

W. D. KELLER.
BRIQUETTING MACHINE.
APPLICATION FILED JULY 10, 1920.

1,404,441.

Patented Jan. 24, 1922.

3 SHEETS—SHEET 1.

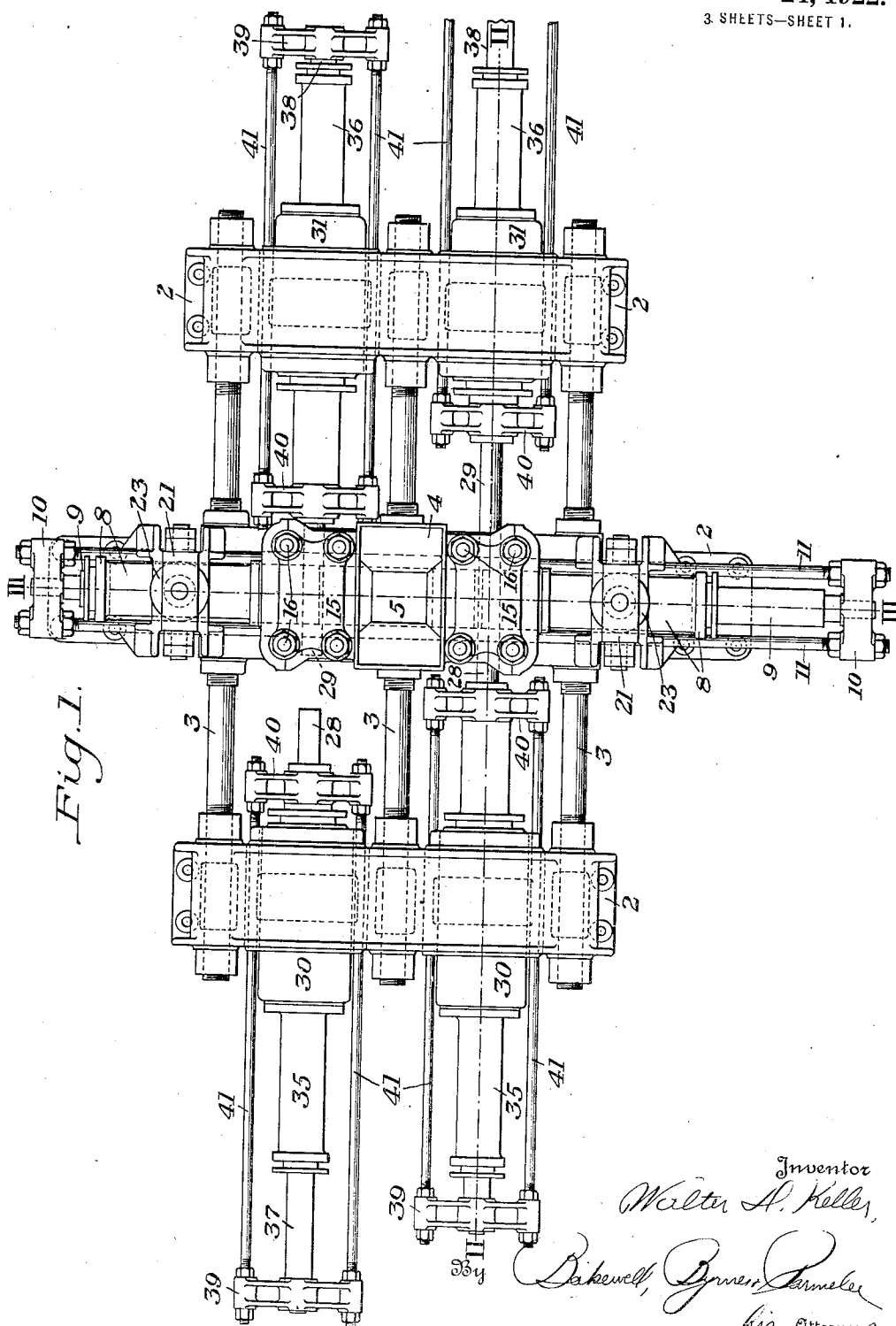


Fig. 1.

