

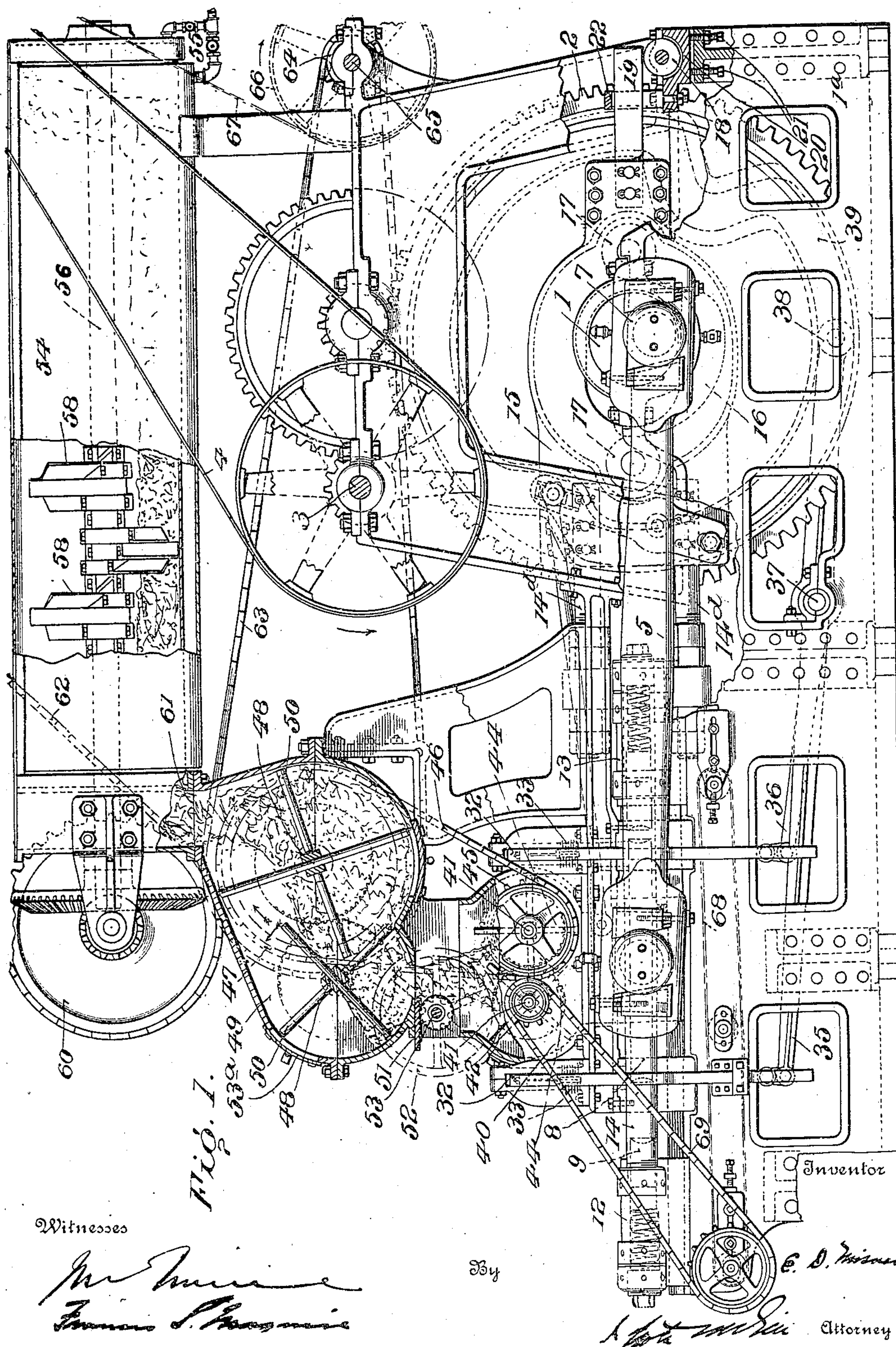
No. 843,565.

PATENTED FEB. 5, 1907.

E. D. MISNER.  
BRIQUET MAKING MACHINE.

APPLICATION FILED JULY 27, 1906.

