

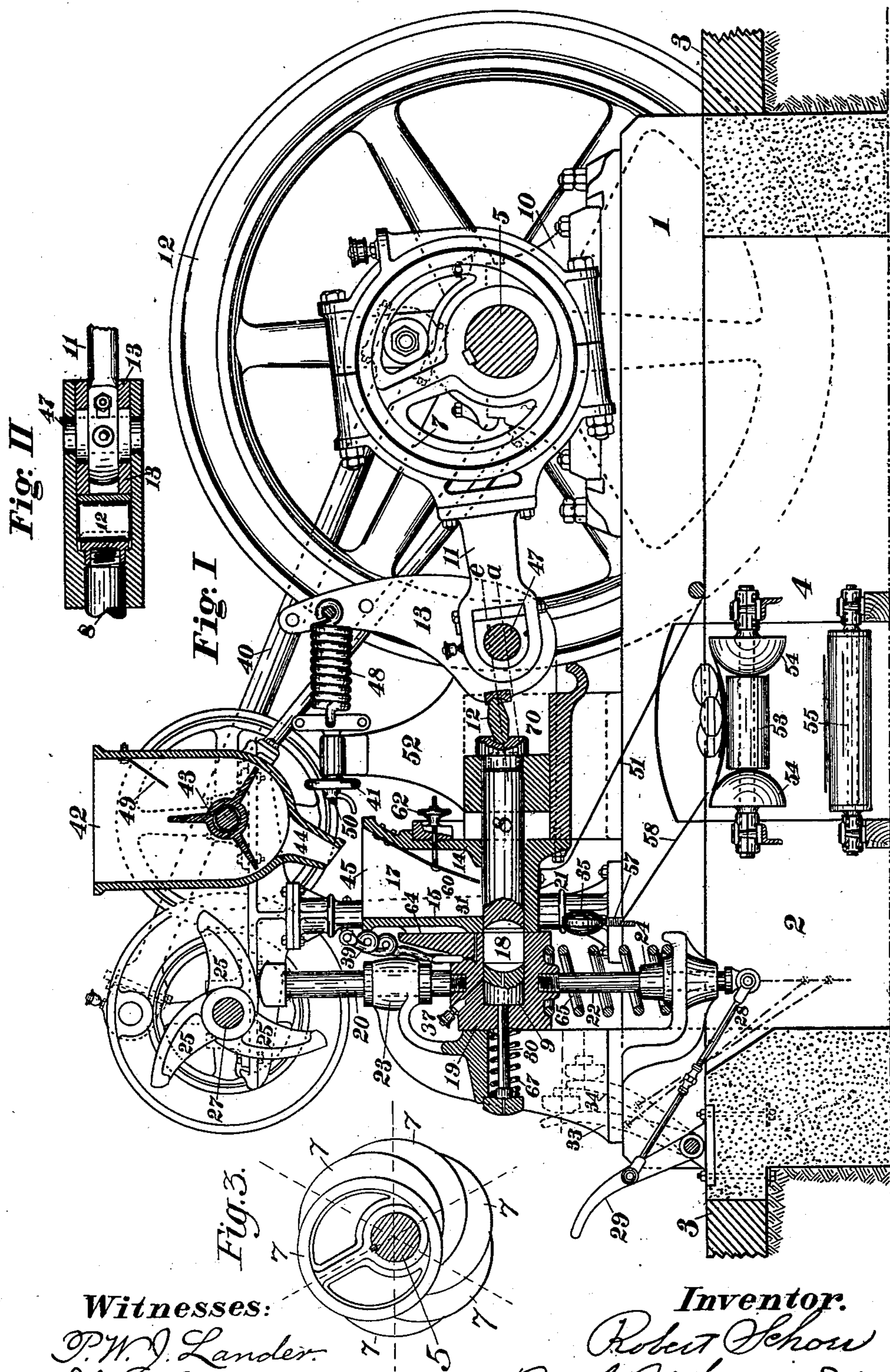
No. 667,254.

Patented Feb. 5, 1901.

R. SCHORR.  
BRIQUET MACHINE.

(Application filed Jan. 18, 1900.)

(No Model.)



Witnesses:

P. W. J. Lander.  
Elmer Wickes.

Inventor.

Robert Schorr  
By J. Richards & Co. Attys

# UNITED STATES PATENT OFFICE.

ROBERT SCHORR, OF SAN FRANCISCO, CALIFORNIA.

## BRIQUET-MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,254, dated February 5, 1901.

Application filed January 18, 1900. Serial No. 1,925. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT SCHORR, a citizen of the United States of America, residing at San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Briquet-Machines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to machinery for compressing and molding into briquets mineral or other substances—such as fuel, ore, and cement—and to certain improvements in machines for this purpose.

My invention consists in a series of successively-acting pistons or plungers, preferably of circular section, operated by eccentrics and forcing the material into molds, the latter movable for the purpose of filling and discharging. It also consists in means to supply the material to the machine and remove the briquets therefrom, with various features of construction and operation that will be more particularly explained in connection with the drawings herewith and forming a part of this specification.