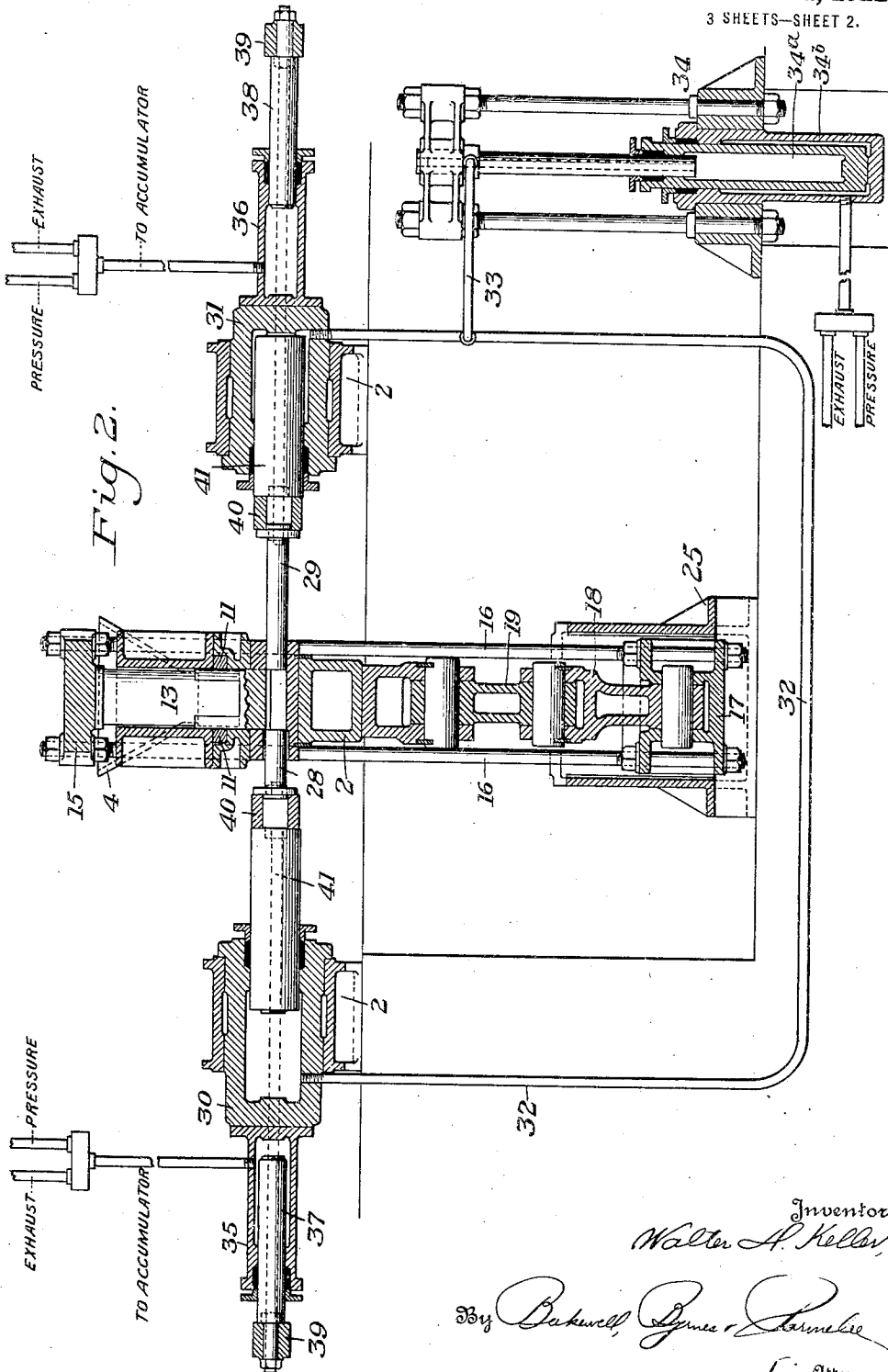
Inventor
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— his Attorneys.

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3 SHEETS—SHEET 2.