4 SHEETS—SHEET 1.





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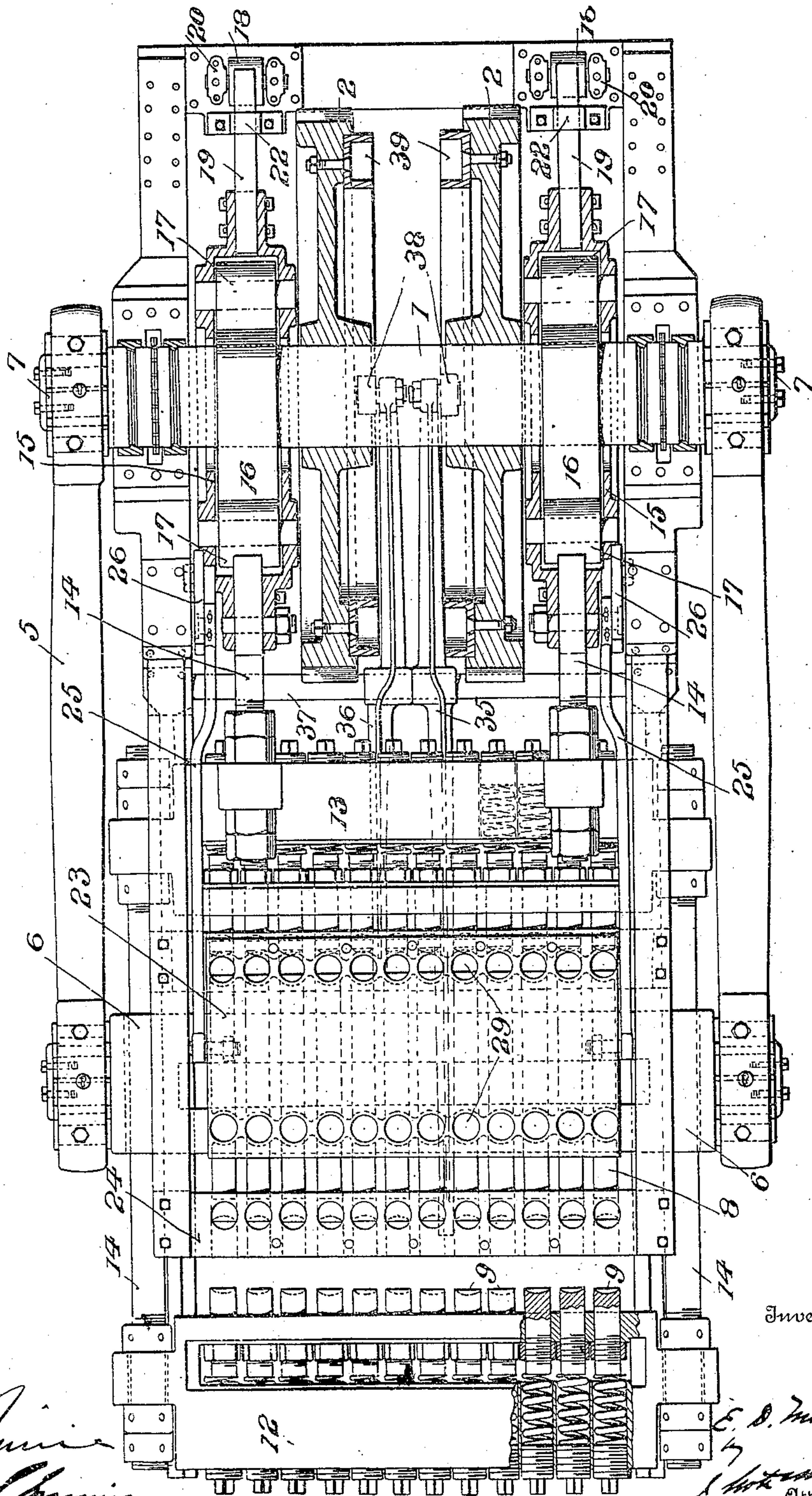
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4 SHEETS—SHEET 2.

FIG. 2.



