

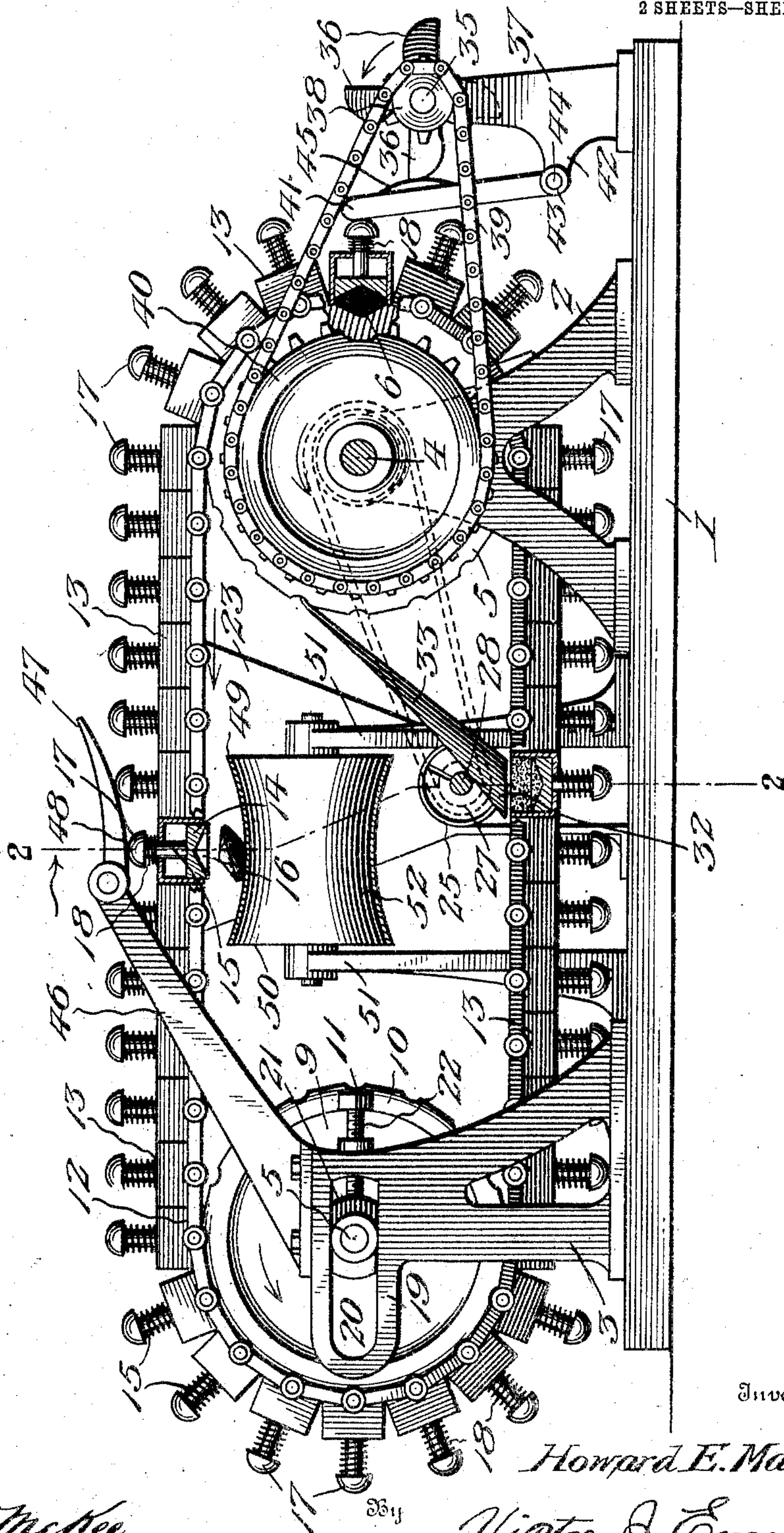
No. 780,050.

PATENTED JAN. 17, 1905.

H. E. MARSH.
BRIQUETING MACHINE.
APPLICATION FILED JAN. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Edwin F. McKee
Chas. S. Hoyer.