Inventor
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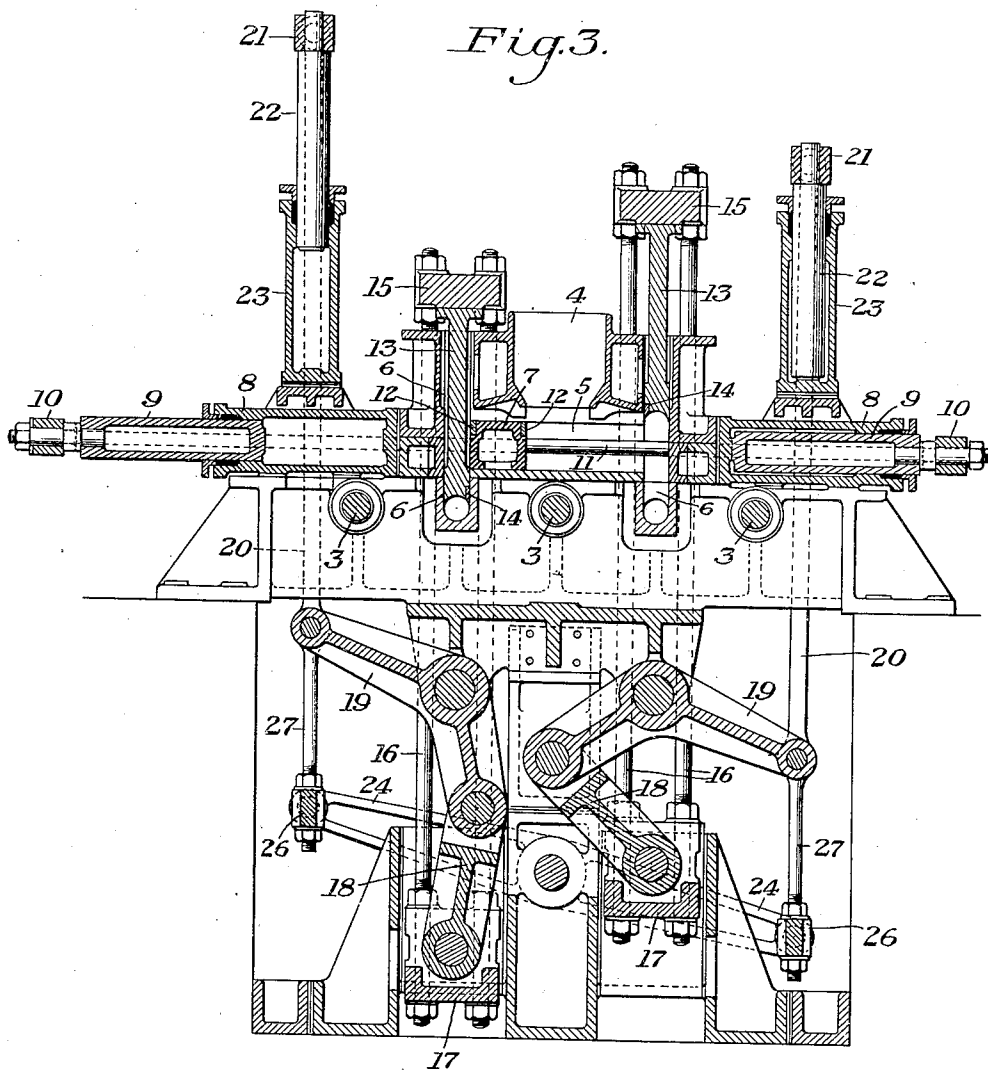
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UNITED STATES PATENT OFFICE.

WALTER D. KELLER, OF ALLIANCE, OHIO, ASSIGNOR TO THE ALLIANCE MACHINE COMPANY, OF ALLIANCE, OHIO, A CORPORATION OF OHIO.

BRIQUETTING MACHINE.

1,404,441.

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To all whom it may concern:

Be it known that I, WALTER D. KELLER, a citizen of the United States, residing at Alliance, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Briquetting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of a machine embodying my invention, and

Figures 2 and 3 are sections taken respectively on the lines II—II and III—III of Figure 1, Figure 2 being diagrammatic with respect to the pipe connections which are shown.

My invention has relation to briquetting machines, and more particularly to a machine of this character which is designed to make briquettes from turnings and other similar metal scrap, the briquettes being in such form that they can be readily charged into a furnace for melting.

