

May 30, 1933.

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1,911,299

POWDER PACKING MACHINE

Filed July 16, 1932

4 Sheets-Sheet 1

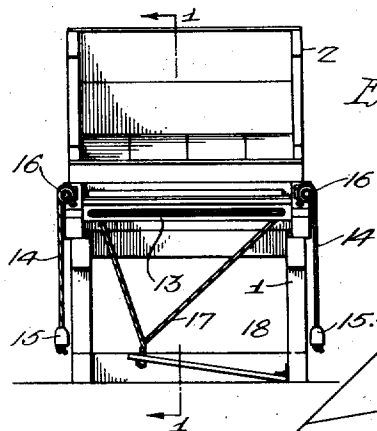


Fig. 2.

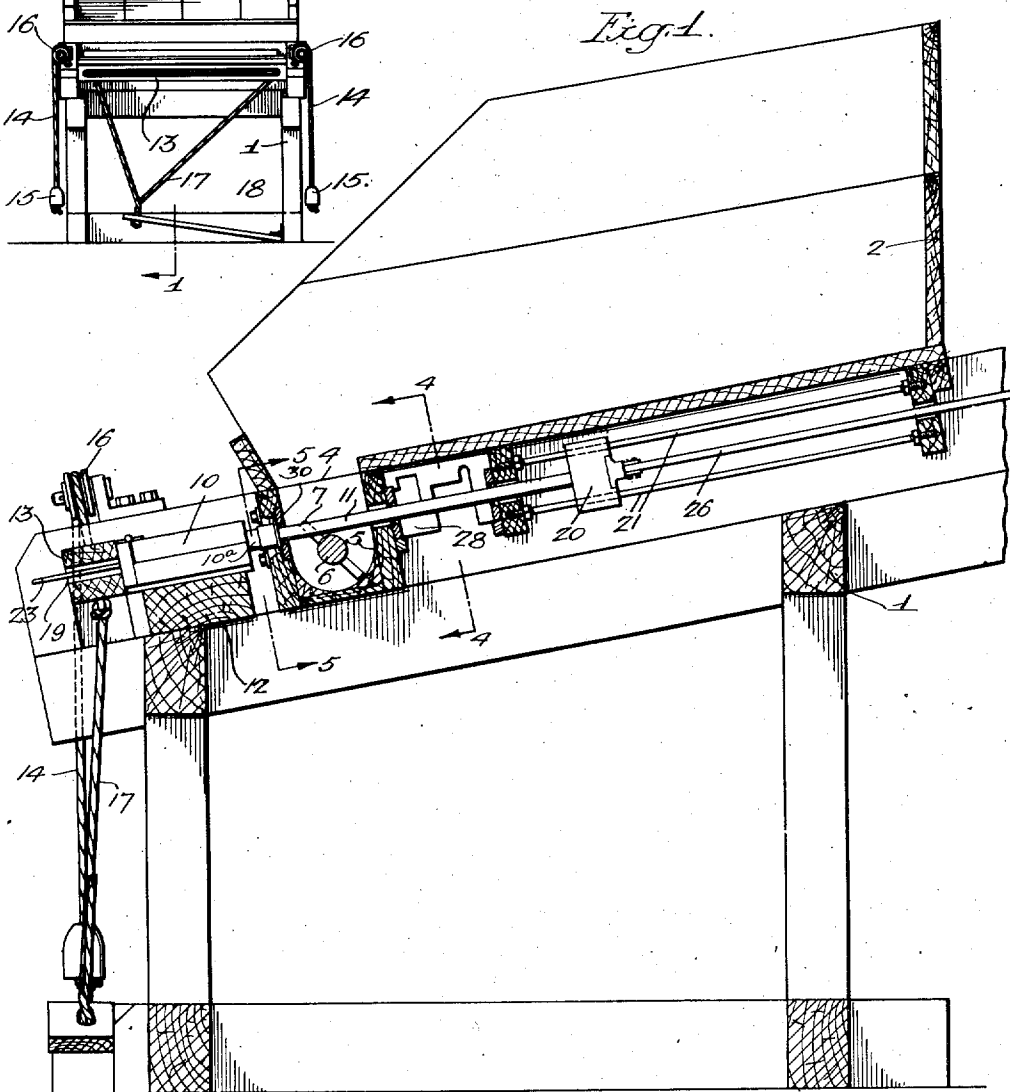


Fig. 1.

