G. L. RILEY.

SHELL LOADING MACHINE.

APPLICATION FILED MAR. 19, 1908.

930,231.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.

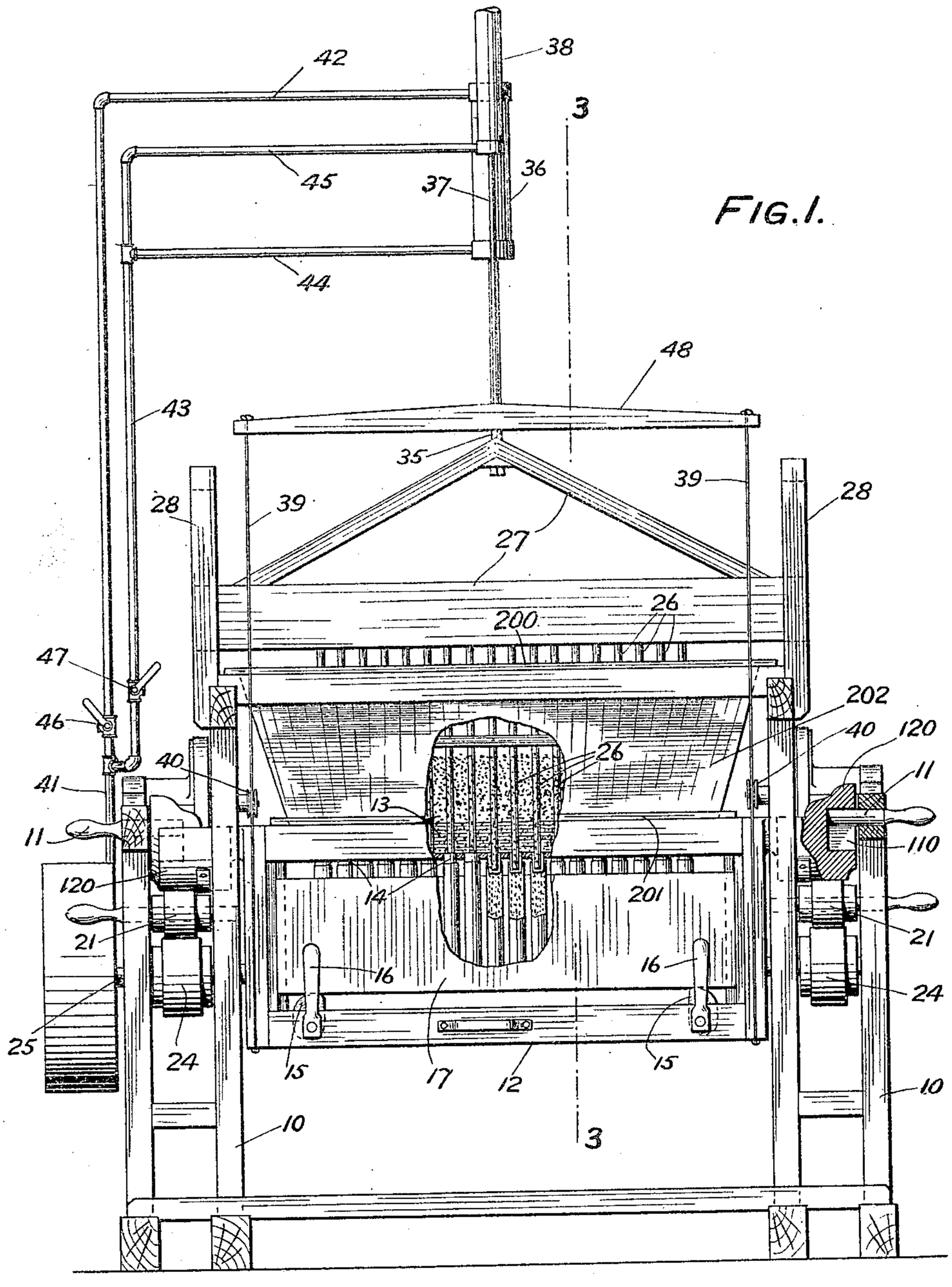

FIG. 1.