The object of the invention is to provide a simple machine of this character, by means of which the work can be efficiently and rapidly done.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown a preferred embodiment thereof, and which will now be described, it being premised, however, that various changes can be made in the details of construction, arrangement and combination of the various parts, without departing from the spirit and scope of my invention as defined in the appended claims.

The particular machine shown in the accompanying drawings and now to be described is a duplex machine, but my invention is clearly applicable to single machines, as will be apparent from the following description.

In these drawings, the numeral 2 designates a plurality of transverse frame members spaced longitudinally from each other and connected by the longitudinal rods 3. 4 designates a feed hopper for the material to be briquetted, this hopper being arranged at the central portion of the central frame member 2, and discharging at its bottom into a transversely extending feed chamber 5.

This feed chamber opens at each end into a vertically extending mold or former 6 in which the material is shaped into briquetted form. The particular machine illustrated is designed to form cylindrical briquettes, but this form is not essential to my invention.

The material fed from the hopper 4 into the feed chamber 5 is discharged alternatively into one or the other of the formers by means of a transversely reciprocating plunger 7, arranged in the chamber 5 and actuated, in the particular machine shown, by the two cylinders 8. These cylinders are placed opposite each other at opposite sides of the machine and their plungers 9 are connected by means of the cross-heads 10 and rods 11 so that the two plungers reciprocate in unison with each other, carrying the plunger 7 with them. This plunger is provided at opposite sides of its upper portion with the shear blades 12, clearly shown in Figure 3. Arranged to reciprocate vertically in each of the formers is a combined plunger and shear 13, carrying each a shear blade 14 which is designed to co-operate respectively with the shear members 12. Each plunger 13 is carried by a reciprocating cross head 15 which is connected by rods 16 with a cross head 17 at the lower portion of the machine and which is connected by means of toggles 18 and 19, rods 20 and cross head 21 to plungers 22 working in cylinders 23.

An alternate operation of the plungers 22 is secured by means of an equalizing lever 24, pivotally connected to a guide bracket 25, and which is connected by crossheads 26 and rods 27 to lower ends of rods 20. Each rod 20 is also connected to one of the toggle or bell-crank members 19.

Each former 6 is provided with two co-operating compressing and ejecting plungers 28 and 29 which are actuated by the respective cylinders 30 and 31, the reduced working end portions of these plungers being arranged to enter the formers from opposite sides in the manner clearly shown in Figure 2. Cylinders 30 and 31 are connected by means of by-pass 32 which is connected by pipe 33 to the high pressure cylinder 34^a of an intensifier 34.

Adjacent to cylinders 30 and 31 are cylinders 35 and 36 in which operate plungers 37

and 38 which are connected respectively to plungers 28 and 29 through crossheads 39 and 40, and rods 41.

The operation is as follows:

5 The material to be formed into briquettes is introduced in any suitable way into the hopper 4, the feed into this hopper being preferably substantially continuous.

In the first operation, the cylinders 8 are
10 operated to actuate the plunger 7 to move a charge of the material from the chamber 5 into one of the formers 6 and compress this charge to a width or thickness equal to the diameter of the finished briquette. The plun-
15 ger 7 at the close of this operation is in the position shown at the left hand side of Figure 3.

In the second operation, the corresponding cylinder 23 is actuated to move the corre-
20 sponding plunger 13 downwardly into the former. During this movement, the shear 14 co-operates with one of the shear members 12 to shear off any scrap material which may extend back over the top of the plunger 7.
25 In its further movement, the plunger 13 reaches the position shown at the left hand side of Figure 3 and compresses the material downwardly into cylindrical form. At the close of this operation, the plunger 7 com-
30 mences to retrieve.

In the third operation, the plungers 28 and 29 are actuated by their respective cyl-
inders 30 and 31 to move toward each other and thereby effect a lateral compression of
35 the briquette into its final form. This motion is controlled by the intensifier 34, connected with the cylinders 30 and 31 through the pipe 33 and by-pass 32. During this third operation, the cylinders 35 and 36 are
40 under constant pressure and balance each other, being connected through open valves, to the accumulator, the forward movement of plungers 28 and 29 forcing the water from cylinders 35 and 36 back into the accumu-
45 lator.