Inventor

Howard E. Marsh

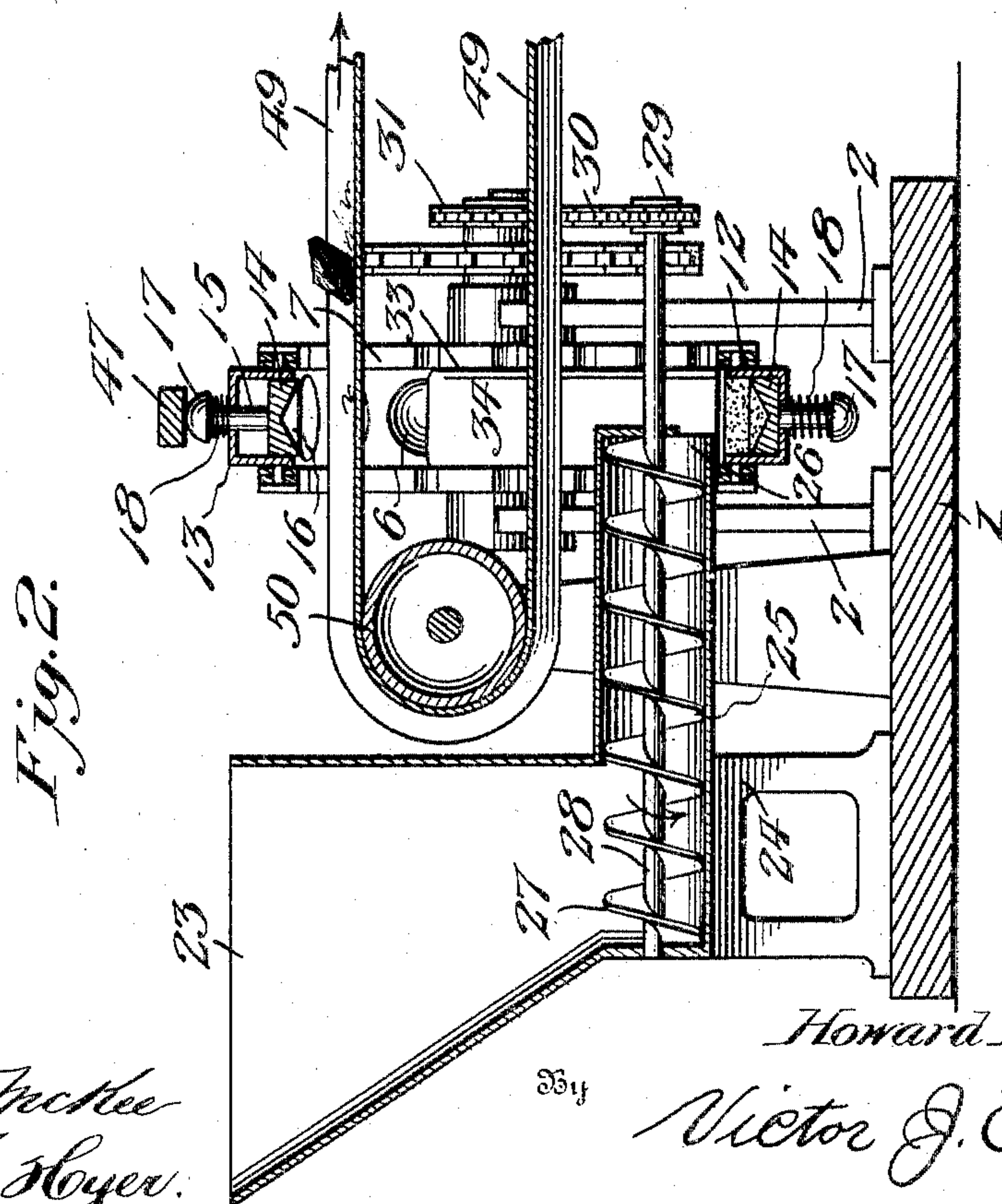