WITNESSES:

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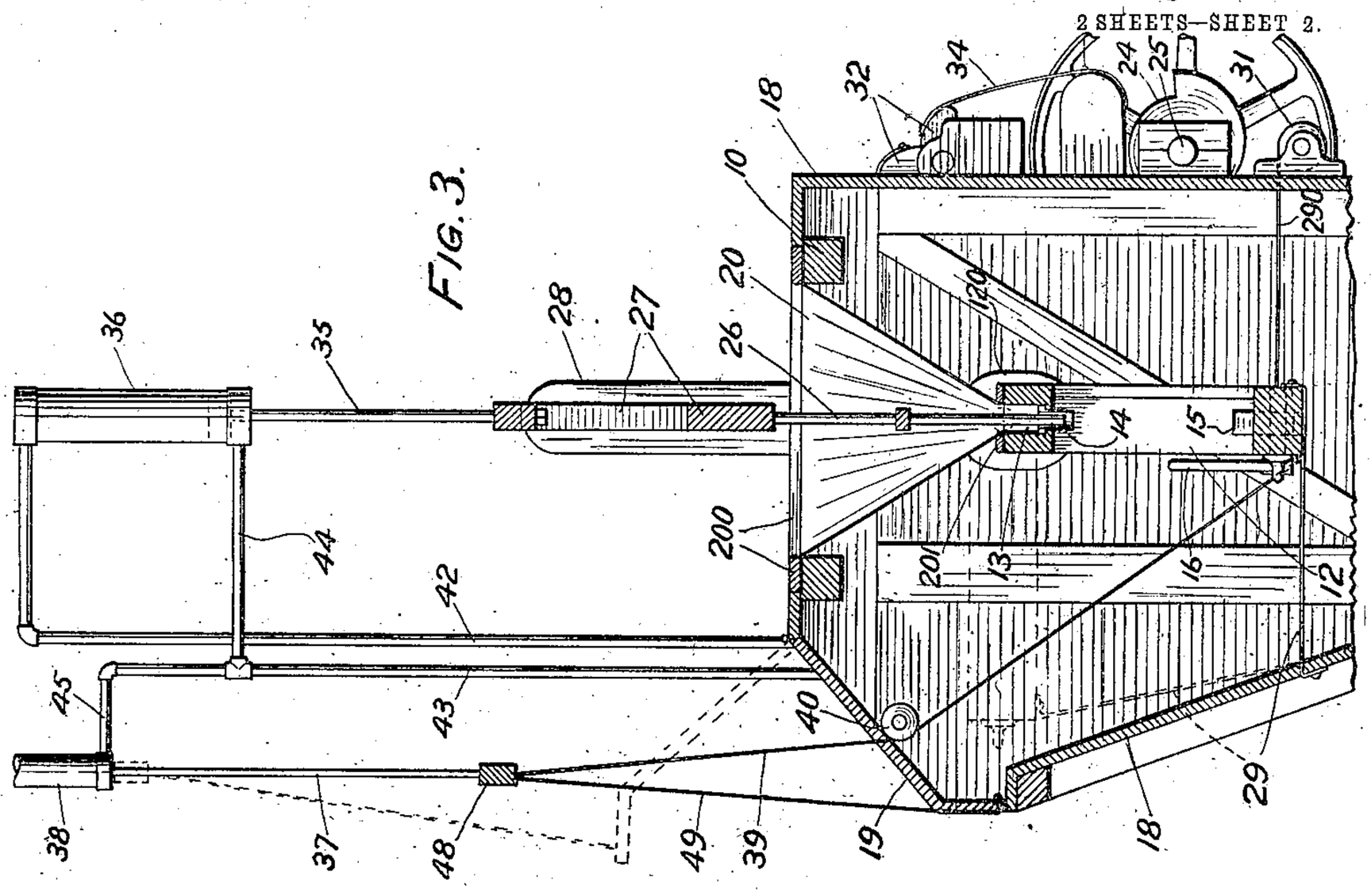

FIG. 3.

