

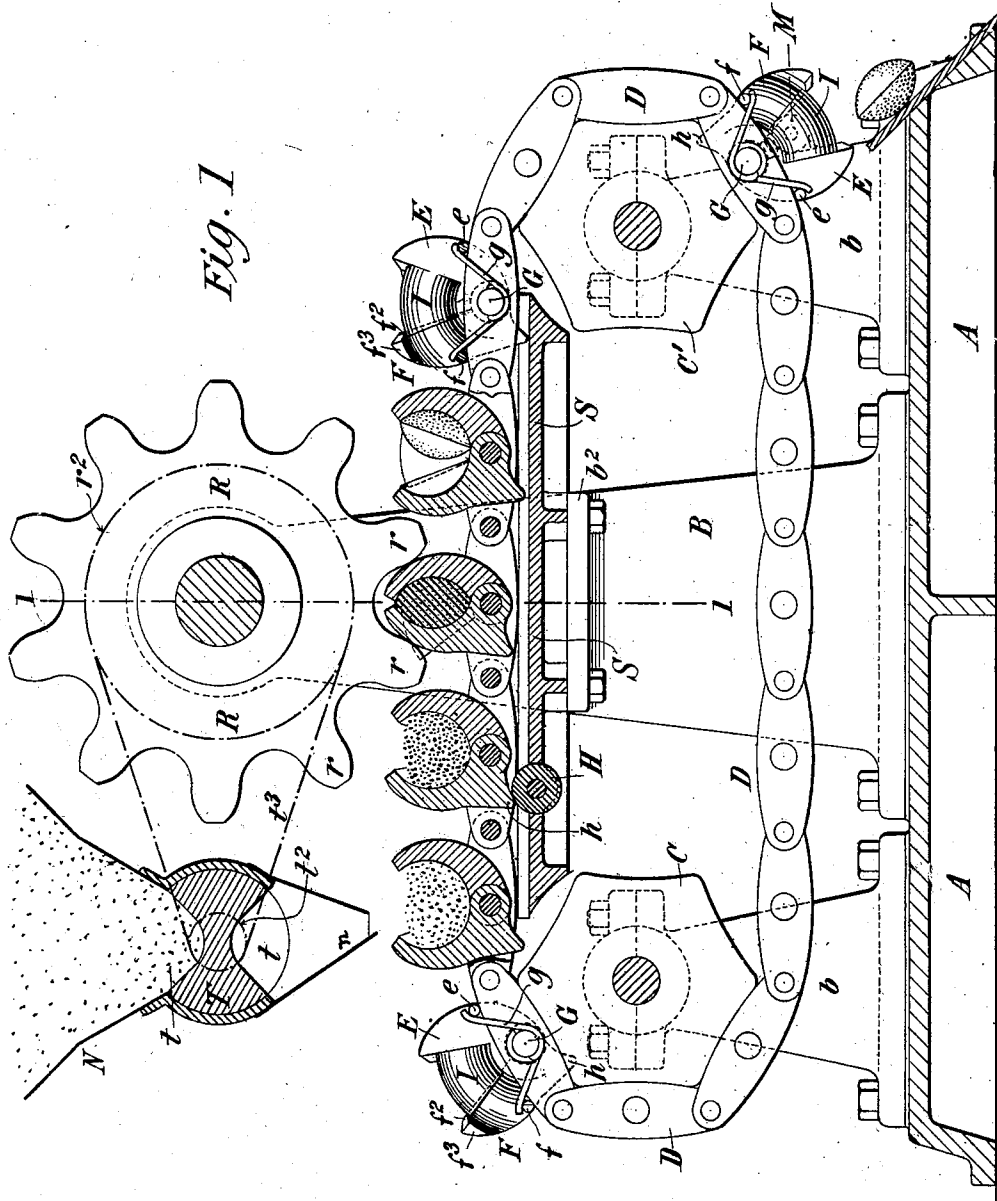
No. 678,359.

Patented July 16, 1901.

J. T. DAVIS.
BRIQUETING MACHINE.
(Application filed Aug. 31, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
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Inventor:
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by Edmund Cougar Brown Atty.

