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G. KOMAREK.
BRIQUET MACHINE.
APPLICATION FILED JUNE 19, 1911.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 1.

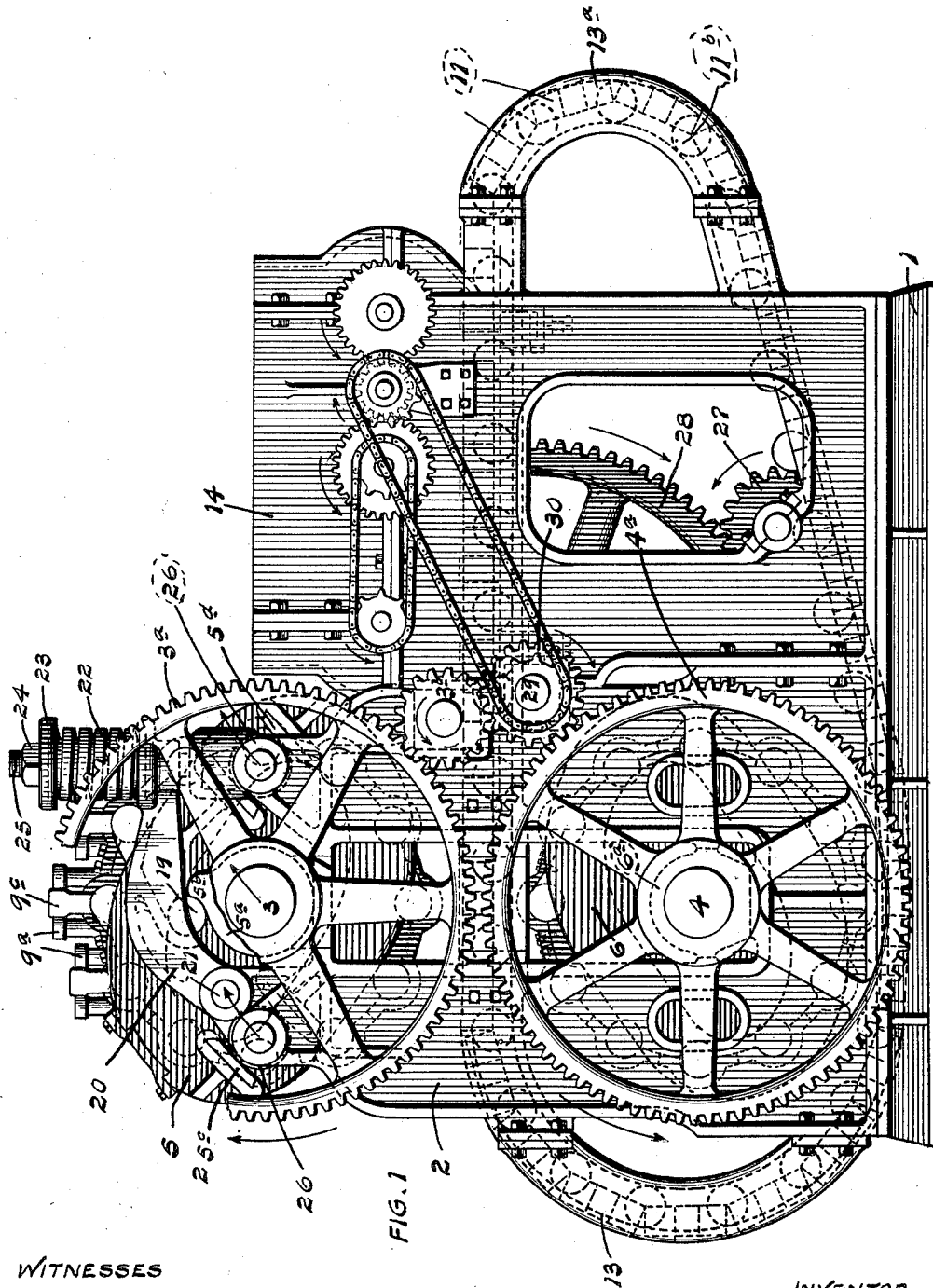


FIG. 1

WITNESSES

Mr. Janus.
Mr. Smith

INVENTOR

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BY *J. K. Carmody* ATT'Y.