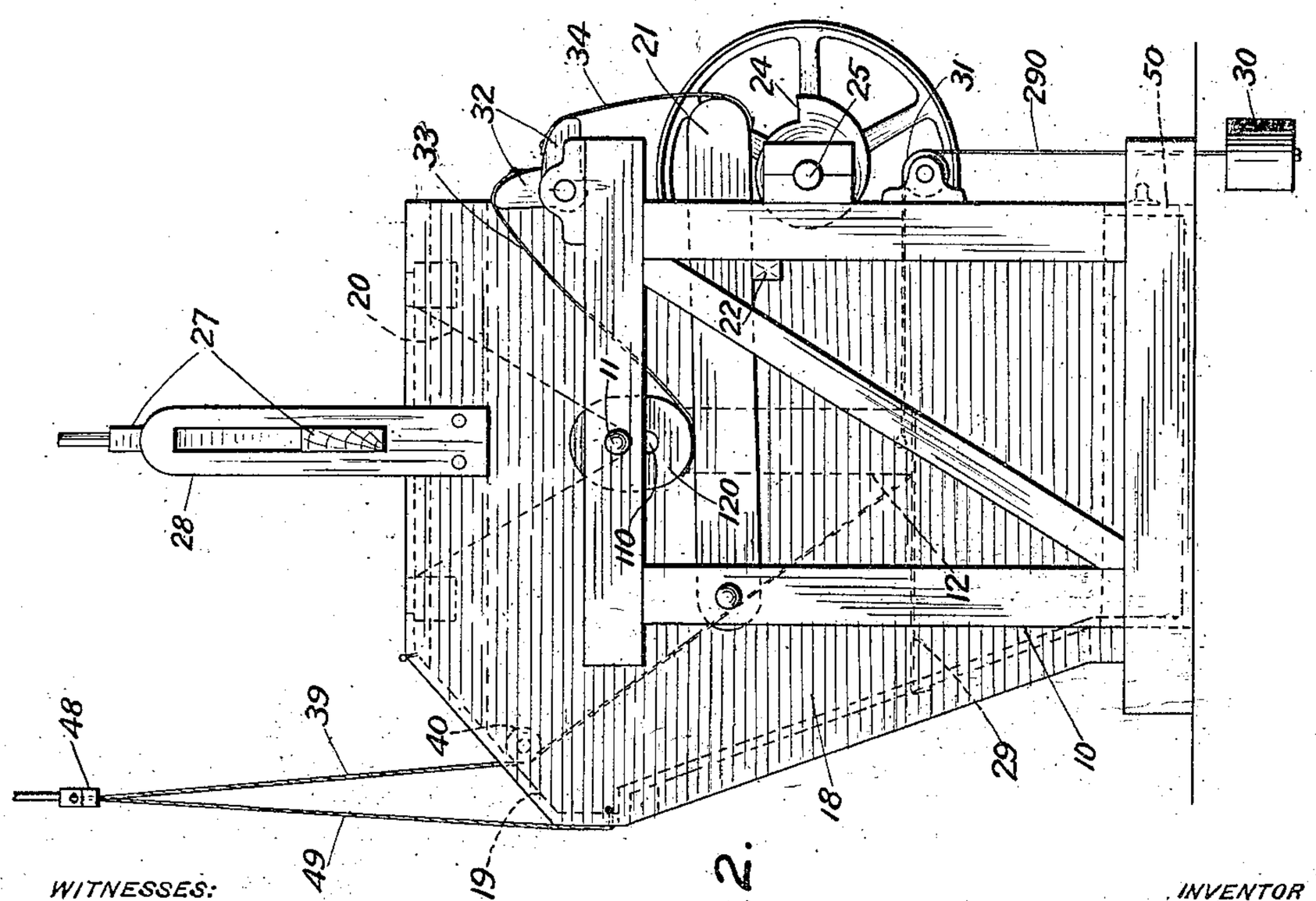

FIG. 2.