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No. 843,565

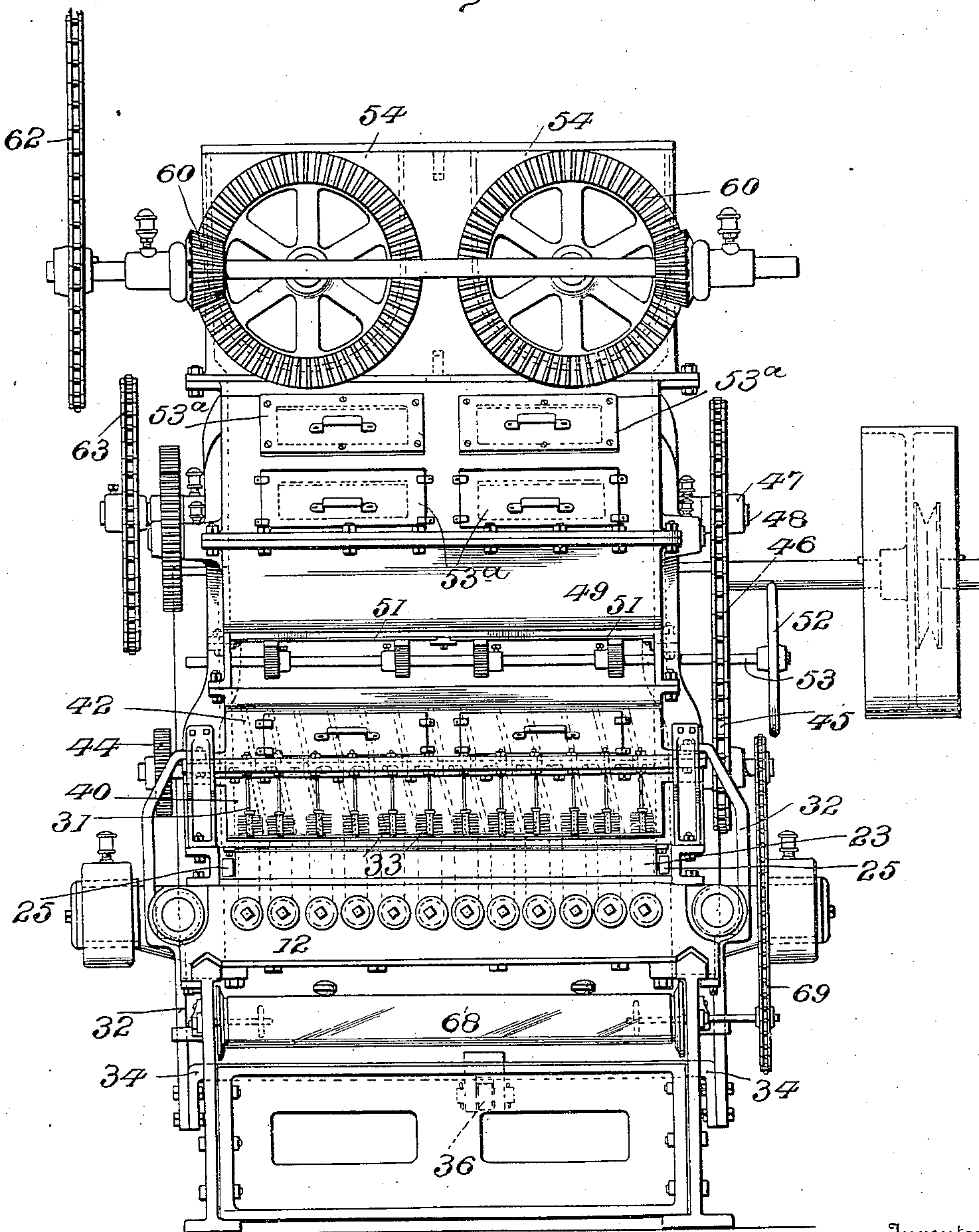
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4 SHEETS—SHEET 3.

Fig. 3.