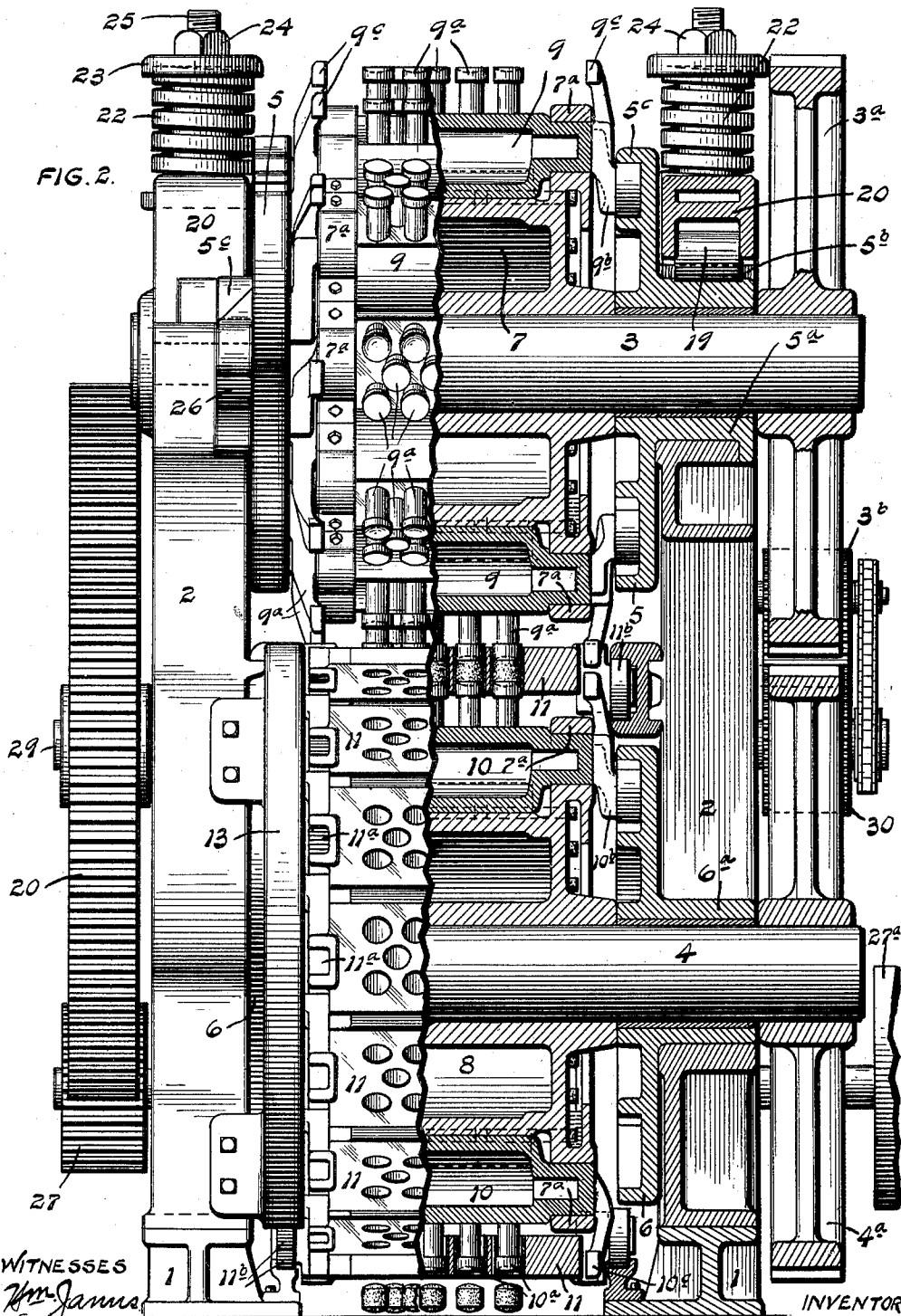
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WITNESSES
Wm. J. James
M. C. Smith