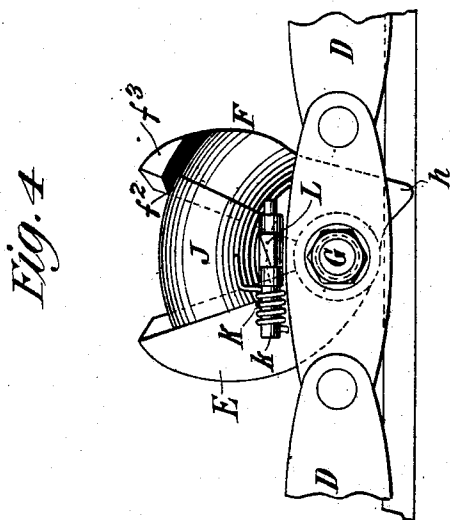
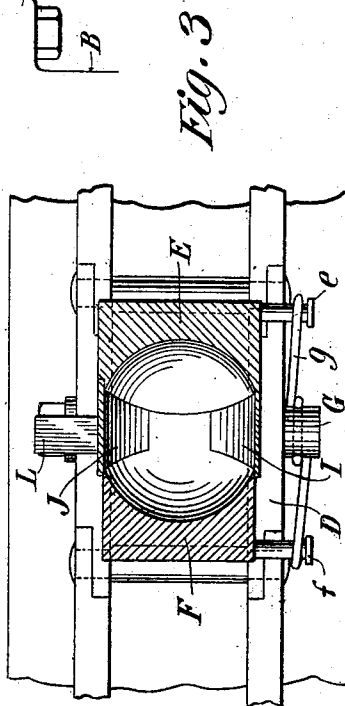
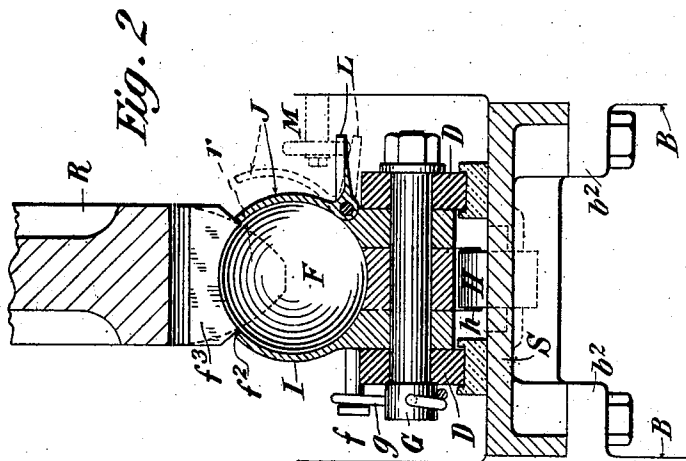
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3 Sheets—Sheet 2.



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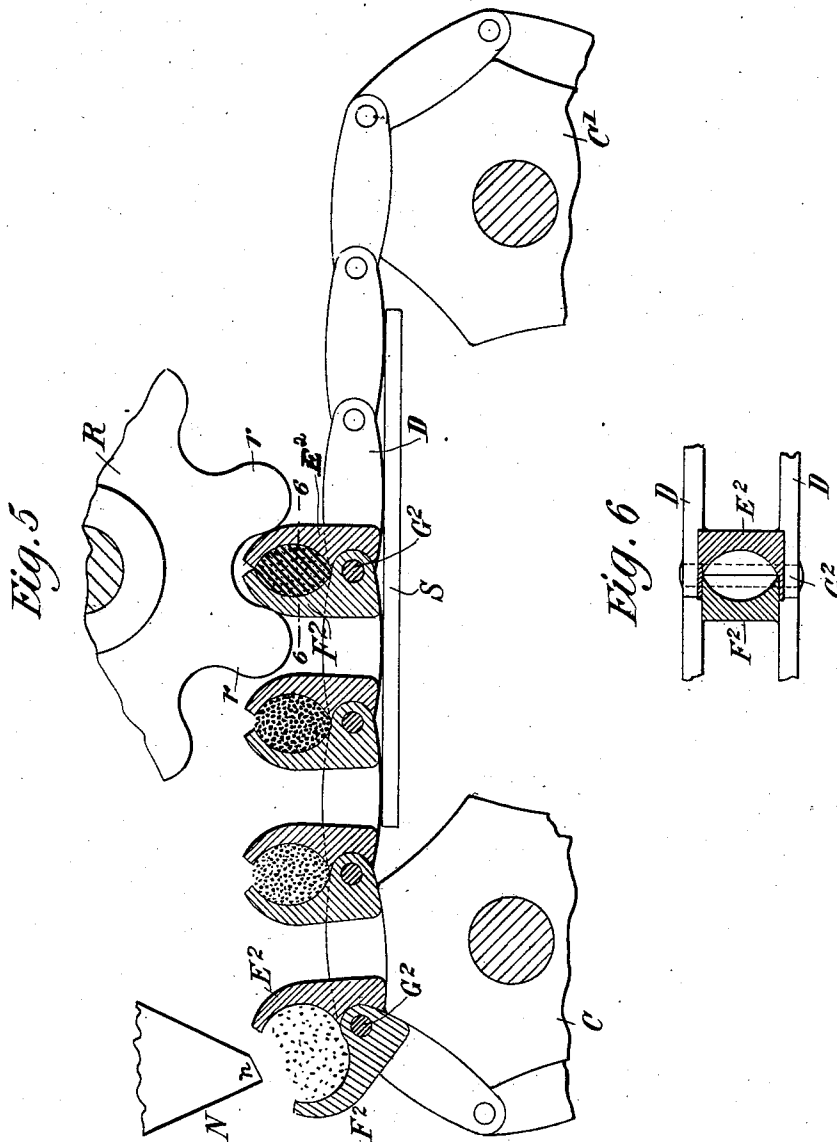
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JOHN THOMAS DAVIS, OF SAN FRANCISCO, CALIFORNIA.

BRIQUETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 678,359, dated July 16, 1901.

Application filed August 31, 1897. Serial No. 650,101. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMAS DAVIS, a citizen of the United States, and a resident of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Briqueting-Machines, of which the following is a specification.

My invention relates to apparatus for molding, compressing, and forming into briquets, eggettes, and other shapes culm or coal-dust and other material capable of being so treated, the same being usually prepared by being mixed with some suitable binding material or substance.

The invention consists, essentially, of the novel construction, arrangement, and combination of one or more series of molds for receiving the material to be treated, a toothed wheel or roller for compressing the molds and their contents, and other devices and parts more particularly hereinafter described.

In the accompanying drawings, Figure 1 is a side view, partly in section, of a machine embodying my invention. Fig. 2 is a transverse vertical section on the line 1 1 of Fig. 1, the said view also showing diagrammatically, in dotted lines, the action of the guard-opening roller hereinafter described. Fig. 3 is a horizontal section of one of the molds open, with appurtenant parts. Fig. 4 is a back view showing one of the molds open. Fig. 5 is a side view, partly in section, of a modified form of my invention; and Fig. 6 is a detail view of the same.

The construction of my invention is as follows: To a suitable base or foundation A are bolted or otherwise secured upright supports B b b for the running parts of the machine. Upon the supports b b are journaled rollers or drums C C', over which pass endless chains D, composed of links secured together in the usual or any suitable manner. In the drawings but two chains are shown, (see Figs. 2 and 3;) but it is obvious that any number of chains and supporting rollers or drums may be employed, each pair of chains bearing between them a series of molds, as hereinafter described.

The molds for receiving and compressing the material to be treated are each formed of two parts, the form of which will of course

vary somewhat, according to the shape which it is desired to give to the finished product. In the accompanying drawings the molds are shown formed of two parts E and F, hollowed out interiorly to form approximately hemispherical cups. The parts are pivotally united or hinged at their lower edges and secured by a pin or bolt G, the ends of which extend outward and secure the molds to the adjacent links of the endless chains, Figs. 1, 2, and 3. A spring g, which may pass around the projecting end of the pin G, acts upon the studs e and f to keep the molds open, except when the same are closed in the operation of the machine, as hereinafter described. The said studs also prevent the molds from opening too far by resting upon the top of the link, as shown in Fig. 1. The parts F of the molds are provided with downwardly-projecting cams h, adapted to engage with the roller H and be elevated thereby, as hereinafter described.

I and J are lateral guards for preventing the escape of the material to be molded before the closing of the mold. The guard I is rigidly attached to one side of the part E of the mold, while the guard J is pivotally attached to the part F of the mold, as shown in Fig. 4, or in any suitable manner. The edges of the guards do not meet at the top of the mold; but a sufficient space exists between to permit the passage of material into the mold. (See Fig. 3.) Both guards are shaped so as to embrace the sides of the part F of the mold (see Fig. 2) and allow the same to move freely therein as the mold opens and closes, the said part F being also suitably shaped externally, having channels or recesses f², into which the edges of the guards pass, with a wider portion f³ above for engagement with the teeth of the compressing-wheel, as hereinafter described. The guard J is provided with a spring K, wound around the end k of the pin of the hinge, attaching said guard to the mold, the said spring serving to keep said guard closed except when opened, as hereinafter described. The said guard J is also provided with a laterally-projecting arm L, Fig. 2, which when depressed opens the guard. Attached to the right-hand support b, Fig. 1, is a wheel or roller M, placed so as to engage with the arm L when the mold passes by. The relative position of said arm and roller when en-

gaged is shown in Fig. 2. The said view does not, however, indicate the true position of the roller with regard to the machine as a whole, said position being shown in Fig. 1, Fig. 2 being, as regards the roller M and the dotted lines showing the open guard, a diagrammatic view.

