No. 763,498. PATENTED JUNE 28, 1904.

F. MEYER.

BRIQUET MACHINE.

APPLICATION FILED MAR. 14, 1903.

NO MODEL. 6 SHEETS—SHEET 1.

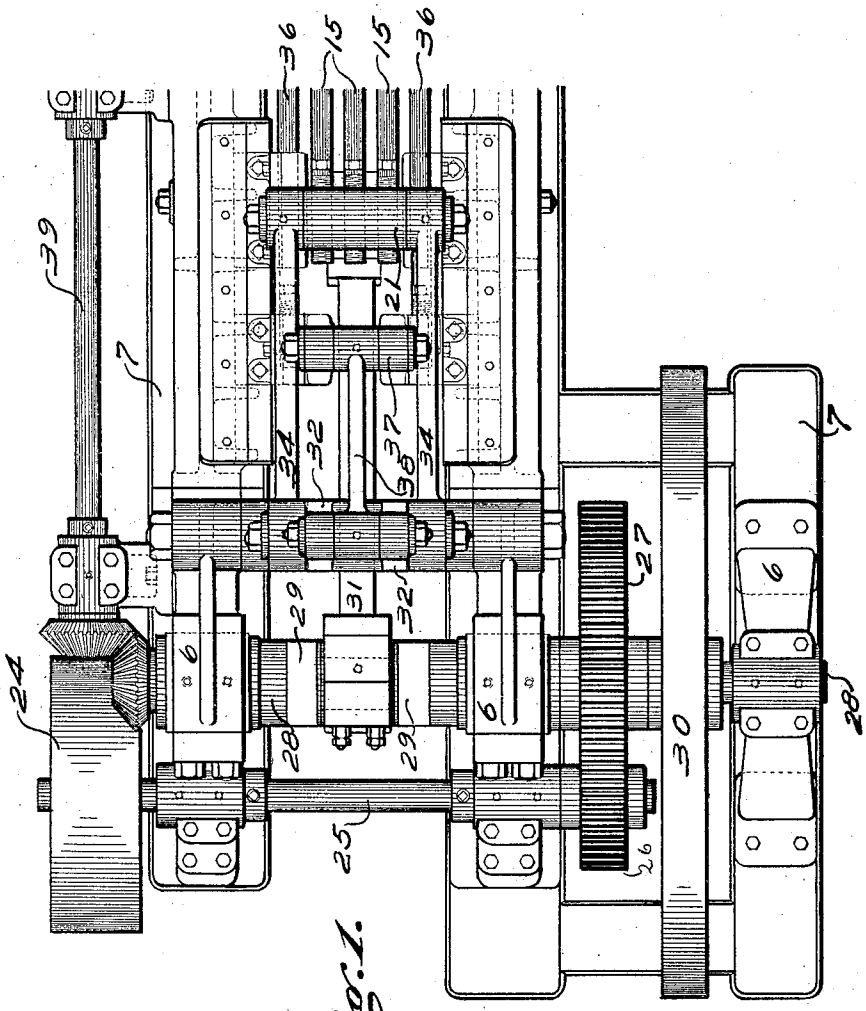

Fig. 1.