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UNITED STATES PATENT OFFICE.

GEORGE L. RILEY, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE E. I. DU PONT DE NEMOURS POWDER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF NEW JERSEY.

SHELL-LOADING MACHINE.

No. 930,231. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed March 19, 1903. Serial No. 622,035.

To all whom it may concern:

Be it known that I, GEORGE L. RILEY, a citizen of the United States, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Shell-Loading Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide a machine adapted to the packing of explosives into shells and particularly explosives in a dry or granular form.

In the drawings: Figure 1 is a front view of the machine, partly in section, with the casing removed. Fig. 2 is a side elevation of the machine including the casing. Fig. 3 is a section on the line 3—3 of Fig. 1, with the casing applied and the shuttle omitted.

10 is the frame of the machine. At opposite sides of the frame are the studs 11, from which is hung the shuttle-frame 12 by the extension 120. The studs extend into elongated vertically extending recesses 110 in the shuttle-frame to enable the same to be reciprocated vertically.

The top bar of the shuttle-frame 12 is provided with a longitudinal recess 13, in the bottom of which is secured a row of nozzles 14, which project below said bar.

On the bottom bar of the shuttle-frame are pivoted shafts carrying the cams 15 secured to hand-levers 16. The shuttle or shell-holder 17 is vertically movable on guides on the upright end bars of the shuttle-frame. To place the shells 18 into operative relation with the nozzles 14, the cams 15 are turned into the positions shown in Figs. 1 and 3, thereby elevating the shuttle so as to cause the upper ends of the shells to slip over the nozzles.

A casing 18 is provided inclosing the shuttle-frame and open at its top to allow a hopper 20 to be introduced. This hopper comprises a top frame 200 secured to the upper bar of the main frame, a bottom frame 201 secured to the top bar of the shuttle-frame, and sides 202 connecting the top and bottom frames. The sides are preferably flexible to permit the discharge end of the hopper to be moved up and down with the shuttle-frame without disturbance of the fixed connection between the top frame 200 of the hopper and the machine frame; although any other construction of hopper that will not disturb the connection between its discharge end and the shells to be filled, may be less preferably availed of.

To vertically reciprocate the shuttle-frame, the following construction is provided. A lever 21 is pivoted at one end on the main frame and extends under one of the outer ends of the shuttle-frame, and rests on a stop 22, its free outer end extending over a cam 24 secured to the driving shaft 25. Similar devices are provided at the other end of the machine. Rotation of the driving shafts rock the levegs 21 up and down, and the shuttle-frame is lifted on the upward movement of the levers and drops during the downward movement of the levers. In this vertical reciprocation of the shuttle-frame, the discharge end of the hopper is necessarily given a like movement, which is permitted by the yielding nature of the hopper walls. This operation causes the explosive material in the hopper to be agitated, whereby the same is fed into the shells.

In order to insure the packing of the explosive into the shells with the desired degree of pressure as well as to prevent clogging or bridging over of the material at the discharge end of the hopper, I provide the tamps 26 secured to the tamp-frame 27, which slides in the uprights 28 secured to the main-frame. These tamps are so positioned that they enter the mouths of the shells at the upward stroke of the shuttle-frame and recede from the shells when the shuttle-frame moves downwardly. After the shells have been filled, the hinged cover 190 of the casing is opened, the cams 15 turned to withdraw the shells from the nozzles, and the shuttle-frame swung up into a horizontal position on the studs 11 as an axis and the shells removed. To hold the shuttle-frame in its natural working position, I provide the flexible connections 29 secured at one end to the casing and at the other end to the bottom bar of the shuttle-frame, and the weights 30 to which are connected flexible connections 290 passing over rollers 31 and also secured to the bottom bar of the tamp-frame. These connections at

the same time permit the shuttle-frame to be swung into a horizontal position as described.