R is a toothed wheel or roller journaled in suitable upright supports, only one of which appears in the drawings, B, Fig. 1. It is provided with teeth r , which are of such shape and pitch as to readily grasp the molds, completing the closing thereof, which is begun by the action of the roller H upon the cams h , and when the molds have passed directly under the wheel tightly compressing the same, as shown in the middle part of Fig. 1. The chains D, carrying the molds, pass in the upper part of their course over a table S, supported by shelves b^2 , projecting from the supports B. This table upholds the molds and reacts against the downward pressure of the wheel R, thus allowing any desired degree of compression to be obtained. In order to obtain different degrees of compression, the wheel R may be journaled or mounted adjustably in any suitable manner to allow a slight vertical variation in its position. In the drawings the wheel R is shown comparatively narrow, Fig. 2, and adapted to operate but one series of molds; but it is obvious that should it be desired to employ and operate two or more series of molds simultaneously the wheel R can be made of any width, forming in that case a roller, which could be either grooved continuously or provided with pockets suitably shaped and situated to engage with, close, and compress the molds.

N is a hopper for receiving the material to be treated. It opens at the bottom over a measuring-roller T, which is provided with pockets t , each capable of holding the proper quantity of material to fill one of the molds. The measuring-roller is provided with a gear-wheel or sprocket t^2 , over which passes a sprocket-chain t^3 , which also passes over a sprocket r^2 upon the wheel R. The sprockets r^2 and t^2 are so geared with reference to each other that the measuring-roller T shall make half a revolution while the wheel R moves one tooth, and the relative positions of the various parts are so adjusted that when the measuring-roller is in the position to discharge, as shown in Fig. 1, an empty and open mold may be directly underneath to receive the material. Below the measuring-roller is a spout or guide n for directing the material into the molds.

The operation of my invention is as follows: Power from any suitable source is applied either to the drum or roller C' or the wheel R, or to both. The endless chains passing over the rollers being thus set in motion, the molds are successively carried into position below the measuring-roller T, being held open by the springs g , and are filled with the material

to be treated. Passing along, the molds are partly closed by the upward action of the roller H upon the cams h and are then grasped between the teeth r of the wheel R and subjected to an increasing pressure, which reaches its maximum when the mold is directly beneath the axis of the wheel R. As the molds pass farther on and are released from the teeth of the wheel R they are forced open by the springs g , and passing still farther, into the position shown in the lower right-hand corner of Fig. 1, the guard J on one side of the mold is opened by the action of the roller M upon the arm L and the completely-formed briquet allowed to escape, the same having been until then held in the mold, the space between the top edges of the guards not being sufficient to allow it to pass. The operation of the roller M in opening the guard is shown by the dotted lines in Fig. 2, the said view being to that extent a diagrammatic one, as stated above.

Fig. 5 shows a modification of my invention, and Fig. 6 is a horizontal section of one of the molds of such a modified machine, taken on the line 6 6 of Fig. 5. In this form of my invention the chain-carrying rollers, the compressing wheel or roller, and the devices for feeding the material to be treated to the molds are the same as in the form of the invention hereinbefore described. The endless mold-conveying chains also are substantially similar. The molds, however, instead of being placed at or about the middle of the links of the chains are placed at the ends of the link, one-half of the mold being rigidly attached on each side to each of the adjacent ends of the links, and the lower parts of the two halves E^2 and F^2 of each mold, as well as the links to which they are attached, being united in a common hinge-joint and secured by a common pin or bolt G^2 . In this form of my invention the spring g and the roller H and cam h may be dispensed with, as the passing of the chain over the rollers C C' will open the molds, and the straightening of the chains after they leave the roller C will close the molds sufficiently to allow them to be grasped between the teeth of the compressing-wheel. The side guards for the molds, with closing and opening devices therefor, will, however, be required in the modified form of my invention as well as in the form first described. These guards and devices are not shown in Figs. 5 and 6, being substantially similar to those shown in the preceding figures. The operation of the modified form of my invention is, with the exceptions above noted, the same as that of the form first described. It is obvious that in this form of my invention also any number of series of molds and conveying-chains may be employed by increasing the length of the conveying-drums and the compressing-roller.