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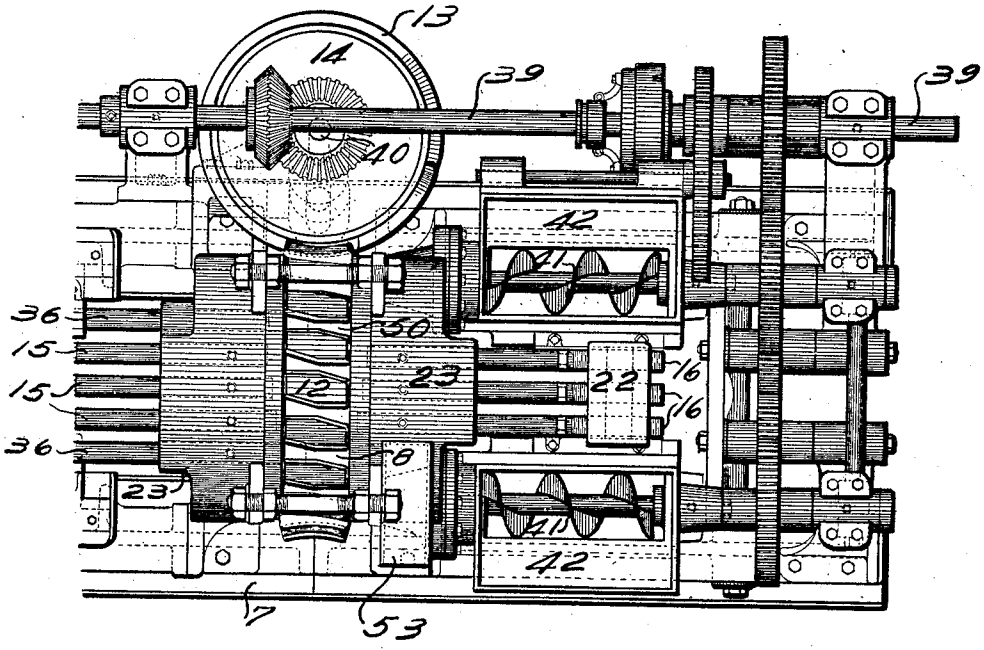
NO MODEL. 6 SHEETS—SHEET 2.

Fig. 2.



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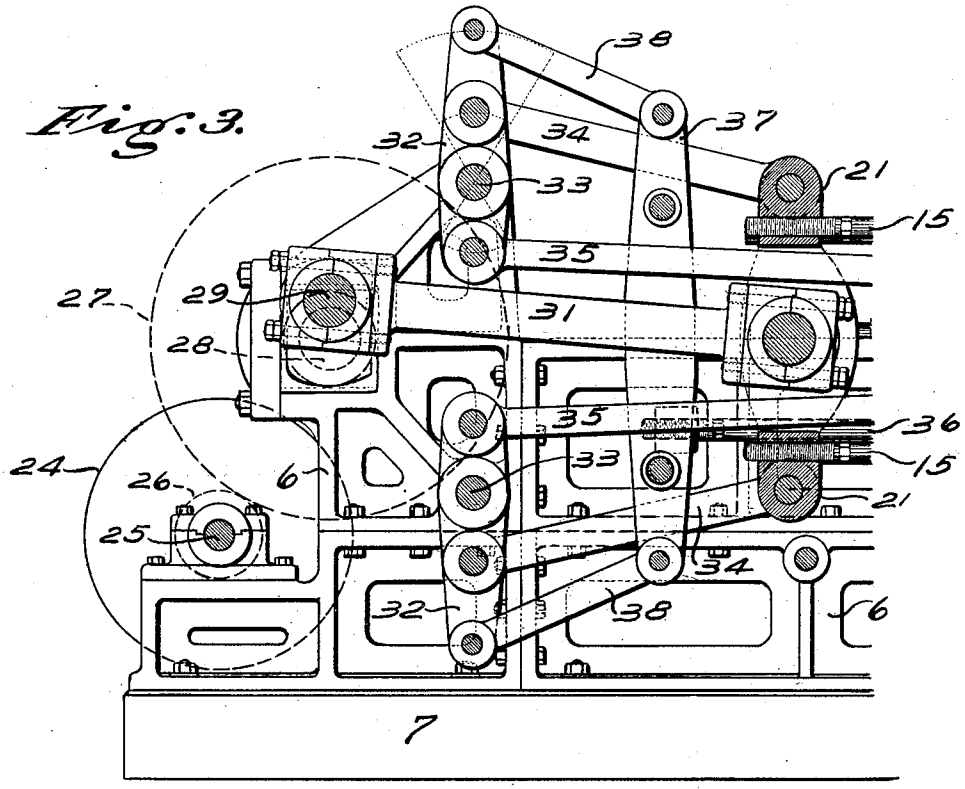
NO MODEL. 6 SHEETS—SHEET 3.

Fig. 3.