To prevent the constantly revolving shaft 25 from acting upon the shuttle-frame during the latter's raised position, there is provided, at each end of the machine, a bell-crank 32, pivoted on the main frame, a strap 33 secured to the lower side of the corresponding end of the shuttle-frame extension and one arm of the bell-crank, and a strap 34 secured to the other end of the bell-crank and the outer end of the corresponding lever 21. As the shuttle-frame is raised, the straps 33 and 34 lift the outer end of the lever 21 above the path of travel of the corresponding cam 24.

It is desirable to raise and lower the tamps and to raise the shuttle-frame by power, to which end, the following mechanism is provided. The piston 35 of a fluid pressure cylinder 36 is secured to the tamp frame, and the piston 37 of a fluid pressure cylinder 38 has secured thereto a cross-bar 48 which is connected by flexible connections 39, engaging guide rollers 40, with the lower end of the shuttle-frame. A pipe 41 has the branches 42 and 43, the latter in turn having the branches 44 and 45. Three-way cocks 46 and 47 are applied to pipes 42 and 43 respectively. Pipe 44 runs to the lower end of cylinder 36, pipe 42 to the upper end of cylinder 36, and pipe 45 to the lower end of cylinder 38. By turning the cock 47 to admit pressure fluid to the lower ends of the two cylinders after cock 46 has been previously turned to connect the upper end of cylinder 36 with the exhaust, the tamps are drawn above the shuttle-frame and the latter is swung upwardly. By turning the cock 47 to allow the pressure fluid in the lower ends of the two cylinders to exhaust, the shuttle-frame will drop into position by gravity, and by turning the cock 46 to admit pressure to the upper end of cylinder 36, the tamps are forced down into operative position.

The hinged cover 19 is also preferably connected with the cross-bar 48 by means of the flexible connections 49, so that the cover will be automatically raised to allow access to the shuttle at the same time that the shuttle-frame is elevated.

To facilitate removal of the fine explosive dust that may accumulate within the casing, a drawer 50 may be arranged to slide in the lower part thereof. This drawer should be of substantially the internal dimensions of the casing, so that all the dust will collect therein.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:—

1. In a shell loading machine, in combination, a vertically reciprocable shuttle-frame movable into and out of operative position, means to reciprocate said frame when the same is in operative position, and mechanism actuated by the shuttle-frame adapted when the shuttle-frame is moved out of operative position to render said shuttle-frame reciprocating means inoperative.

2. In a shell loading machine, in combination, a pivotally supported shuttle frame, means to supply explosive material thereto, means to reciprocate the shuttle-frame, and mechanism actuated by the shuttle-frame adapted when the shuttle-frame is swung on its pivot out of operative position to render said shuttle-frame reciprocating means inoperative.

3. In a shell-loading machine, in combination, a pivotally supported shuttle-frame, a rocking lever adapted to vertically reciprocate the shuttle-frame, a cam adapted to operate said lever, and connections between the shuttle-frame and rocking lever adapted, when the shuttle-frame is swung on its pivot out of operative position, to withdraw said lever from the action of the cam.

4. In a shell loading machine, in combination, a pivotally supported shuttle-frame, a rocking lever adapted to vertically reciprocate the shuttle-frame, a cam adapted to operate said lever, a bell crank, a strap connecting the shuttle-frame and one arm of the bell-crank, and a strap connecting the lever and the other arm of the bell crank, whereby when the shuttle-frame is swung on its pivot out of operative position said lever is withdrawn from the action of the cam.

5. In a shell loading machine, in combination, the main frame, a shuttle-frame having in its end vertically elongated recesses, studs in the main frame entering said recesses whereby the shuttle-frame is hung therefrom, and means to reciprocate the shuttle-frame on said studs.