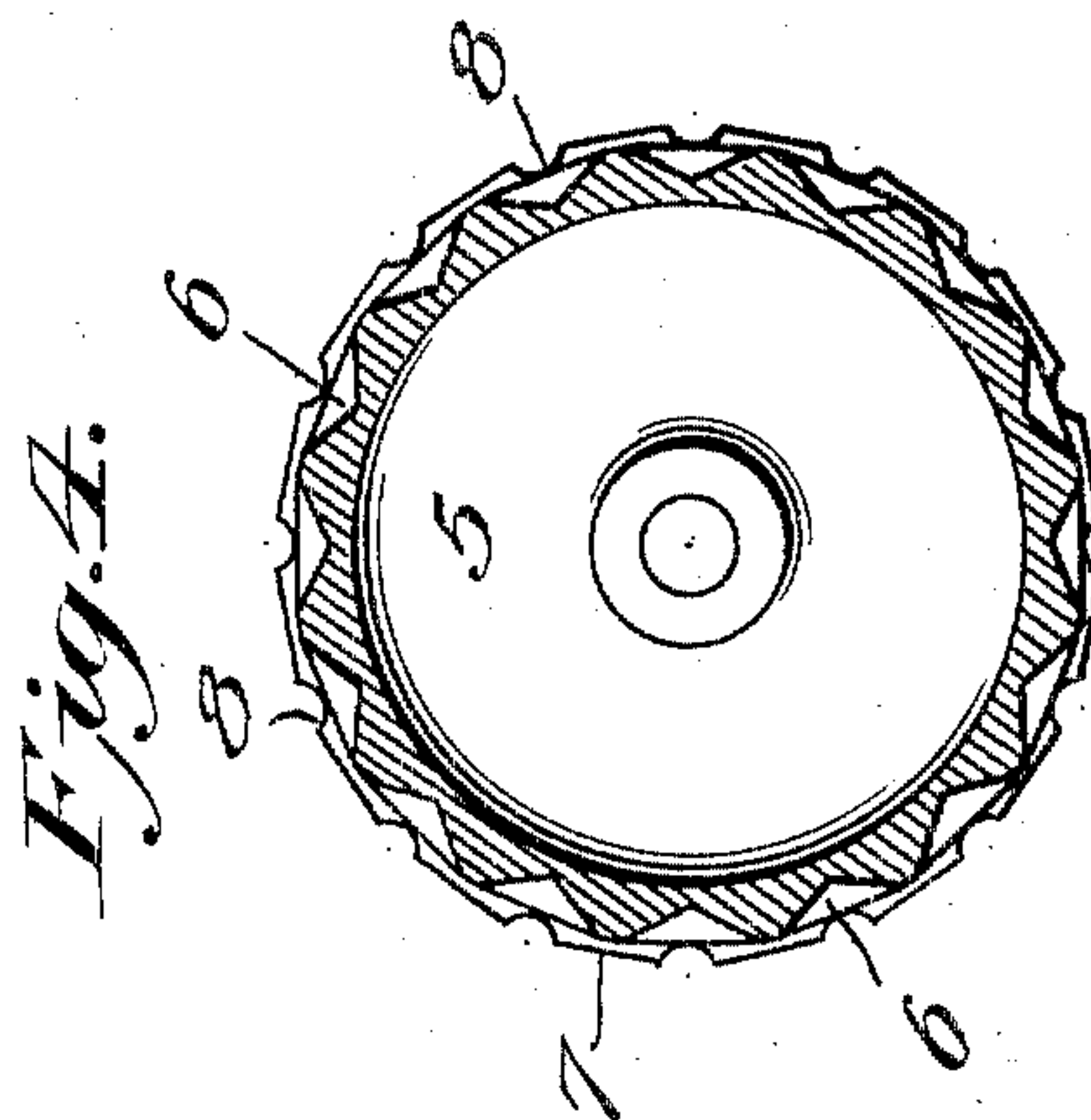