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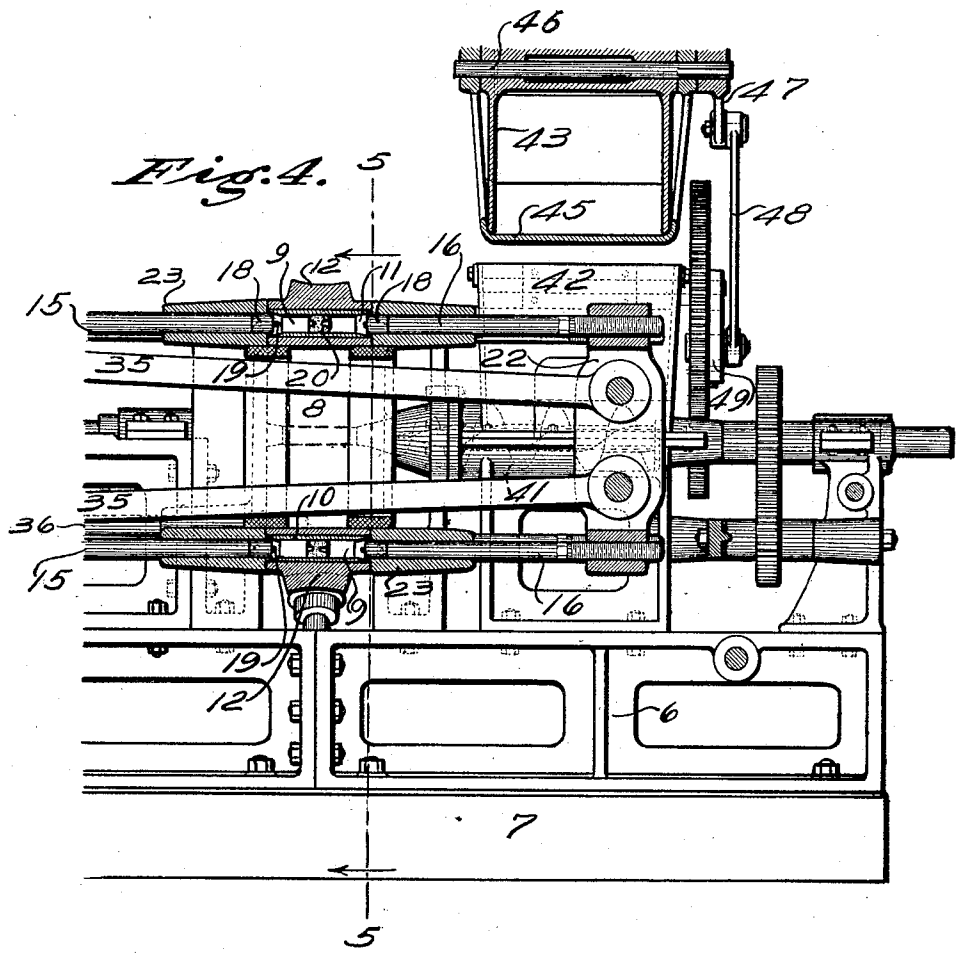
NO MODEL. 6 SHEETS—SHEET 4.

Fig. 4.



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BRIQUET MACHINE.

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NO MODEL. 6 SHEETS—SHEET 5.