It must be understood that although I have applied the name "briquetting-machine" to my invention and have termed the finished

products thereof "briquets" I do not confine my claims to machinery for manufacturing what are technically known as "briquets" in the strict sense of the word. It will be obvious that the shape of the finished product is merely dependent upon the shape of the interior of the mold and that the machine and its operation will be essentially the same, whether the products be such as are, strictly speaking, called "briquets" or they be "egg-gets" or any other shape into which such material may be formed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a machine for forming briquets, a mold, formed of pivotally-united parts, provided with means for opening and closing the same and with guards adapted to confine the material to be molded until the closing of the mold, substantially as herein set forth.

2. In a machine for forming briquets, a mold, formed of pivotally-united parts, provided with means for opening and closing the same and with guards adapted to confine the material to be molded until the closing of the mold, one of which guards is pivotally attached to the mold and provided with means for opening and closing the guard, substantially as herein set forth.

3. In a machine for forming briquets, a mold, formed of pivotally-united parts, provided with means for opening and closing the same and with guards adapted to confine the material to be molded until the closing of the mold, one of which guards is pivotally attached to the mold and provided with means for closing the guard and with a laterally-extending arm adapted to be depressed for opening the guard, substantially as herein set forth.

4. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, provided with means for opening the same, one of said parts being provided with a downwardly-projecting cam or lug, said mold being also provided with guards adapted to confine the material to be molded until the closing of the mold, one of which guards is pivotally attached to the mold and provided with means for closing the guard and with a laterally-extending arm adapted to be depressed for opening the guard, of means for conveying said mold, a roller adapted to engage with said cam or lug thereon for the purpose of closing the mold, and a roller adapted to engage with said laterally-extending arm of the guard for the purpose of opening the same, substantially as herein set forth.

5. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, provided with means for opening the same, one of said parts being provided with a downwardly-projecting cam or lug, said mold being also provided with guards adapted to confine the material to be molded until the closing of the mold, one of which guards is

pivotally attached to the mold and provided with means for closing the guard and with a laterally-extending arm adapted to be depressed for opening the guard, of endless chains or belts, passing over supporting and operating rollers or drums, for conveying said mold, a roller adapted to engage with said cam or lug thereon for the purpose of closing the mold, and a roller adapted to engage with said laterally-extending arm of the guard for the purpose of opening the same, substantially as herein set forth.

6. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, said mold being provided with means for opening and closing the same, and being also provided with guards adapted to confine the material to be molded until the closing of the mold, of means for compressing said mold and for conveying same to and from the compressing device, substantially as herein set forth.

7. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, of means for opening and closing said mold, means for opening and closing said guards, means for compressing said mold, and means for conveying said mold to and from the compressing device, substantially as herein set forth.

8. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, of a gear-wheel or roller adapted to compress said mold, means for conveying said mold to and from said wheel or roller, a bed-plate beneath said mold adapted to resist the downward pressure of said wheel or roller, and means for opening and closing said guards, substantially as herein set forth.

9. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, of a gear-wheel or roller adapted to compress said mold, means for conveying said mold to and from said wheel or roller, a bed-plate beneath said mold adapted to resist the downward pressure of said wheel or roller, means for opening and closing said mold, and means for opening and closing said guards, substantially as herein set forth.

10. In a machine for forming briquets, the combination with a mold, formed of pivotally-united parts, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, of a gear-wheel or roller adapted to compress said mold, means for conveying said mold to and from said wheel or roller, a bed-plate beneath said mold adapted to resist the downward pressure of said wheel or roller, means for open-

ing and closing said mold, means for opening and closing said guards, and means for feeding to the mold the material to be molded, substantially as herein set forth.

5 11. A machine for forming briquets, comprising one or more series of molds, each mold formed of pivotally-united parts, one of which is provided with a downwardly - projecting cam or lug, each of said molds being provided
10 with a spring adapted to open the same, and with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to said mold, and being provided with a spring
15 adapted to close the guard and a laterally-extending arm adapted to be depressed for opening the same; endless chains or belts for conveying said molds; rollers or drums for supporting and operating said chains or belts;
20 a roller adapted to engage with the said cams or lugs of the molds; a roller adapted to engage with the laterally-extending arms of the guards; a compressing gear-wheel or roller; a bed-plate beneath the same adapted to support the molds against the downward pressure of the compressing-wheel; and a base or foundation and supports for the moving parts of the machine, substantially as herein set forth.