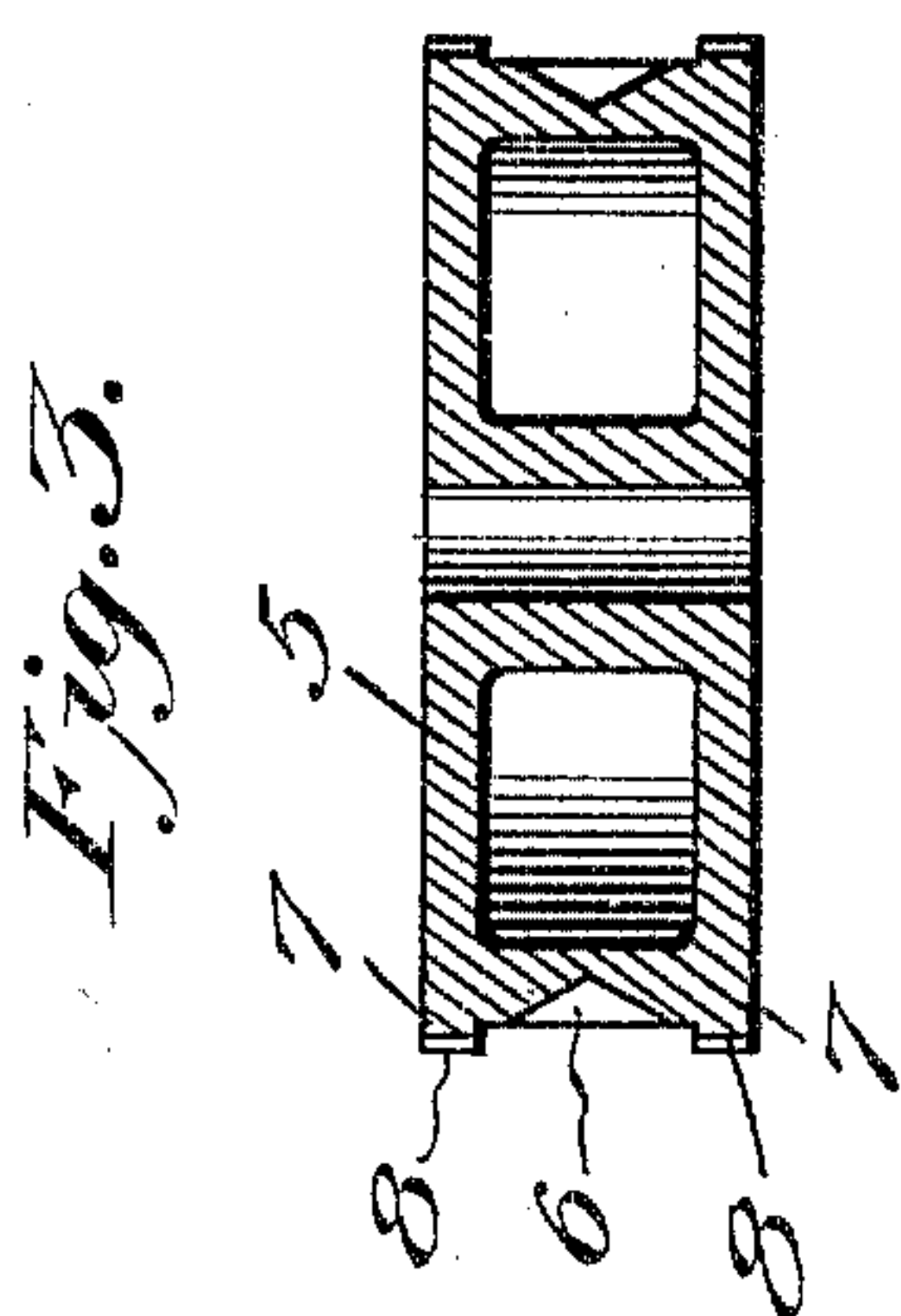
Victor J. Evans
Attorney

