yokes, fixed disks having cam grooves wherein said rollers are located, a rotary series of plungers for coöperating with said molds, said cam grooves acting on said rollers of the yokes to force the dies outwardly to eject the material from the die-housings, a trough containing cooling water through which said die-housings are designed to travel while said dies are in their outer positions, said dies being cooled in passing through the
 120
 125
 130

water, said cam groove then acting on said yokes to draw the dies inwardly, and means for rotating the plungers and die-housings.

11. In a molding machine, in combination,
5 a series of circularly-arranged die-housings, each housing having a series of die-openings and a series of relief-openings transverse to the die-openings, a series of dies fitted in
10 inner ends for engaging the walls of said relief-openings, yokes connecting all the dies of each series, rollers carried by said yokes, fixed disks having cam grooves in which said rollers are designed to travel, a rotary
15 series of plungers for coöperating with said die-housings, the pressure of the plungers on the material against the dies being taken

up by the shoulders of the latter bearing against the walls of the relief-openings, said cam grooves acting on said rollers to force 20 the dies outwardly after the plungers have coöperated with the die-housings, a water trough through which said housings are designed to travel, said cam groove then serving to move said dies inwardly in said open- 25 ings, and means for continuously rotating said die-housings and plungers.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

EDGAR D. MISNER.

Witnesses:

THOMAS NORTON,
JESSIE M. DAUGHERTY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."