30 12. A machine for forming briquets, comprising one or more series of molds, each mold formed of pivotally-united parts, one of which is provided with a downwardly - projecting cam or lug, each of said molds being provided
35 with a spring adapted to open the same, and with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to said mold, and being provided with a spring
40 adapted to close the guard and a laterally-extending arm adapted to be depressed for opening the same; endless chains or belts for conveying said molds; rollers or drums for supporting and operating said chains or belts;
45 a roller adapted to engage with the said cams or lugs of the molds; a roller adapted to engage with the laterally-extending arms of the guards; a compressing gear-wheel or roller; a bed-plate beneath the same adapted to support the molds against the downward pressure of the compressing-wheel; means for feeding to the molds the material to be molded; and a base or foundation and supports for the moving parts of the machine, substantially as herein set forth.

55 13. In a machine for forming briquets, a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain-links
60 being pivotally united, the said molds being provided with guards adapted to confine the material to be treated until the closing of the mold, substantially as herein set forth.

65 14. In a machine for forming briquets, a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain-links

being pivotally united, the said molds being provided with guards adapted to confine the material to be treated until the closing of the mold, one of said guards being pivotally attached to the mold and being provided with means for closing the guard and being also provided with a laterally - extending arm adapted to be depressed to open the guard, substantially as herein set forth.

15. In a machine for forming briquets, the combination with a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain - links being pivotally united, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, said guards being provided with means for opening and closing the guards, of means for compressing the said mold, substantially as herein set forth.

16. In a machine for forming briquets, the combination with a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain-links being pivotally united, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to said mold and being provided with a spring adapted to close the guard and a laterally-extending arm adapted to be depressed to open said guard, of means for compressing the said mold, substantially as herein set forth.

17. In a machine for forming briquets, the combination with a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain-links being pivotally united, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, said guards being provided with means for opening and closing the guards, of means for compressing the said mold, and means for conveying the same to and from the compressing device, substantially as herein set forth.

18. In a machine for forming briquets, the combination with a mold formed of two parts, each of which is rigidly attached to the end of a chain-link, the said parts with their attached chain - links being pivotally united, said mold being provided with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to said mold and being provided with a spring adapted to close the guard and a laterally - extending arm adapted to be depressed to open said guard, of means for compressing the said mold, and means for conveying the same to and from the compressing device, substantially as herein set forth.

19. A machine for forming briquets, comprising one or more series of molds, each mold formed of two parts each of which parts is rigidly attached to the end of a chain-link, the

said parts with their attached chain-links being pivotally united, said molds being provided with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to the mold and being provided with a spring adapted to close the guard and being also provided with a laterally-extending arm adapted to be depressed to open the guard; endless chains formed of the links to which the said molds are attached, for conveying said molds; rollers or drums for supporting and operating said chains; a roller adapted to engage with the laterally-extending arm of the guards; a compressing gear-wheel or roller; a bed-plate beneath the same adapted to support the molds against the downward pressure of the compressing-wheel, and a base or foundation and supports for the moving parts of the machine, substantially as herein set forth.

20. A machine for forming briquets, comprising one or more series of molds, each mold formed of two parts each of which parts is rigidly attached to the end of a chain-link, the said parts with their attached chain-links being pivotally united, said molds being pro-

vided with guards adapted to confine the material to be molded until the closing of the mold, one of said guards being pivotally attached to the mold and being provided with a spring adapted to close the guard and being also provided with a laterally-extending arm adapted to be depressed to open the guard; endless chains, formed of the links to which the said molds are attached, for conveying said molds; rollers or drums for supporting and operating said chains; a roller adapted to engage with the laterally-extending arm of the guards; a compressing gear-wheel or roller; a bed-plate beneath the same adapted to support the molds against the downward pressure of the compressing-wheel; means for feeding to the molds the material to be molded; and a base or foundation and supports for the moving parts of the machine, substantially as herein set forth.

Signed at New York, in the county of New York and State of New York, this 12th day of August, A. D. 1897.

JOHN THOMAS DAVIS.

Witnesses:

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A. E. MILLER.