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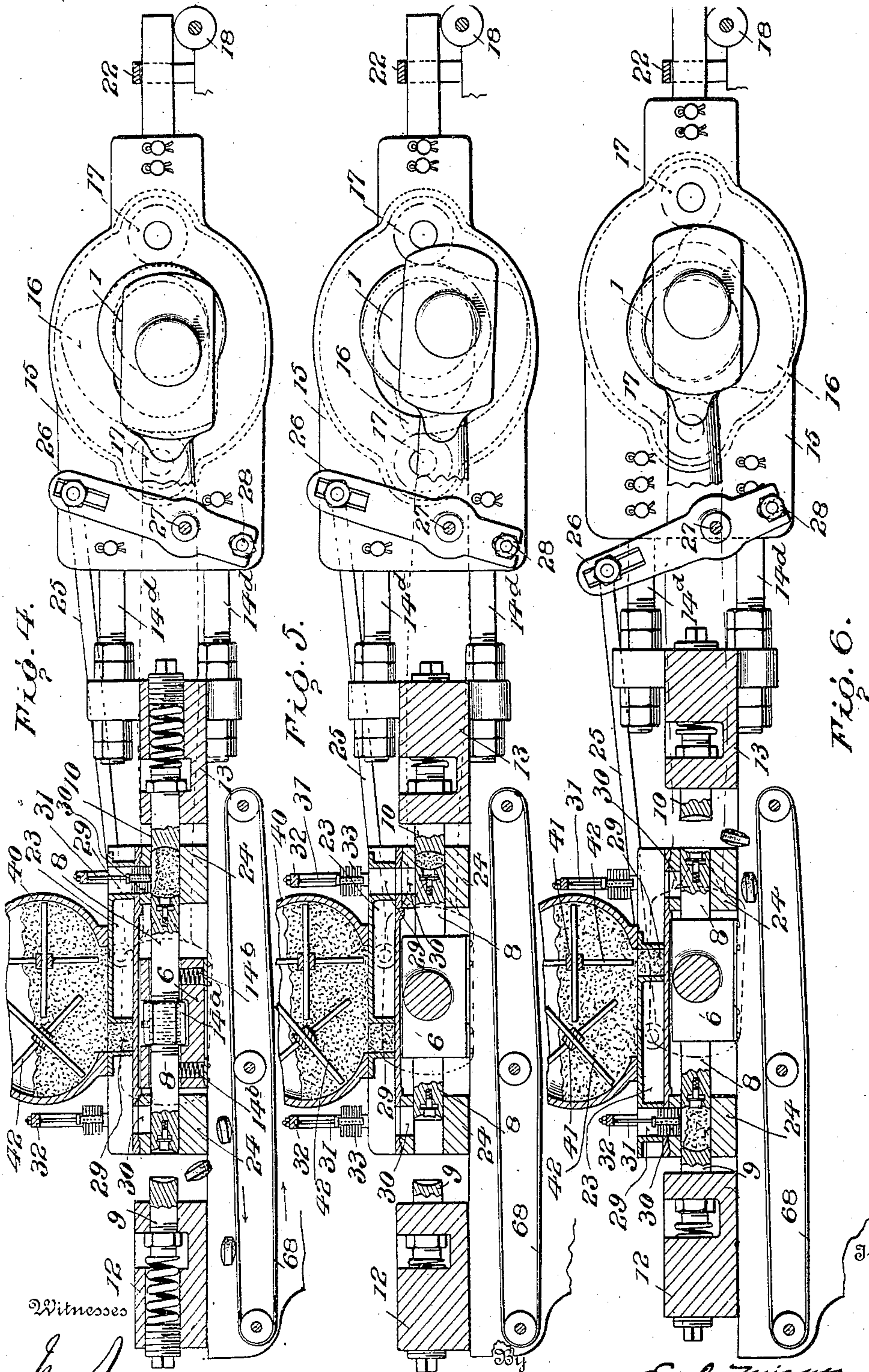
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

EDGAR D. MISNER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WILLIAM C. RENFROW, OF JOPLIN, MISSOURI.

## BRIQUET-MAKING MACHINE.

No. 843,565.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed July 27, 1906. Serial No. 328,137.