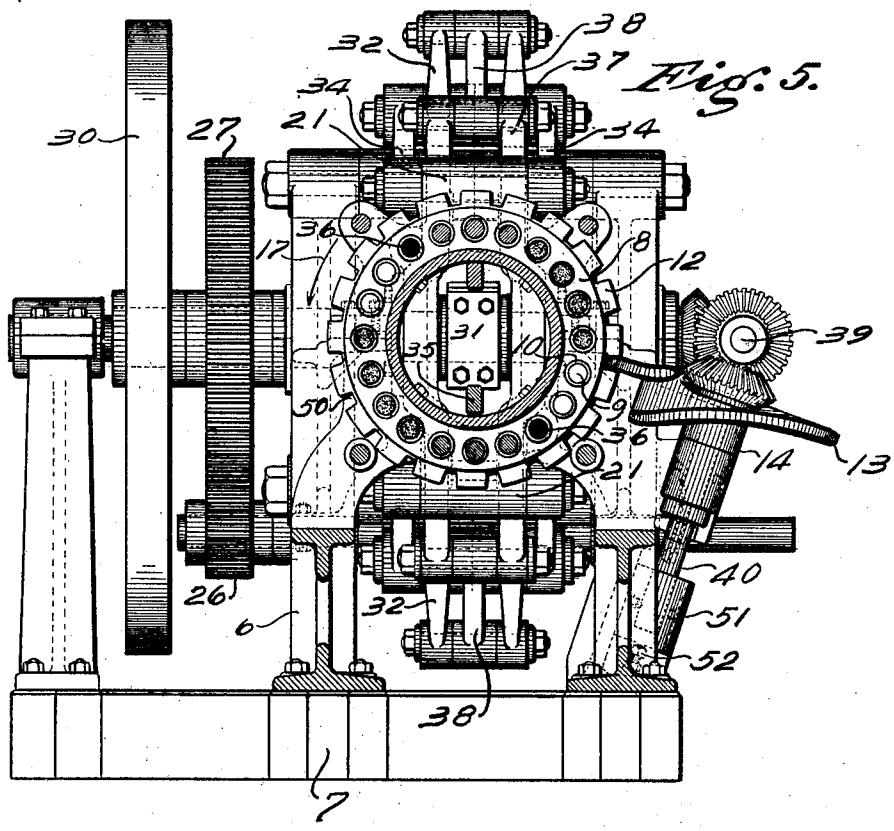

Fig. 5.

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No. 763,498. PATENTED JUNE 28, 1904.

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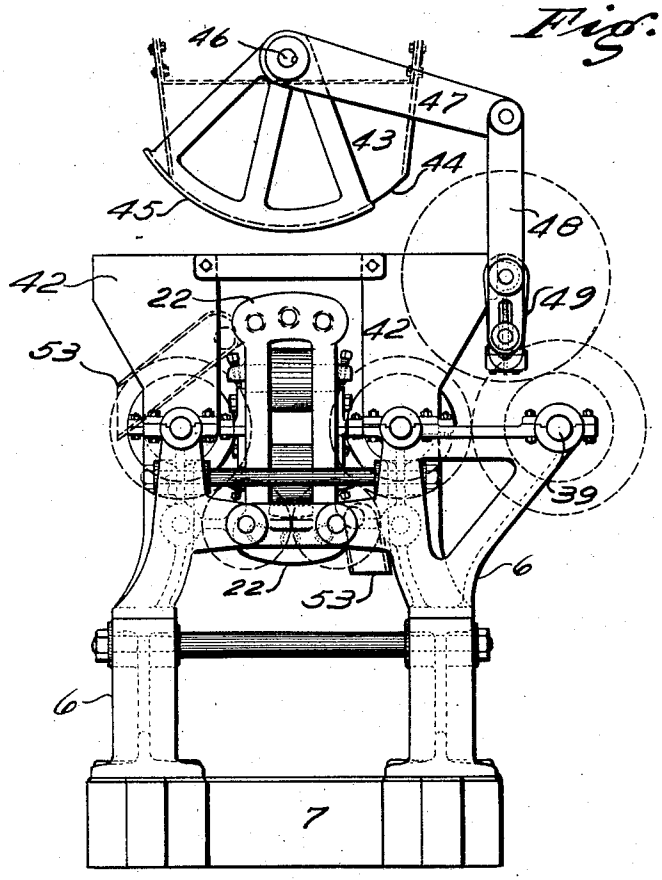
BRIQUET MACHINE.

APPLICATION FILED MAR. 14, 1903.

NO MODEL. 6 SHEETS—SHEET 6.

Fig. 6.



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No. 763,498. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

FREDERICK MEYER, OF CHICAGO, ILLINOIS, ASSIGNOR OF FIVE-SIXTHS TO EUGENE J. KIRBY, OF CHICAGO, ILLINOIS, AND THE CHICAGO AMERICAN FUEL BRIQUETTING COMPANY, OF CHICAGO, ILLINOIS.