No. 780,050.

PATENTED JAN. 17, 1905.

H. E. MARSH.
BRIQUETING MACHINE.
APPLICATION FILED JAN. 16, 1904.

2 SHEETS—SHEET 2.



Witnesses

Edwin F. McKee
Chas. S. Hoyer.

Inventor

Howard E. Marsh

By

Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

HOWARD E. MARSH, OF NEW YORK, N. Y., ASSIGNOR TO NATIONAL FUEL COMPANY, A CORPORATION OF ARIZONA TERRITORY.

BRIQUETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 780,050, dated January 17, 1905.

Application filed January 16, 1904. Serial No. 189,371.

To all whom it may concern:

Be it known that I, HOWARD E. MARSH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Briqueting-Machines, of which the following is a specification.

This invention relates to machines for forming briquets from any suitable material; and the primary object of the same is to generally improve the organization of contributing elements embodied in such machines to more effectively and expeditiously feed the material, compress the briquets, and regularly relieve the molds of the briquets and insure a uniformity in the production of compact and flawless briquets.

A further object of the invention is to provide a machine of this class having an increased capacity and operative with a comparatively small power requirement and also to have the several parts so assembled that substitutions may be readily effected to accommodate the formation of briquets having different contours.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter set forth.

In the drawings, Figure 1 is a side elevation of a machine embodying the features of the invention and showing portions thereof in section. Fig. 2 is a transverse vertical section on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section through a molding-cylinder forming part of the machine. Fig. 4 is a longitudinal vertical section through the same cylinder.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a base having pairs of standards 2 and 3 fixed thereto and rising therefrom, the upper ends of said standards having suitable means for respectively rotatably supporting shafts 4 and 5, the standards 3 being provided with special adjusting means for the shaft 5, which they support. The shaft 4 will be extended and connected to any suitable driving medium, and thereon is keyed or otherwise secured a molding cyl-

inder or drum 5^a, having its periphery provided with a series of circumferentially-alined molding-cavities 6, the said cavities being at the center between side projecting flanges 7, having indentations or recesses 8 at regular intervals. On the shaft 5 is secured a similar drum 9, having parallel peripheral flanges 10, with indentations or recesses 11 therein at regular intervals, the drum 9 between the flanges 10 being smooth and unbroken by indentations. Surrounding the drums 5^a and 9 are a pair of link or chain belts 12, carrying closely-arranged inwardly-opening molds or mold-boxes 13, in each of which is an expelling molding-head 14, having an outwardly-projecting stem 15, freely movable through the outer closed end of the box. The inner side of the molding-head 14 is formed with a molding-cavity 16, similar in contour to the cavity 6 in the cylinder 5^a. The outer end of each stem 15 is provided with a semicircular or analogous head 17, and between the said head and the adjacent end of the box or mold 13 a spring 18 surrounds the stem and tends to normally throw the latter outwardly and retain the molding-head 14 within the box. The stem and molding-head as set forth constitute a plunger which is moved at regular intervals by mechanism that will be hereinafter set forth.

It is obvious that a certain tension on the link or chain belts 12 must be maintained, and for this purpose the upper ends of the standards 3 have outward extensions 19, in which and the upper ends of said standards longitudinally-disposed adjusting-slots 20 are formed to receive slidable journal-boxes 21. The ends of the shaft 5 are fitted in these boxes, and adjustment of the boxes is obtained through the medium of screws 22, secured to the inner ends thereof and passing through the inner portions of the said standards.

At one side of the mold-boxes and chain belts carrying the same a feed-hopper 23 is disposed and held by suitable supports or uprights 24, a feed-tube 25 projecting inwardly from the lower end of said hopper over the lower part of the chain belts and molds or mold-boxes carried by the latter, the inner end of said feed-tube having an outlet-opening 26.

In the feed-tube is disposed a rotatable feed-screw 27, held on a shaft 28, which projects beyond the inner feed end of said tube a sufficient distance and has thereon a sprocket-wheel 29, which is surrounded by a chain belt 30, also engaging a sprocket-wheel 31 of larger dimensions secured on the shaft 4. The inner outlet end of the tube 25 extends into the lower inclosing extremity 32 of a scraper 33, having its lower end in proximity to the plane of movement of the molds or mold-boxes 13 to scrape the surplus material from the latter. The upper end 34 of the scraper 33 is slightly bent and projects between the flanges 7 of the cylinder 5^a and is close enough to scrape the said cylinder to relieve the same of any material that may adhere thereto during the molding operation, which will be hereinafter set forth.