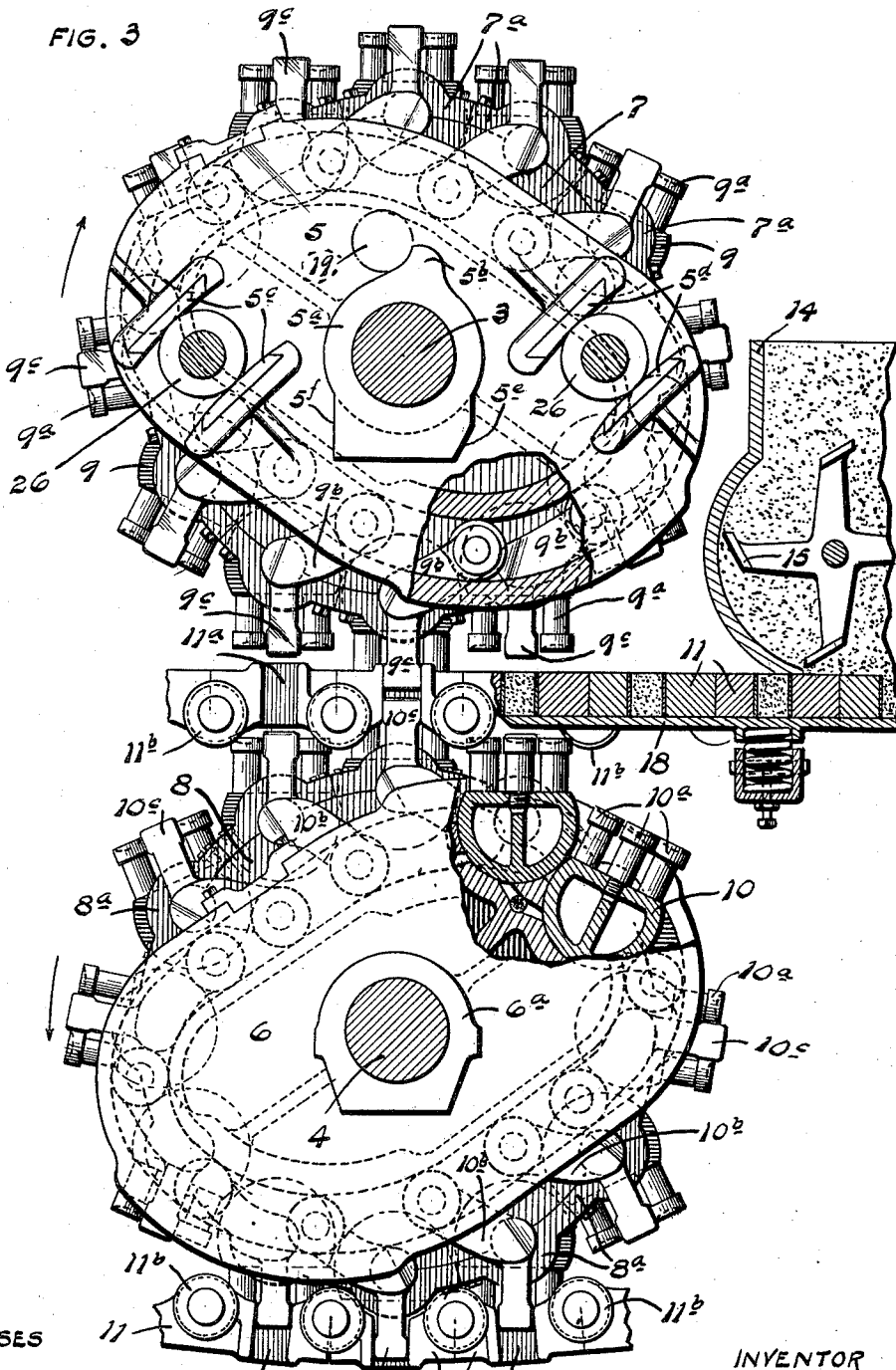
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3 SHEETS—SHEET 3.