*To all whom it may concern:*

Be it known that I, EDGAR D. MISNER, of St. Louis, State of Missouri, have invented certain new and useful Improvements in Briquet-Making 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 provide in a briquet-making machine means for preventing any of the pulverulent material from adhering to the walls of the feeder or supply-openings of the die-housing, insuring thereby in each operation the presence between the coöperating dies of an uniform amount of such material.

A further object is to improve the construction of several of the operative parts of the briquet-making machine shown and described in Letters Patent No. 796,921, issued to me August 8, 1905, including thereby means for effecting the thorough agitation of the agglomerated mass and preventing the same from adhering either to the walls of the inclosing casings or to the agitator-shafts; and a further object is to enable the hot mixer and the agitators to be operated independently of each other and of the die-actuating mechanism.

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

In the accompanying drawings, Figure 1 is a side elevation with parts broken away. Fig. 2 is a horizontal longitudinal sectional view with parts omitted. Fig. 3 is an end view. Figs. 4, 5, and 6 show the dies, feeder, and ejectors in various positions, together with the actuating means therefor. In Fig. 4 the die-carrying body is shown in section.

The die-actuating mechanism is constructed substantially after the manner shown and described in my Patent No. 796,921. The main shaft 1 carries two large gear-wheels 2, which are rotated through intermediate gearing by the operating-shaft 3, driven by a belt 4 from a counter-shaft. (Not shown.) As in my before-noted patent, shaft 1 is connected by rods 5 with the central die-carrying body 6, said rods being fitted on wrist-pins 7, projecting from the ends

of said shaft. The relative arrangement of the double set of dies 8 in the die-carrying body 6 and the outer end dies 9 to the inner end dies 10 is the same as pointed out in my said patent, the carrying-body 12 of the outer end dies and the carrying-body 13 of the inner end dies being connected to move in unison by nutted rods 14. The dies 8 are held in their carrying-body as against longitudinal displacement by nuts 14<sup>a</sup>, (see Fig. 4,) located within the chambered center of said body, and the dies are also held in perfect horizontal position by coil-springs 14<sup>b</sup>, Fig. 4, mounted in openings in said body, said springs carrying the weight of the dies to prevent friction on the die-housings.

The die-carrying body 13 is directly connected by rods 14<sup>a</sup> to frames 15, which are moved longitudinally by cams 16 on shaft 1, engaging idlers 17 of said frames. To provide for evenness of movement and perfect alinement of the dies, idlers 18, with which projections 19 of said frames 15 engage, are mounted in vertically-adjustable bearings 20. These bearings may be readily adjusted by the turning of screws 21, working in the main supporting-frame 1<sup>a</sup>. (See Fig. 1.) These adjustable bearings carry loops 22, through which projections 19 extend, said loops serving to prevent the latter from jumping the idlers 18. In the present instance the reciprocating feeder 23, mounted on the connecting-plate of the two die-housings 24, is actuated by rods 25, each of which is connected to the upper end of a lever 26, fulcrumed at 27 to the adjacent side of the main frame, said levers at their lower ends being slotted for engaging with pins 28 of the reciprocating frames 15, the movement whereof effects the rocking of levers 26 and the reciprocation of the feeder. The latter is provided with two series of pockets 29 for alternately feeding the pulverulent material to the vertical-supply openings 30 of the two die-housings, which latter openings intersect and empty into the horizontal openings, wherein the dies effect the compression of the material into briquets.

In order to insure the discharge of the material from the feeder-pockets and for forcing it from the supply-openings into the horizontal openings of the die-housings, I



provide two separate series of vertically-movable ejectors 31, located directly above the supply-openings and capable of being lowered down through the several pockets of the feeder and into said supply-openings when the pockets are coincident with the latter. Each ejector of each series is shown in the form of a rod depending from a common cross-bar 32 and carrying at its lower end laterally-extended wires 33 of brush formation. The cross-bars 32 at their outer ends are carried downwardly and their ends connected at points beneath the dies and their housings by cross-bars 34. To these cross-bars are pivotally connected the ends of levers 35 36, fulcrumed on a common rod 37 and carrying at their other ends rollers 38, which fit in cam-guideways 39, preferably formed of channel-bars secured to the inner opposite faces of wheels 2. The offsets in these cam-grooves, as indicated in dotted lines, Fig. 1, are so arranged relatively as to effect the alternate reciprocation of the two series of ejectors.