6. In a shell loading machine, in combination, a reciprocable shuttle frame, a hopper, in operative relation with the shuttle frame, adapted when actuated to agitate the material therein, and means to reciprocate the shuttle frame and thereby actuate the hopper.

7. In a shell loading machine, in combination, a reciprocable shuttle frame, nozzles carried thereby, a hopper whose discharge end is movable relatively to its receiving mouth, said discharge end being secured to the shuttle frame in operative relation with said nozzles, and means to reciprocate the shuttle frame and the discharge end of the hopper.

8. In a shell loading machine, in combination, the main frame, a shuttle frame pivotally connected to the main frame and adapted to move vertically thereon, a hop-

per, in operative relation with the shuttle frame, adapted to be actuated to agitate the material therein, and mechanism adapted to vertically reciprocate the shuttle frame and thereby actuate the hopper.

9. In a shell loading machine, in combination, the main frame, a shuttle-frame vertically reciprocable on the main frame, nozzles carried by the shuttle-frame, a hopper having flexible walls whose discharge end is secured to the shuttle-frame in operative relation with said nozzles and whose upper end is secured to the main frame.

10. In a shell loading machine, in combination, a pivotally suspended and vertically reciprocable shuttle-frame, means to supply explosive material thereto during its reciprocation, mechanism adapted to swing the shuttle-frame on its pivot out of operative position, and a tension device tending to restore said frame to operative position.

11. In a shell loading machine, in combination, the main frame, a pivotally suspended and vertically reciprocable shuttle-frame, means to supply explosive material thereto during its reciprocation, mechanism adapted to lift the shuttle-frame on its pivot out of operative position, a tension device tending to move the shuttle-frame to and beyond its operative position, and a connection between the main frame and the shuttle-frame limiting the movement of the shuttle-frame beyond its operative position.

12. In a shell loading machine, in combination, a shuttle-frame, means to move the same out of operative position, means to vertically reciprocate the shuttle-frame while in operative position, nozzles connected with the shuttle-frame, means to supply explosive material to the nozzles, tamps adapted to work in said nozzles during reciprocation of the shuttle-frame, and mechanism for lifting said tamps and moving the shuttle-frame out of operative position.

13. In a shell-loading machine, in combination, a vertically reciprocable shuttle-frame, a hopper to supply explosive material thereto, a casing inclosing the shuttle-frame and hopper but permitting explosive material to be fed into the hopper, a hinged cover for the casing, the shuttle-frame being movable out of operative position toward said cover, and mechanism connecting with both the shuttle-frame and hopper adapted to move the shuttle-frame toward said cover and lift the cover to allow access to the shuttle-frame.

14. In a shell loading machine, in combination, the main frame, a shuttle-frame, nozzles carried thereby, a hopper having flexible walls and whose upper end is fixedly connected with the main frame and whose discharge end is fixedly connected with the shuttle-frame, means to removably secure a shell shuttle in said frame so that the shells therein will register with said nozzles, studs on the main frame on which the shuttle-frame is both pivotally supported and vertically reciprocable, a rocking lever pivoted on the main frame and engaging the shuttle-frame and by which the same is vertically reciprocated, a shaft, a cam thereon underlying said lever and adapted to alternately lift the same and allow it to drop, a bell-crank, straps respectively connecting the frame and one arm of the bell-crank and the rocking lever and the other arm of the bell-crank whereby, when the shuttle-frame is lifted on its pivot, the rocking lever is lifted above the cam, tamps entering said nozzles and slidable in vertical guides on the main frame, means adapted to lift the tamps and swing the shuttle-frame, a strap connecting the main frame and the shuttle-frame, and limiting its movement when swung into operative position, and a tension device acting on the shuttle-frame and acting with said strap to hold the shuttle-frame in operative position.

In testimony of which invention, I have hereunto set my hand, at Gibbstown, N. J., on this twelfth day of March, 1908.

GEORGE L. RILEY.

Witnesses:

JOSEPH W. WILSON,

WILLIAM A. L. DROGEMILLER.