FIG. 3



WITNESSES

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UNITED STATES PATENT OFFICE.

GUSTAV KOMAREK, OF ST. LOUIS, MISSOURI, ASSIGNOR TO ST. LOUIS BRIQUETTE MACHINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

BRIQUET-MACHINE.

1,036,647.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed June 19, 1911. Serial No. 634,045.

To all whom it may concern:

Be it known that I, GUSTAV KOMAREK, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain
5 new and useful Improvement in Briquet-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, refer-
10 ence being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view of my improved briquet machine. Fig. 2 is an
15 end elevational view partly in vertical section. Fig. 3 is a detailed view of the revoluble plungers and endless mold carriers.

This invention relates to a new and useful improvement in briquet machines the
20 object being to construct a machine of the character described which will be simple in construction, powerful and of great capacity.

My present invention is designed as an
25 improvement upon the briquet machines disclosed in Letters Patent No. 969540, granted to me Sept. 6th, 1910. In my aforesaid patent the material to be molded is intended to be first heated and introduced into a feed
30 box 14 where it is kept in a state of agitation by angle flights 15 which flights ride over mold cavities in the endless chain and fill said cavities to the uniform density. After the cavities are filled, the chain passes
35 between the two sets of revoluble plungers, which plungers compress the material in the cavities and afterward the plungers of the lower set reënter the cavities to eject the finished briquet.

My present improvement consists princi-
40 pally in providing the revoluble plungers with means whereby the particular set of plungers in action are interlocked with the mold plate containing the cavities in which
45 the plungers act.

Another feature of my present invention resides in the manner of mounting the upper
50 set of revoluble plungers, whereby they are spring held in operative position being yielding in an arc described about the axis of the driven pinion, whereby they are always kept in proper mesh even when forced upwardly by some incompressible
55 substance in the mold cavity.

Another feature of my invention resides

in the provision of tracks or housings for the endless chain of mold carriers whereby they are guided in their movements.

In the drawings: 1 indicates the base cast-
ings and 2 the side frames of the machine. 60

3 and 4 are cross shafts mounted in bearing boxes formed by the hubs 5^a and 6^a of the side grooved cams 5 and 6 respectively. The side frames 2, as shown in Fig. 1 are
65 formed with suitable non-circular openings for receiving the hubs 5^a and 6^a and preventing their rotation. In this manner the said hubs and their conjoined side face cams are normally held stationary. The openings in the side frames 2 which receive these hubs
70 are enlarged immediately above the hubs so as to permit the ready assemblage and removal of the hubs and their conjoined cams.

7 and 8 are drums or cylinders formed with semi-circular seats in their peripheries
75 in which are mounted the heads 9 and 10 carrying the upper and lower revoluble plungers 9^a and 10^a. These heads while being revoluble are also rocked in their seats, their ends being trunnioned in the flanges at the
80 ends of the cylinders or drums, said trunnioned portions being held in position by straps 7^a and 8^a as shown. These straps are preferably made up in sections and bolted
85 in position, a section over each trunnion, so that the plunger heads may be separately removed. On the ends of the trunnions are trailing arms 9^b and 10^b carrying rollers at their ends which rollers operate in side cam
90 grooves of the cams 5 and 6. As the cams are held stationary and as the drums with their rocking plunger heads and plungers revolve (in the direction of the arrows, Fig. 3) it will be seen that the plungers occupy a
95 vertical position in approaching the endless chain of mold carriers which position is maintained during the compressing action and after said plungers leave the mold cavities. As the arc of movement of the plungers
100 involves two components to wit: a vertical component and a horizontal component it follows that the horizontal speed of the plungers would ordinarily not coincide with the speed of travel of the mold carriers, except for a given instant of time to wit: when
105 the vertical component is neutral; hence means are provided for increasing the horizontal speed of the plungers to overcome the vertical component and this means consists of the rocking plunger heads and their actu- 110