BRIQUET-MACHINE.

SPECIFICATION forming part of Letters Patent No. 763,498, dated June 28, 1904.

Application filed March 14, 1903. Serial No. 147,875. (No model.)

To all whom it may concern.

Be it known that I, FREDERICK MEYER, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Briquet-Machines, of which the following is a specification.

My invention relates to briquet-compressing machines particularly adapted for compressing moist powdered material into hard and compact and dry briquets.

The main objects of my invention are to provide a machine of this class which will give a great compression of the material with a minimum movement of the operating mechanism; to provide improved means for subjecting the material to a succession of compressions and releasing the pressure upon same between succeeding compressions, so as to permit the escape of air and water from the interstices of same; to provide a rotating mold member having therein an annular series of mold-apertures, together with simple and improved mechanism for intermittently rotating such mold member and securing same in exact alinement with compressing-plungers; to provide spiral-conveyer-feeding mechanism for supplying material to said mold member, with improved intermittent actuating mechanism adapted to regulate the supply of material to such conveyer in the desired quantities without clogging the action of same. I accomplish these objects by the device shown in the accompanying drawings, in which—

Figures 1 and 2 together form a top plan of a peat-briquet-compressing machine constructed according to my invention. Figs. 3 and 4 are a longitudinal section through the center line of same, being, respectively, sections of the parts shown in Figs. 1 and 2. Fig. 5 is a transverse vertical section along the line 5 5 of Fig. 4. Fig. 6 is a right end elevation of the parts shown in Fig. 2.

In the construction shown the supporting-frame 6 is rigidly supported by a suitable bed-plate 7. A rotating mold member 8 is journaled on a horizontal axis in the supporting-frame 6 and is provided with an annular series of horizontally-disposed mold-apertures 9, extending entirely through same. The mold-apertures 9 are preferably provided with removable bushings 10 and are flared at both ends, as at 11 in Fig. 4. The mold member 8 has on its periphery an annular series of teeth 12, which mesh with a spiral thread 13 of the cam 14. The cam 14 is journaled in the frame 6 on its axis transverse to that of the mold member 8. Part of the thread 13 is of suitable form to turn the mold member 8 through an angle corresponding to one tooth-space on such member during a certain part of the revolution of the cam 14, and the remaining part of the thread 13 lies in a plane substantially at right angles to the axis of the cam 14, so as to hold the mold member 8 in a fixed position while being operated upon by the compressing mechanism.

A plurality of pairs of opposed plungers 15 and 16, horizontally disposed and longitudinally slidable in the frame 6, are arranged so as to engage corresponding mold-apertures in the member 8 while such member is in one of its stationary positions. The plungers 15 and 16 are arranged in two sets, each set comprising three pairs of plungers. As shown in Fig. 2, it will be seen that the plungers 15 and 16 are of different lengths and that they increase in length successively in the direction of the movement of the member 8, as indicated by the arrow 17 in Fig. 5. The plungers are preferably provided with heads 18, having faces suitably formed for shaping the ends of the briquets and provided with central conical points 19, adapted to enter the material of the briquet and wedge same outwardly toward the sides of the mold-aperture 9. This feature is more fully described and claimed in my co-pending applications, filed March 18, 1904, Serial Nos. 198,823 and 198,824. The briquet is indicated in Fig. 4 at 20. The heads 18 are removable and may be readily replaced when worn. The plungers 15 are rigidly connected

to a cross-head 21, which is horizontally slidable in the supporting-frame 6. Similarly the plungers 16 are rigidly secured to a cross-head 22, also horizontally slidable in the frame 6. The ends of the plungers 15 and 16 which are adjacent to the mold member 8 are slidably supported by suitable guide members 23, rigidly secured to the supporting-frame 6.