40 designates the supply-hopper, between which and the die-housings the feeder 23 is designed to reciprocate. Within this hopper are two revolving shafts 41, each carrying agitator-arms 42, the arms of each shaft in their revolution approaching closely to the other shaft, so as to prevent any of the pulverulent material from adhering to the latter. These arms are composed of rods passed through their respective shafts at right-angles to the axis thereof and deflected on each side of the shaft, so as to occupy an angular position relative thereto, as shown in dotted lines, Fig. 3. The shafts are rotated in opposite directions, so that the two sets of arms will conjointly lift the material and effect the thorough mixing thereof and at the same time leave it loose to fall into the pockets of the feeder. These shafts at one end have intermeshing gear-wheels 44, and on the other end of one shaft is a sprocket-wheel 45, which is actuated by a chain 46 of a sprocket-wheel 47 on one of two shafts 48, mounted in a superposed hopper 49, said shafts also carrying agitator-arms 50, constructed similarly to the arms 42. The outlet from this superposed hopper to the feeding-hopper 40 is controlled by sliding doors 51 after the manner pointed out in my before-noted patent, said doors being actuated by a hand-wheel 52 on shaft 53. Access may be had to hopper 49 through door-covered openings 53<sup>a</sup>.

54 54 designate horizontally-disposed hot mixer-chambers, into each of which the material is supplied at one end, such chambers having each a surrounding jacket to which and to the chambers themselves steam is supplied by piping 55. Centrally within each chamber is a shaft 56, carrying spirally-

arranged agitator-arms 58, the blades of which are set obliquely to the plane of rotation, so as to effectively cut through the material and force it toward one end. The arms at their outer ends scrape the interiors of the chambers while forcing the pulverulent material therethrough. The shafts 56 are actuated in opposite directions by gearing 60 at the discharging ends, and the material is discharged through passage-ways 61 directly into the superposed hopper 49.

The gearing 60 for the hot mixers is actuated by a belt 62, driven by the same counter-shaft as that which drives the belt 4. One of the shafts of the superposed hopper carries at one end a sprocket-wheel which is engaged by a chain 63, which is actuated by a sprocket-wheel 64 on a shaft 65, carrying a band-wheel 66, which is driven by a belt 67, actuated from the same counter-shaft. By this means I am enabled to separately control the actuation of the hot mixers, the agitators of the hoppers and the mechanism for actuating the dies enabling any one or two of these to be operated alone. This is of special advantage when it is necessary to additionally work the material either in the hot mixers or in the hoppers, or in both, but without operating the dies and feeder.

The operation is as follows: The mass of finely-formed or pulverized material is deposited by any suitable means into the hot mixers, wherein in the presence of steam it is thoroughly agitated and caused to travel therethrough by the obliquely-set agitator-arms 58. The mass falls through passage-ways 61 into the superposed hopper, wherein it is still further agitated by the two agitators traveling in opposite directions, and from this hopper the material passes in regulated quantities into the feeding-hopper 40, where it is further worked by the two agitators. The die-feeder is being constantly reciprocated, its two series of pockets alternately coinciding with the outlet from the supply-hopper. The material filling such pockets is conveyed to the vertical supply-openings of the die-housings and is forced into the die-openings by the vertically-movable ejectors 31, which latter are alternately actuated by the rocking of their respective levers by cams 39. The material once deposited in the die-openings is acted upon by the several sets of dies and formed into briquets after the manner indicated in my above-noted patent, such briquet falling from the die-housings onto a conveyer 68, by which they are carried beyond one end of the machine. This conveyer is shown in Fig. 1 as being actuated by a chain 69, operated by one of the agitator-shafts 41.

I claim as my invention—

1. A molding-machine comprising a die-housing, two series of cooperating dies, a



hopper out of line with the die-housing, a feeder for supplying pulverulent material from said hopper to said die-housing, means located in line with said die-housing for positively removing all material from said feeder into said die-housing, and means for simultaneously operating the dies for compressing the material within such die-housing.