There are two independent mechanisms for controlling the movement of the plungers in the molds or mold-boxes 13, the one mechanism having an operation at regular intervals, or as the plungers come into alinement therewith, to compress the material held by the mold-boxes and practically render all the briquets of uniform density and to impart thereto the shape desired in accordance with the contours of the cavities 6 in the cylinder 5^a and the cavities 16 in the heads 14 of the several plungers. This mechanism may be termed the "compression" devices or part of the machine. This mechanism consists of a cam-shaft 35 having cam arms or members 36 projecting therefrom, said shaft being held in suitable uprights 37, fixed on the base 1. On one end of the shaft 35 is a sprocket-wheel 38, which is surrounded by a chain belt 39, also engaging a materially larger sprocket-wheel 40, secured to the shaft 4 between the sprocket-wheel 31 and one end of the cylinder 5^a. A striker or tappet arm 41 is movably secured at its lower end to a projection 42 and is maintained in normal upright position by a spring or analogous device 43, engaging the pivot-pin 44 therefor and a part of said projection, as shown by dotted lines in Fig. 1. The striker or tappet arm 41 has a curved enlargement 45 on its outer edge, which is successively engaged by the cam arms or projections 36 on the shaft 35 to force the said arm 41 inwardly toward the cylinder 5^a.

The secondary means for actuating the plungers may be termed an "expelling" mechanism, and consists of an upwardly-inclined support 46, secured at its lower end to the top of one standard 3 and having fixed to the upper end thereof an elongated cam-arm 47, which projects over the centers of the molds or mold-boxes 13 and is slightly flared upwardly, the said cam-arm 47 being converged towards its free end and having a regularly-curved lower side 48. The heads 17 of the plungers regularly pass under and engage the lower side 48 of the cam-arm 47, the maximum depression of

the individual plungers occurring adjacent to the attached end of said cam-arm or approximately in line with the vertical center of the machine. The cam-arm 47 throws the heads 14 of the plungers far enough inwardly from the open sides of the molds or mold-boxes to completely expel and loosen the briquets directly over a conveying mechanism. The conveying mechanism consists of a belt 49, disposed and moving in planes at right angles to the belts 12, and molds or mold-boxes 13, the said belt engaging a roller or drum 50, disposed at a suitable elevation between the upper and lower portions of the said belts 12 and mold-boxes 13. Only one of these rollers or drums 50 is shown, the opposite similar device being located at a suitable distance from the machine. Each roller or drum 50 is rotatably held between the upper ends of standards 51 and is formed with a concave surface 52, having the greatest depth at the center and gradually inclining upwardly toward opposite ends of the roller. The belt or conveyer 49 is held in close relation to the rollers or drums 50 and is thereby given a similar contour, or depressed at the center, so as to reliably hold the briquets, which are regularly expelled and fall thereunto from the molds or mold-boxes 13. The central dipped arrangement for the belt or conveyer 49 serves to retain the briquets from falling off the said belt, and a simple means is thus provided for effectually conveying the briquets away from the machine having a smooth surface, which will avoid injury to or formation of irregular indentations or depressions in the several briquets before they are burned or hardened.

In the operation of the machine the material of which the briquets are to be formed is disposed in the hopper 23 and the several parts of the machine set in motion. The screw 27 gradually feeds the material over and causes it to deposit in the open ends of the molds or mold-boxes 13, which, as before set forth, are always directed inwardly. After receiving the material to be molded the several mold-boxes move toward and upwardly over the drum 5^a, and the parts are so proportioned that each mold-box will be regularly disposed over one of the cavities 6. As the heads 17 of the plungers in the mold-boxes arrive opposite and engage the inner edge of the striker or tappet arm 41 each plunger will be pressed inwardly against the action of its spring 18 by the cam arms or projections 36 regularly engaging the cam enlargements 45 on the outer edge of said arm 41 to give the material carried by the several molds or mold-boxes the shape desired and to compress such material. After the plungers move out of engagement with the inner edge of the arm 41 they return to normal position and the briquets are forced outwardly into the molds or mold-boxes and remain in the latter until the plunger-heads move under the cam-arm 41, when the several

plungers will be individually depressed to expel the briquets onto the belt or conveyer 49. This operation will be regularly carried on without requiring special manual attention.