Power is supplied to the device by means of a belt on the pulley 24, which is rigidly mounted on a counter-shaft 25. The counter-shaft 25 connects, through the gears 26 and 27, with a main driving-shaft 28, having a crank 29 at its middle part and carrying a fly-wheel 30. The shaft 28 is journaled in suitable bearings on the supporting-frame 6. The crank 29 is connected with the cross-head 21 by means of a connecting-rod 31. The levers 32 are fulcrumed on the frame 6 at 33, and one arm of each of said levers is connected with the cross-head 21 by means of a link 34. The other arm of each of said levers connects with the cross-head 22 by means of a link 35, the cross-heads 21 and 22 being thus connected, so as to be driven in opposite directions.

The briquets 20 are discharged from the member 8 by means of the plungers 36, which are slidably mounted in the frame 6 and one of which succeeds each series of compression-plungers 15. The discharge-plungers 36 are rigidly connected to a third cross-head 37, which connects, by means of links 38, with the levers 32. The links 38 connect to the levers 32 at greater distances from the fulcrum 33 than do the links 34 and 35. Thus the cross-head 37 is given a greater range of movement than either of the cross-heads 21 or 22. The plungers 36 are arranged to move entirely through the member 8 and discharge the briquets into suitably-arranged chutes 53, one of said chutes being shown dotted in Fig. 6.

The movement of the cam 14 is effected by means of the shaft 39, which is disposed longitudinally of the machine and connects the shafts 28 and 40 by means of bevel-gears, as shown.

Material is fed to the mold-apertures in the member 8 by means of the spiral conveyers 41, which are located at opposite sides of the member 8 and between the sets of plungers 15 and 16. The conveyers 41 are conical toward their delivery ends (see Fig. 4) and partly compress the material before same enters the mold-apertures 9. Suitable hoppers 42 receive the material and are disposed above the conveyers 41, as shown. The material is fed to the hoppers 42 from a chute 43 above same. The lower end 44 of the chute 43 is arc-shaped and is closed by an arc-shaped plate 45, which is pivoted at 46. The plate 45 is rigidly connected to an arm 47, which connects, by means of a link 48, with a crank 49, which is geared to the shaft 39, as indicated in Figs. 4 and 6. The conveyers 41 are also rotated by suitable gearing connecting same with the shaft 39, as indicated in the drawings.

The spaces 50 between the teeth 12 of the member 8 are of the form shown in Fig. 2, so as to adapt themselves to the change of direction of the curvature of the spiral thread 13, so as to always properly mesh with said thread. Wear between the teeth 12 and the thread 13 is compensated for by the adjustable foot-bearing 51, within which the shaft 40 rests. Such adjustment is effected by means of the adjusting-screw 52.

The operation of the device shown is as follows: Assume that the shaft 28 is constantly rotating. This rotation through the action of the connecting-rod 31 and the system of levers and links will cause the plungers 15 and 16 to reciprocate longitudinally, the members of each pair moving in opposite directions. The cam 14 also continuously rotates, and its thread is so arranged that the member 8 will be held with its mold-apertures in exact alinement with the plungers 15 and 16 while such plungers are within said mold-apertures and will rotate the member 8 through an angle corresponding to the angular spacing of the mold-apertures 9. Material is simultaneously fed by means of the conveyers 41 to such mold-apertures as are in alinement with said conveyers, the feeding of such material to the hoppers 42 being regulated by means of the rocking of the plate 45 to such quantities as are required by the mold member 12. The discharge of the chute 43 is regulated by means of the adjustable connection between the link 48 and the crank 49, (shown in Fig. 6,) which regulates the throw of the plate 45.

It will be seen that each mold-aperture will receive material from one of the conveyers 41 and will then pass successively to each of the plungers 15 and 16. The plungers being successively of greater length successively submit the material to greater degrees of compression, and since the plungers after each stroke are entirely withdrawn from the mold-apertures the air and moisture confined between the interstices of the material are permitted to escape between each successive stage of compression. In this manner such air and water are prevented from retarding the compression. The plungers 36, which move simultaneously with the plungers 15 and 16, serve to discharge the finished briquets from the mold-apertures 9 after such briquets have been subjected to the action of the plungers 15 and 16. The briquets discharged from the mold-apertures 9 are received by suitable chutes 53 and discharged into suitable receptacles.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention. I therefore do not confine myself to such details, except as hereinafter limited in the claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a briquet-machine, the combination of a frame; a member rotatably mounted in said frame, and having an annular series of mold-apertures extending longitudinally through same; a plunger movable in said frame and co-acting with said mold-apertures; an annular series of teeth extending around the periphery of said member; a cam journaled on an axis transverse to that of said member and having on its periphery a thread meshing with the teeth on said member and adapted to intermittently rotate said member during the rotation of said cam; suitable connection between said plunger and said cam, whereby said member will remain stationary when said plunger is engaging one of said apertures and will be advanced to bring a succeeding mold-aperture into alinement with said plunger after said plunger is withdrawn from said aperture; and means for operating said plunger, member, and cam, substantially as described.