2. A molding-machine comprising a die-housing, two series of cooperating dies, a hopper out of line with the die-housing, a feeder for supplying pulverulent material from said hopper to said die-housing, means located in line with said die-housing for positively removing all material from said feeder into said die-housing, such means comprising wire brushes for entering openings in the feeder and die-housing, and means for simultaneously operating the dies for compressing the material within said die-housing.

3. A molding-machine comprising two die-housings, dies located between the die-housings, means for reciprocating said dies, two end sets of dies movable each toward and away from one die-housing, means for simultaneously operating all of said dies so that one end set of dies will always be cooperating with the first-mentioned dies, means for supplying pulverulent material to said die-housings, and means for ejecting the material from said last-mentioned means into said die-housings.

4. A molding-machine comprising two die-housings, dies located between the die-housings, means for reciprocating said dies, two end sets of dies movable each toward and away from one die-housing, means for simultaneously operating all of said dies so that one end set of dies will always be cooperating with the first-mentioned dies, means for supplying pulverulent material to said die-housings, and two series of ejectors, one for each die-housing, for forcing the material from the last-mentioned means into the respective die-housings.

5. The combination, in a molding-machine, of a die-housing, two series of cooperating dies, a reciprocating feeder having a series of pockets for conveying the pulverulent material to said die-housing, and vertically-movable ejectors normally located above the plane of said feeder and designed to eject the material from the pockets thereof into said die-housing, and means for reciprocating said dies.

6. The combination, in a molding-machine, of two die-housings, double series of dies located between the two die-housings, means for reciprocating said dies, two end sets of dies movable each toward and away from one die-housing, means for simultaneously operating all of the dies so that one set of end dies will always be cooperating with the first-mentioned dies, a reciprocating feeder hav-

ing two series of pockets for supplying pulverulent material to said die-housings, and two series of ejectors, designed to be alternately operated, for forcing the material from said pockets into said die-housings.

7. The combination, in a molding-machine, of a die-housing having vertical supply-openings, two series of cooperating dies, means for actuating said dies, a feeder for pulverulent material having a series of pockets designed to coincide with said supply-openings, a series of vertically-disposed ejectors designed to force the material from said pockets and through said supply-openings into said die-housing, a lever for actuating said ejectors, and means for intermittently actuating said lever.

8. The combination with the die-housings, the series of dies, and the feeder, of the supply-hopper having two shafts located therein and movable in opposite directions, and agitator-arms carried by said shafts, the arms of each shaft being deflected from a plane at right angles thereto and designed to extend to within a short distance of the other shaft.

9. The combination with the die-housings, the series of dies, and the feeder, of the supply-hopper located above said die-feeder and having two shafts designed to operate in opposite directions, each shaft having separate series of arms consisting of rods extending obliquely from the shaft, the arms of each shaft being designed to extend within a short distance of the other shaft.

10. In a molding-machine comprising hot mixers, agitators therein, means for operating such agitators, a die-housing, hoppers interposed between said hot mixers and said die-housing, said hoppers having agitators therein, means for operating said agitators, cooperating dies, and means for operating said dies, the respective operating means of said hot-mixer agitators, said hopper-agitators, and said dies being each capable of being independently operated.

11. The combination with the die-housing and the feed-supply hopper, of the feeder interposed between the hopper and said die-housing, the rods connected to said feeder, the levers to which said rods are secured, the movable frame engaging said levers, and means for actuating said frame.

12. The combination with the die-carrying body, of the dies mounted therein and projecting laterally therefrom, and the springs mounted in said body and forming bearings for said dies.

13. The combination with the main frame, the die-carrying body, two series of dies mounted therein, inner and outer end series of dies, and means connecting them together, of the main operating-shaft, rods connecting the latter to said die-carrying body, the movable frames connected to one of said end set



of dies, cams on said shaft for actuating said  
frames, said frames having end extensions,  
idlers for said extensions, adjustable bear-  
ings for said idlers, and loops carried by said  
5 bearings through which said extensions pro-  
ject.

In testimony whereof I have signed this

specification in the presence of two subscri-  
ing witnesses.

EDGAR D. MISNER.

Witnesses:

NORMAN J. SADLER,  
JENNA E. LOGAN.