The object of my invention is to provide convenient and rapid means whereby mineral fuel, ores, cement, or other substance in a comminuted form can be compressed and molded into sections commonly called "briquets," to permit convenient use, handling, transporting, or otherwise dealing with the material. To these ends I construct machinery and devices as illustrated in the drawings.

Figure I shows an elevation, mainly in section, of a briquet compressing and molding machine made and operating according to my invention; Fig. II, a detail showing the top of one of the cross-heads, mainly in section, illustrating the construction of the safety devices to prevent fracture by accidents and overstrain. Fig. III is an end view of the main shaft and eccentrics, showing the way the latter are set equidistantly around said shaft to provide for successive action and equality of strain.

1 is a main frame or sole-plate spanning a pit 2 to accommodate such parts of the ma-

chine as extend below the floor-line 3 and also to receive a belt conveyer 4, hereinafter described. The operating parts are actuated by a main shaft 5, on which is fastened a series of eccentrics 7, corresponding in number to the number of pistons or plungers 8 and dies 9, according to the capacity of the machine. The main shaft 5 is mounted in strong bearings 10, attached to the sole-plate 1, is pivoted with one or more fly-wheels 12, and is driven by suitable connection to the motive power that operates the machine. The action of the eccentrics 7 is communicated to the pistons 8 by a link or connection 11, a cross-head 70, and a toggle-bar 12, the latter abutting at its rear end against a pivoted lever 13, the purpose of which will be hereinafter explained. The pistons 8 pass through the walls 14 15 of the feeding-box or supply-chamber 17 and are thus held in alinement with the molds 18.

The main members 19 of the molds 18, hereinafter called "magazines," are supported and guided by two stems 20 22, inserted in the top and bottom of the member 19 and slide through the bearings 23 and 24, as shown in Fig. I.

The magazines 19, containing the molds 18 and dies 9, are depressed by means of the cams 25 on the shaft 27. These cams 25 are as many in number as there are pistons 8, three only being shown in the present drawings. In the course of their revolution and at a point coincident with a predetermined backward position of the pistons 8 the cams 25 strike upon and depress the stems 20 and the magazines 19 until the molds 18 pass below the plate 21.

When the magazines 19 are depressed, the links 28, attached to the bottom of the stems 22, draw forward levers 29, that come in contact with the heads of the stems 30, as indicated by dotted lines in Fig. I. These stems 30 are attached to the dies 9, forming the bottoms of the molds 18, and serve to press the dies 9 forward, and thus eject the briquets 35 from the molds 18.

The dotted lines at 33 and 34 indicate the working range of the several parts directed to the ejection of the completed sections or briquets. The die 9 has a small central passage, as shown, through which air contained

in the mold 18 can escape when the mold is filled.

Lubrication for the die 9 is provided for at 37 and also to some extent the pistons 8. The faces at 31 are lubricated by a tube and hose, as indicated at 39, or in any other suitable manner.

As the shafts 5 and 27 have to revolve in positive relation one to the other, I connect these at their ends, preferably by links or connections 40, attached to cranks of like radius at the ends of the two shafts, or the same result can be attained by tooth-gearing and a shaft to span the distance.

42 is a supply trough or vessel provided with a revolving rake 43, that loosens, disintegrates, measures, and moves forward the material, so it will be discharged by a spout 44 into a hopper 45, constituting a part of the supply-chamber traversed by the pistons 8.

Referring now to the pivoted levers 13 and to one element only of the machine, these are loosely mounted on the cross-pins 47, to which the links 11 connect, and are held at the top by coiled springs 48, that can be adjusted by means of a hand-wheel 41 and the screw 50, held on the standard 52, which is a portion of or attached to the sliding cross-head 70. *a* is a line representing the direction of the thrust or strain passing through the center of the eccentric 7 and the pins 47, that unite the pivoted lever 13 to the thrust-links 11. *e* is a line drawn through the center of the toggle-plate 12 and its seats in pivoted lever 13 and cross-head 70, representing the direction of the strain transmitted through said toggle-plate to said cross-head, which is parallel to line *a*. Since lines *a* and *e* do not coincide, there is a turning strain of the levers 13 about the axis of the pin 47 in proportion to the distance between the lines *a* and *e*, which strain is resisted by the spring 48. Such turning strain on the levers 13 is resisted by the spring 48 so long as the pressure upon the pistons 8 is normal and does not exceed the force required to compact and mold the material being treated; but in case some obstruction enters with the material too firm to be crushed—some article of iron or steel, for example—then the levers 13 will yield and prevent fracture of the parts by overstrain.

Beneath the machine I provide a band conveyor 4, made of any suitable material and curved in its cross-section by the center and end rollers 53 and 54 and supported at the bottom by parallel rollers 55. The briquets 35 after being ejected from the mold 18 fall and after striking upon an elastic stop 57 are deflected thereby to a spout 58, from which they slide by gravity down to the conveyor-band 4 and are carried to some place of storage or use. A top guard-plate is provided to direct the briquets in case they rebound.