2. In a briquet-machine, the combination of a frame; a member rotatably mounted in said frame, and having an annular series of mold-apertures extending longitudinally through same; a pair of plungers slidably mounted in said frame in alinement with each other and parallel to the axis of said member and adapted to coact with each other in one of said mold-apertures; an annular series of teeth extending around the periphery of said member; a cam journaled on an axis transverse to that of said member and having on its periphery a thread meshing with the teeth on said member and adapted to intermittently rotate said member during the rotation of said cam; suitable connection between said plungers and said cam, whereby said member will remain stationary when said plungers are engaging one of said apertures and will be advanced to bring a succeeding mold-aperture into alinement with said plungers after said plungers are withdrawn from said aperture; and means for operating said plungers, member, and cam, substantially as described.

3. In a briquet-machine, the combination of a frame; a member rotatably mounted on an axis in said frame, and having an annular series of mold-apertures extending longitudinally through same; a series of plungers acting from each side into said mold-apertures; said plungers being arranged to compress material in said apertures to varying degrees of compression; said member being provided with gear-teeth; and a cam mounted on an axis transverse to the axis of said member, acting on said gear-teeth, and being adapted to intermittently rotate said member so as to advance the mold-apertures to different plungers while the plungers are withdrawn, and to hold said member against rotation during a part of the rotation of said cam, substantially as described.

4. In a briquet-machine, the combination of a frame; a member rotatably mounted therein having an annular series of mold-apertures, extending longitudinally through same, and being provided with gear-teeth; plungers acting into said apertures; and a cam mounted on an axis transverse to the axis of said member, acting on said gear-teeth, and being adapted to intermittently rotate said member so as to advance the mold-apertures to different plungers while the plungers are withdrawn, and to hold said member against rotation during a part of the rotation of said cam, substantially as described.

5. In a briquet-machine, the combination of a frame; a member rotatably mounted therein having an annular series of mold-apertures extending longitudinally through same, and being provided with gear-teeth; plungers acting into said apertures; a cam mounted on an axis transverse to the axis of said member, acting on said gear-teeth, and being adapted to intermittently rotate said member so as to advance the mold-apertures to different plungers while the plungers are withdrawn, and to hold said member against rotation during a part of the rotation of said cam; and feeding mechanism geared to said cam and adapted to inject material into one of said apertures while said member is held against rotation, substantially as described.

6. In a briquet-machine, the combination of a frame; a member rotatably mounted in said frame, and having an annular series of mold-apertures extending longitudinally through same; plungers acting into said apertures; means for intermittently rotating said member so as to advance the apertures to different plungers; spiral feeding mechanism coacting with said means, for injecting material into one of said apertures; a hopper for supplying said feeding mechanism; and means, geared to said feeding mechanism, for intermittently cutting off such supply, substantially as described.

7. In a briquet-machine, the combination of a frame; a mold mounted therein; plungers acting into said mold; spiral feeding mechanism adapted to inject material into said mold; a hopper for supplying said feeding mechanism; a chute above said hopper having its open end opened and closed by a sliding segment; a rock-shaft rigidly carrying said segment; and a connection between said rock-shaft and said feeding mechanism whereby the amount of discharge from said chute is made dependent upon the action of said feeding mechanism, substantially as described.

Signed at Chicago this 11th day of March, 1903.

FREDERICK MEYER.

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WM. R. RUMMLER.