ating cam pieces which advance the plungers beyond the peripheral speed of the drum, rapidly at first and then more slowly until the vertical component is neutralized, which neutralization occurs when the plungers are in the vertical plane of the axis of rotation of the drum; and, after leaving this neutral zone, the plungers are retarded in their movement so as to cause them to continue to stand perpendicular to the endless chain of mold carriers until said plungers leave the mold cavities.

During the time that the plungers are entering and leaving the mold cavities, I provide means for interlocking given active plungers with their cooperating mold carriers, in order to avoid non-registration of the plungers with the mold carriers and to insure the advance in movement of the parts in unison. By doing this I overcome irregularities in such movement incident to lost motion, the wear of parts, etc. This means consists of projections 9^c and 10^c extending from the trunnions at each end of the plunger heads, said extensions cooperating with pockets or recesses 11^a in the ends of the mold carrier plates 11. These plates are pivotally connected to each other as shown, rollers being arranged upon the pintles of the pivotal connections which rollers at the point of compression run in track grooves secured to the side frames 2. The plates 11 are provided with mold cavities which mold cavities are designed to register with the plungers, said mold cavities being preferably lined, as shown.

By articulating the upper set of plungers, the mold carrier plate and the lower set of plungers so that they all move in unison and by preserving the vertical position of the plungers, I am enabled to dispense with the flaring openings of the mold cavities shown in my former Patent No. 969540, as there is in my present construction no rocking or tilting movement of the plungers in the mold cavities and consequently it is unnecessary to provide means to compensate for such movement. As the mold carriers pass under the bottom of the feed boxes 14 and the cavities are filled with the material to be compressed, said mold plates rest upon a spring held supporting plate 18 as in my former patent, and pass between the top and bottom plungers and in this passage the material is compressed, after which the rollers 11^b referred to, enter grooved curved tracks 13, which tracks bring the carrier plates under the lower plungers where the interlocking member 10^c again enters its cooperating carrier plate to register the plunger with the mold cavities and the plungers now serve to discharge the compressed briquets. When freed of their compressed briquets the mold carrier plates are fed forward and are returned under

the feed boxes by the grooved curve track plates 13^a at the forward end of the machine.

Means are provided for holding the top plungers yieldingly to their work, so that in the event that foreign particles enter the cavities, or the charge forced into the cavities is too dense to be compressed, the said upper plungers may yield; but in yielding the intermesh between the driving gears is maintained. The hub 5^a of the cam 5 and which forms a bearing for the shaft 3 is provided with a projection 5^b on its upper side with which projection cooperates a floating roller 19, said roller being seated against one side of said projection. This roller is also seated in a pocket of a lever 20, the end wall of said pocket serving as an abutment for the roller, while the top wall of the pocket acts as an inclined track for the roller. The lever 20 is pivoted at 21 to the side frame 2 and has its free end formed as a spring seat to receive a spring 22, said spring bearing against a follower 23 held in position by a nut 24 on a threaded rod 25, the lower end of said rod being anchored to the side frame 2. Shaft 3 has a driving gear 3^a fixed to the end thereof, said gear receiving motion from a pinion 3^b and it is obvious that if the shaft 3 and its conjoined gear were lifted vertically, the teeth between 3^a and 3^b would be thrown out of mesh, and if no more serious accident resulted the timed relation of the parts would be destroyed. Hence it is necessary to preserve the driving relation between the pinion 3^b and gear 3^a and at the same time permit the shaft 3 and its carried parts to yield upwardly. This upward movement is guided so that it will take a direction about the pinion 3^b as its axis of movement and to so guide the shaft 3 I provide the cam 5 with a pair of guiding plates 5^c and 5^d which guiding plates are preferably made of hardened metal dove-tailed into lugs extending laterally from the outer side face of the cam. These plates 5^c and 5^d cooperate with rollers 26 extending inwardly from the side frame 2 and are curved in such a manner that when the shaft 3 and its carried parts, including the cams 5, are raised, they are moved upwardly and forwardly about the pinion 3^b as an axis. The spring 22 (this yielding mechanism being duplicated on each side of the machine) will of course be compressed in this action and the floating roller 19 will ride relatively down the hub 5^a and up along the inclined track in the lever 20. In this manner the compression of the spring is compensated for, as the farther the roller gets from the pivotal axis of the lever 20, the less movement will be imparted to the free end of said lever.