The operation of the machine is as follows: Comminuted coal, ore, or other substance to be treated is supplied to the chamber 42, usually mixed with some other substance, such

as bitumen, for what is technically called a "bond" to produce adherence after the material is pressed and molded into briquets. The material is stirred and incorporated by action of the rotary device 43, which is by preference driven from the shaft 27 by any suitable connection. A fixed vane 49 is attached to the inside of the chamber 42 to assist the action of the stirring device 43. The material falls from the spout 44 into the hopper 45 and is deflected forward by an adjustable plate 60, operated by a screw and hand-wheel 62, so the throat at 63 is made wider or narrower, and the quantity of material engaged by the pistons 8 is in this manner regulated. Further stirring or agitating apparatus can be employed in the hopper 45, if required. When the pistons 8 are withdrawn by action of the eccentrics 7, the material falls down in front of the pistons at their backward stroke, and on the forward stroke these drive into the mold 18 sufficient quantity to form a briquet. The pistons 8 advance with increasing force, compressing the material to the dimensions indicated by the briquet 35 and then recede until clear of the magazine 19, which is then depressed by action of one of the cams 25 and stems 20. The extension 64 of the magazines 19 as they descend covers the path of the pistons 8 and close communication with the hopper or chamber 45. At the same time the lever 29 is drawn forward by the link 28, engages the stem 30, and pushes out the die 9, ejecting the briquet, which falls from the mold and is directed to the chute or trough 58, as already described. When the cam 25 releases the stem 20, the member 19 is raised by action of the coil-spring 65, and the die 9 is again drawn back into the mold by the spring 67 acting on the stem 30. In this manner the pistons 8 act successively, dividing the strain upon the shaft 5 and other parts into equal periods corresponding to the number of pistons and molds, so the pressure on the shaft 5 will not at any point exceed the extreme resistance of more than one of the pistons at a time.

If any metallic or other substance that cannot be crushed finds its way into the molds 18 with the material, this brings an excessive strain on the toggle-plates 12, and by reason of the eccentricity of this strain in respect to the pins 47 the spring 48 yields and the levers 13 turn about this pin, yielding enough to prevent fracture, and resume their position on the next backward stroke of the pistons 8.

Having thus described the nature and objects of my invention and the manner of constructing and applying the same in practice, what I claim as novel, and desire to secure by Letters Patent, is—

1. In a briquet-machine, a series of vertically-movable magazines, molds in said magazines, horizontally-reciprocating plungers co-operating with said molds, means to operate said plungers, and means for depressing and

elevating said magazines in synchronism with said plungers, substantially as specified.

2. In a briquet-machine, a series of vertically-movable magazines, molds in said magazines, horizontally-reciprocating plungers co-operating with said molds, a main actuating-shaft provided with eccentrics to operate said plungers set equidistantly about the axis of said shaft for equal distribution of the strains, and a cam-shaft with cams to depress the said magazines, in mechanical connection with the main actuating-shaft, whereby said cam-shaft is operated synchronously with the movements of the plungers, substantially as specified.

3. In a briquet-machine, a series of vertically-reciprocating magazines, molds in said magazines, transversely-reciprocating dies in said molds, sliding stems to operate the dies, and means to operate the stems as the molds are depressed to eject the finished briquets, substantially as specified.

4. In a briquet-machine, a series of depressible magazines, molds in said magazines, upwardly-extending flanges on the molds to cover the path of the plungers, horizontally-reciprocating plungers coöperating with said molds, and means to operate the said plungers in succession, substantially as specified.

5. In a briquet-machine, a series of reciprocating plungers and molds corresponding thereto, movable members or magazines 19 containing the molds 18 mounted on and guided by the stems 20 and 22, the latter connected to and operating the lever 29 and stem 30 for ejecting the briquet, substantially as specified.

6. In a briquet-machine, a series of molds, reciprocating plungers corresponding to said molds, cross-heads in which said plungers

are loosely held, levers 13, pins 47 on which said levers turn, means to reciprocate said levers, and toggle-bars 12 between said levers and said plungers, set obliquely to the line of movement of the plungers and abutting against said levers 13 eccentrically to the centers of pins 47, whereby said levers turn about said pins in case of excessive strain and relieve the plungers, substantially as specified.

7. In a briquet-machine, a series of pistons 8, cross-heads 70, toggle-bars 12 and cross-pins 47 on the latter, pairs of levers 13 turning loosely about the pin and held at their outer ends by springs that will yield and limit the stroke of the pistons in case of obstruction in the molds, in the manner and for the purposes substantially as specified.

8. In a briquet-machine, the depressible magazines 19 with molds 18 therein, the sliding dies 9 in these molds, the stems 30, the levers 29 and the link 28, combined and operating in the manner substantially as specified.

9. In a briquet-machine, a series of depressible magazines, molds in said magazines, reciprocating plungers corresponding to said molds, rotary cams to operate the magazines, a main actuating-shaft, and positive connections between said main actuating-shaft and said rotary cams whereby the movements of the plungers and the molds are coördinated, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT SCHORR.

Witnesses:

ALFRED A. ENQUIST,  
ELMER WICKES.