5 At any time desired a cylinder 5^a and plunger-heads 14, having cavities therein of shapes other than those shown, may be substituted, the operation of the machine being independent of any precise form of briquet. It will
10 also be understood that changes in the proportions, dimensions, and minor details may be resorted to without in the least departing from the spirit of the invention.

Having thus fully described the invention,
15 what is claimed as new is—

1. In a briqueting-machine, the combination of a series of movable molds connected to form a sectional belt, cylinders over which the said molds are movable, one of the cylinders
20 having molding-cavities therein, molding-plungers in the molds, and a flexible belt movable transversely between the upper and lower portions of the connected molds and under a part of the latter, the belt being formed with
25 a central dip to elevate the side edges thereof.

2. In a briqueting-machine, the combination of a series of movable molds connected to form a sectional belt, having expelling means therein, terminal cylinders over which the sectional belt is movable, one of the cylinders having molding-cavities therein, the molds comprised in the sectional belt opening inwardly, mechanism for successively moving the plungers toward the cylinder having the molding-cavities therein, an upper expelling-arm with
30 which the successive plungers engage, and a transversely-movable belt disposed under the molds below the expelling-arm and formed with a central dip to elevate the side edges
40 thereof.

3. In a briqueting-machine, the combination of terminal cylinders, a series of connected molds movable around said cylinders, one of the latter having molding-cavities therein,
45 molding-plungers in the molds, and mechanism for successively moving the plungers toward the cylinder having the molding-cavities therein.

4. In a briqueting-machine, the combination with terminal cylinders, a series of connected molds movable about said cylinders and having molding-plungers therein, the open sides of the molds being always maintained inwardly, means for supplying the molds with
55 the material to be molded, and mechanism for successively moving the plungers toward one of the cylinders to compress the material in the molds and properly shape such material.

5. In a briqueting-machine, the combination of terminal cylinders, a series of connected molds movable around said cylinders and having inner open sides, molding-plungers movably mounted in the molds, one of the cylinders having molding-cavities therein, means
65 for supplying the molds with material to be

molded; and a striker-arm with which the successive plunger-heads engage to move the plungers toward the cylinders having the molding-cavities therein.

6. In a briqueting-machine, the combination of terminal cylinders or drums, connected molds movable over the cylinders or drums and having inner open sides, spring-actuated plungers movably mounted in the molds, one of the cylinders having molding-cavities
70 therein, means for feeding material to be molded into the several molds, means for moving the plungers and the material in the molds successively toward the cylinder having the molding-cavities therein, an upper expelling
80 cam-arm to engage the plungers, and a feeding device disposed under the molds and the said arm.

7. In a briqueting-machine, the combination of terminal rotative devices, a plurality
85 of connected molds movable around said rotative devices and having plungers therein, the molds having inner open sides and the plungers provided with outwardly-projecting heads, means for feeding material to be molded
90 into the several molds, a scraper into which said feeding means outlets, and mechanism for engaging the plunger-heads to press the plungers successively toward the one rotative device to shape the material carried by
95 the molds and also mechanism to operate said plungers to expel the molded briquets from the molds.

8. In a briqueting-machine, the combination of rotatable terminal cylinders, a series
100 of connected molds surrounding the said cylinders and having inner open sides, molding-plungers movably mounted in the molds, one of the cylinders having molding-cavities and the plunger-heads formed with corresponding
105 cavities, and means for forcing the molding-heads of the plungers successively into coincidence with the cavities in the one cylinder.

9. In a briqueting-machine, the combination of rotatable terminal cylinders, a series
110 of connected molds movably surrounding said cylinders, one of the latter having molding-cavities therein, inwardly-movable plungers in the molds having cavities heads, a scraper cooperating at its opposite terminals with the
115 cylinder having the cavity therein and the molds, a feeding means having an outlet in the terminal of the scraper cooperating with the molds, and mechanism for operating the plungers to shape the briquet material by pressing
120 said plungers toward the cylinders having the cavities therein and also for expelling the briquets from the molds.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD E. MARSH.

Witnesses:

M. K. GOLD,

LOUIS C. GAERTH.