In the fourth operation, the low pressure cylinder 34^b of the intensifier 34 and cylinder 36 are simultaneously opened to exhaust. Cylinder 35, being under pressure, will actu-
50 ate plungers 37 and 28, the first operation being to force back the high pressure cylinder of the intensifier to the limit of its stroke by the water exhausted from cylinder 30 through bypass 32 and pipe 33. Further
55 movement of the plungers 37 and 28 will force the excess water through bypass 32 into cylinder 31, thereby producing a forward movement of the plunger 29 and ejecting the briquette which may be delivered to
60 any suitable conveyer not shown on drawing. At this time the plungers 28 and 29 occupy the position shown at upper part of Figure 1.

The return of plungers 28 and 29 to their original position is effected by simultane-
65 ously opening the cylinder 36 to pressure and

cylinder 35 to exhaust, thereby forcing the water from cylinder 31 through the bypass 32 into cylinder 30. At the finish of the stroke of the plunger 38, the cylinder 35 is reopened to pressure, thus restoring a bal- 70
ance to the system, when another complete cycle of operation is performed as before. In the meantime, another charge has been delivered into the other former in connection with which a similar cycle of operations 75
takes place.

In the construction shown, the various moving parts are actuated hydraulically, but I do not wish to limit my invention to this method of operation, since the plungers may 80
be operated by means of any suitable character.

The advantages of my invention will be apparent since it provides a machine capable of simple and convenient operation, and 85
which can be utilized to rapidly briquette scrap material into a form suitable for subsequent use in furnaces.

I claim:

1. I briquetting machine for metal scrap 90
or the like, comprising a mold or former, means for delivering separated masses of the scrap material into the mold or former, and means for successively compressing therein the separated masses, substan- 95
tially as described.

2. A briquetting machine for metal scrap and the like, comprising a mold or former, means for delivering separated masses of the material into the mold or former, 100
said means including co-operating shear members, and means for compressing the separated masses successively into briquette form in the mold or former, substantially
105 as described.

3. A briquetting machine for metal scrap and the like, comprising a feed hopper, a feed chamber into which the hopper is arranged to discharge, a mold or former communicating with said chamber, a feeding 110
and compressing plunger for delivering the metal from said chamber into the mold or former, and compressing members arranged to compress the material in the mold or former both laterally and vertically, sub- 115
stantially as described.

4. A briquetting machine for metal scrap and the like, comprising a feed hopper, a feed chamber into which the hopper is arranged to discharge, a mold or former communicating with said chamber, a feeding 120
and compressing plunger for delivering the metal from said chamber into the mold or former, and compressing members arranged to compress the material in the mold or 125
former both laterally and vertically, one of said compressing members having a shearing element which is arranged to co-operate with the feeding member, substantially as described.

5. A briquetting machine for metal scrap and the like, comprising a mold or former, a feed chamber, a plunger for delivering successive masses of scrap material into the mold or former, a vertically movable compressor member arranged to operate in the mold or former, and oppositely acting lateral compressing means arranged to enter the cavity of the mold or former horizontally from opposite sides, substantially as described.

6. A briquetting machine for metal scrap and the like, comprising a mold or former, a feed chamber, a plunger for delivering successive masses of scrap material into the mold or former, a vertically movable compressor member arranged to operate in the mold or former, and oppositely acting lateral compressing means arranged to enter the cavity of the mold or former horizontally from opposite sides, the feeding plunger and one of the compressing members having co-operating shear elements, substantially as described.

7. A briquetting machine for metal scrap

and the like, comprising a mold or former, means for delivering separated masses of scrap material successively into the mold or former, said mold or former having horizontal openings at opposite sides, a vertically movable compressing plunger movable in said former, and laterally acting compressing members arranged to enter said former through said openings, said last named members also acting as ejecting means for the briquette, substantially as described.

8. A briquetting machine for metal scrap and the like, comprising a feed chamber open at opposite ends, a mold or former communicating with each end of said chamber, a feeding plunger in said chamber arranged to deliver masses of scrap material therefrom alternately to the two molds or formers, and a plurality of compressing plungers arranged to enter each mold or former, substantially as described.

In testimony whereof I have hereunto set my hand.

W. D. KELLER.