As the plungers will not in practice, be raised much over one half an inch, it follows

that this slight movement would not ordinarily constitute a disturbing element of any considerable consequence, but as it is necessary to maintain the plungers absolutely perpendicular to the mold carriers when the parts are articulated, the arcuate movement of the shaft 3 about the driving pinion as an axis, said axis being slightly above the plane of the upper face of the mold carriers, will lift the active plungers in substantially a vertical line, or a short arc having a negative horizontal component; and as the cams 5 are guided as two points, said cams will be maintained in horizontal parallelism, having relatively a slight horizontal as well as a slight vertical component of movement. By this arrangement the slight displacement of the cam with respect to the active plungers would compensate for any tendency of the plungers to tilt due to the arcuate action of the shaft and correct said tendency whereby the plungers are maintained in absolute perpendicularity to the mold faces at all times. As soon as the plungers pass over the incompressible material, the parts will, of course, be restored to normal position.

From the above it will be observed that the top plungers practically float in that they have no fixed bearings, they being held in operative position by yielding pressure. In order to give the hub portion 5^a clearance for this floating movement, one edge 5^e thereof is preferably beveled while the opposite edge 5^f is vertical, this vertical face tending to bring the parts to normal position after displacement.

The means for driving the machine are illustrated in Figs. 1 and 2 in which 27^a indicates a pulley having a pinion 27 on the opposite end of its shaft, said pinion meshing with a gear 28, this gear being arranged on a shaft 29 on the opposite end of which is a pinion 30, said pinion 30 meshing with the gear 4^a on the end of the shaft 4 and also with the pinion 3^b which meshes with the gear 3^a.

What I claim is:

1. In a briquet machine, the combination of a shaft, floating bearings for said shaft, cams conjoined to said bearings, plungers cooperating with said cams, yielding levers and floating rollers interposed between said levers and said bearings, substantially as described.

2. In a briquet machine, the combination of a shaft, moving bearings for said shaft, cams fixed to said bearings, plungers mounted on the shaft and cooperating with said cams, spring-pressed members, floating rollers interposed between said spring-pressed members and said bearings, and inclined tracks in said spring-pressed members for cooperating with said roller, substantially as described.

3. In a briquet machine, the combination of a shaft, bearings therefor, said bearings having a projection, a roller cooperating with said projection, a pivoted lever having a seat to said roller, an inclined track with which said roller cooperates, and a spring for bearing against the free end of said lever, substantially as described.

4. In a briquet machine, the combination of a shaft, a gear wheel mounted on the end of the said shaft, a pinion for driving said gear wheel, a bearing for said shaft, said bearing having a member fixed thereto, guides on said bearing member for guiding the movement of said bearing about the driving pinion as an axis and yielding means for holding said shaft and its carried gear into mesh with said driving pinion, substantially as described.

5. In a briquet machine, the combination of a driving pinion, a gear, a shaft on which said gear is mounted, a bearing for said shaft, said bearing having lateral extensions cooperating with means whereby said bearing is guided in its movement, a pivoted spring-pressed member and an interposed controlling roller between said spring-pressed member and said bearing, substantially as described.

6. In a briquet machine, the combination of a driving pinion gear, a shaft on which said gear is mounted, a bearing for said shaft, said bearing carrying guide lugs or tracks, stationary means for cooperating with said lugs or tracks, a lever having a roller track, and a roller interposed between said lever and said bearing, substantially as described.

7. In a briquet machine, the combination of a driving pinion, a gear, a shaft on which said gear is mounted, a bearing for said shaft, a seat for said bearing, a cam connected to said bearing, said cam having curved track plates, fixed projections cooperating with said track plates, a lever, a spring bearing against said lever, and a roller interposed between said lever and bearing, substantially as described.

8. In a briquet machine, the combination of top and bottom pivotally mounted plungers, means for yieldingly holding said top plungers in position, said means permitting yielding movement of said top plungers, an endless chain of mold carriers passing between said plungers, means for filling the cavities in said mold carriers, and inclined grooved curved track plates cooperating with said mold carriers, substantially as described.

9. In a briquet machine, the combination of top and bottom plungers, mold carriers pivotally connected together to form an endless chain, rollers mounted on pintles of said mold carriers, guiding means cooperating with said rollers and means on each

mold carrier for cooperating with each set of active plungers whereby the active plungers and the particular mold carrier cooperating therewith are articulated so as to
5 move in unison during the period of such cooperation, substantially as described.

10 10. In a briquet machine the combination of a shaft, plungers carried by said shaft, cams mounted on said shaft held against rotation, means for exerting a yielding pressure against said shaft, a compensating device interposed between said shaft and said
15 applied pressure.

15 11. In a briquet machine, the combination of a shaft, carrying plungers, a lever for exerting yielding pressure against said shaft, and a compensating device interposed between said lever and said shaft.

20 12. In a briquet machine, the combination of a shaft, carrying plungers, a lever for exerting yielding pressure against said shaft, a spring bearing against said lever and an equalizing device having a variable bearing on said lever as the parts yield.

25 13. In a briquet machine, the combination of a shaft, carrying plungers, a spring-pressed lever for exerting the pressure against said shaft, and a roller interposed between said shaft and said lever, said roller moving outwardly on the lever as the plungers yield so as to compensate for the leverage on the spring.

30 14. In a briquet machine, the combination of a shaft, carrying plungers, a gear on said shaft, a pinion meshing with said gear, cams cooperating with said plungers, means for exerting a yielding pressure on said shaft, and means for maintaining the cams in horizontal alinement, while permitting a simultaneous horizontal and vertical movement
40 of the active plungers.

15. In a briquet machine, the combination of a plunger, a movable cam cooperating with said plunger, and means for guiding said cam to maintain said plunger in a
45 vertical position.

16. In a briquet machine, a plunger, a movable cam for guiding said plunger, and means for maintaining said cam in horizontal alinement as it is moved on a line intersecting its vertical axis.
50

17. In a briquet machine, a pivoted plunger, a movable cam cooperating with said plunger, means for permitting a vertical movement of said plunger and a transverse
55 movement of said cam, and means for maintaining said cam in horizontal alinement during such movement.

18. In a briquet machine, a revoluble shaft, a movable mold, plungers pivoted
60 about said shaft and adapted to cooperate with said mold in a perpendicular relationship, a movable cam for guiding said plungers mounted on said shaft, means for permitting the oscillation of said shaft, and
65 means for maintaining the cam in horizontal alinement during said oscillation.

19. In a briquet machine, a shaft, a mold, plungers pivoted on said shaft and adapted to cooperate with the mold in perpendicular
70 relationship, means for permitting the oscillation of the shaft to allow movement of the plungers, and means for maintaining the active plungers and the mold in perpendicular
75 relationship during such oscillation.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 14th day of June, 1911.

GUSTAV KOMAREK.

Witnesses:

M. P. SMITH,
LILY ROST.