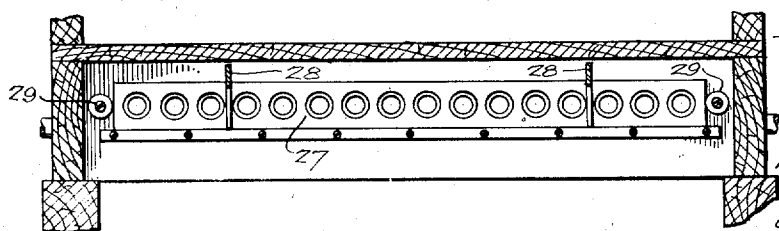


Fig. 4.

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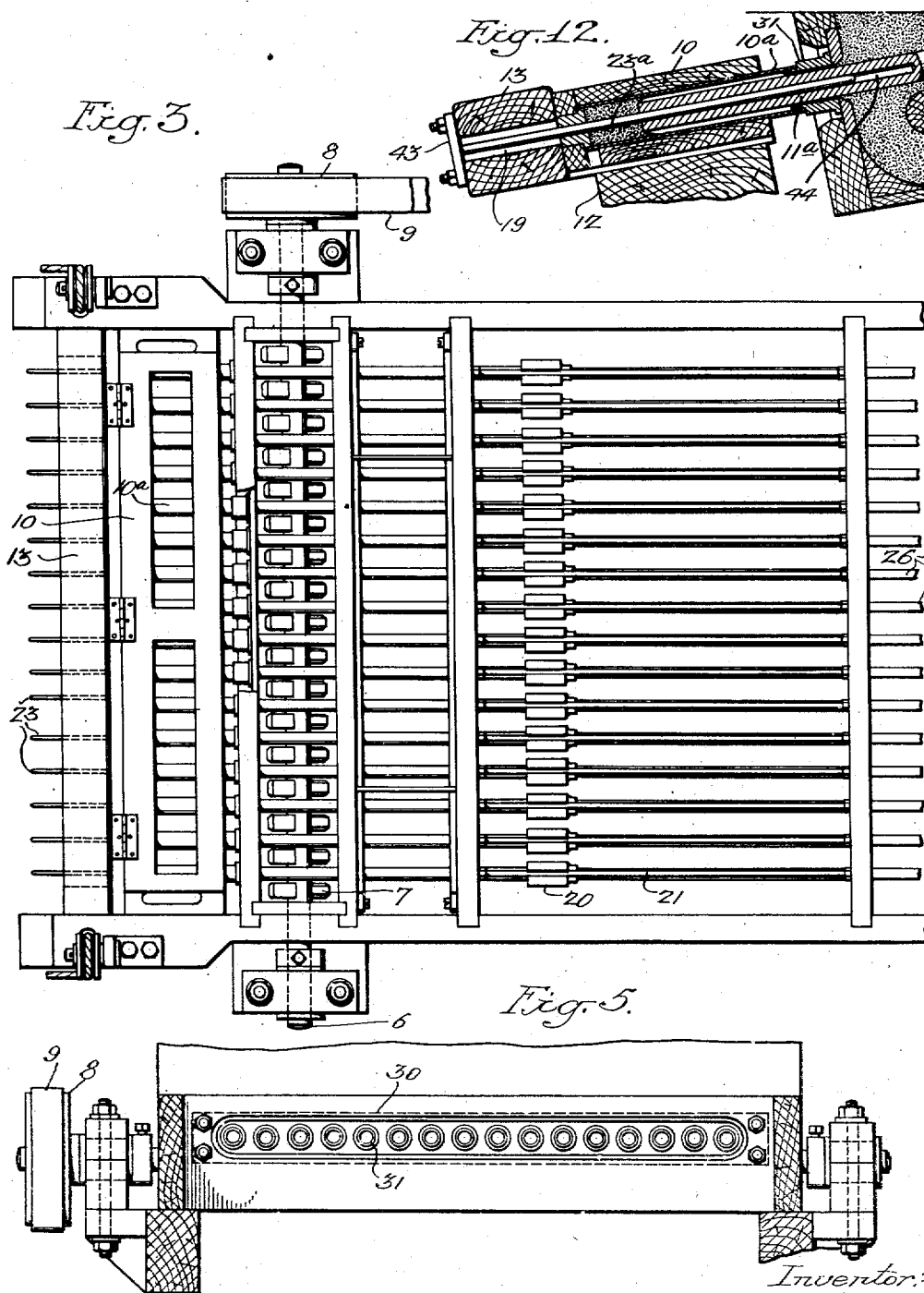
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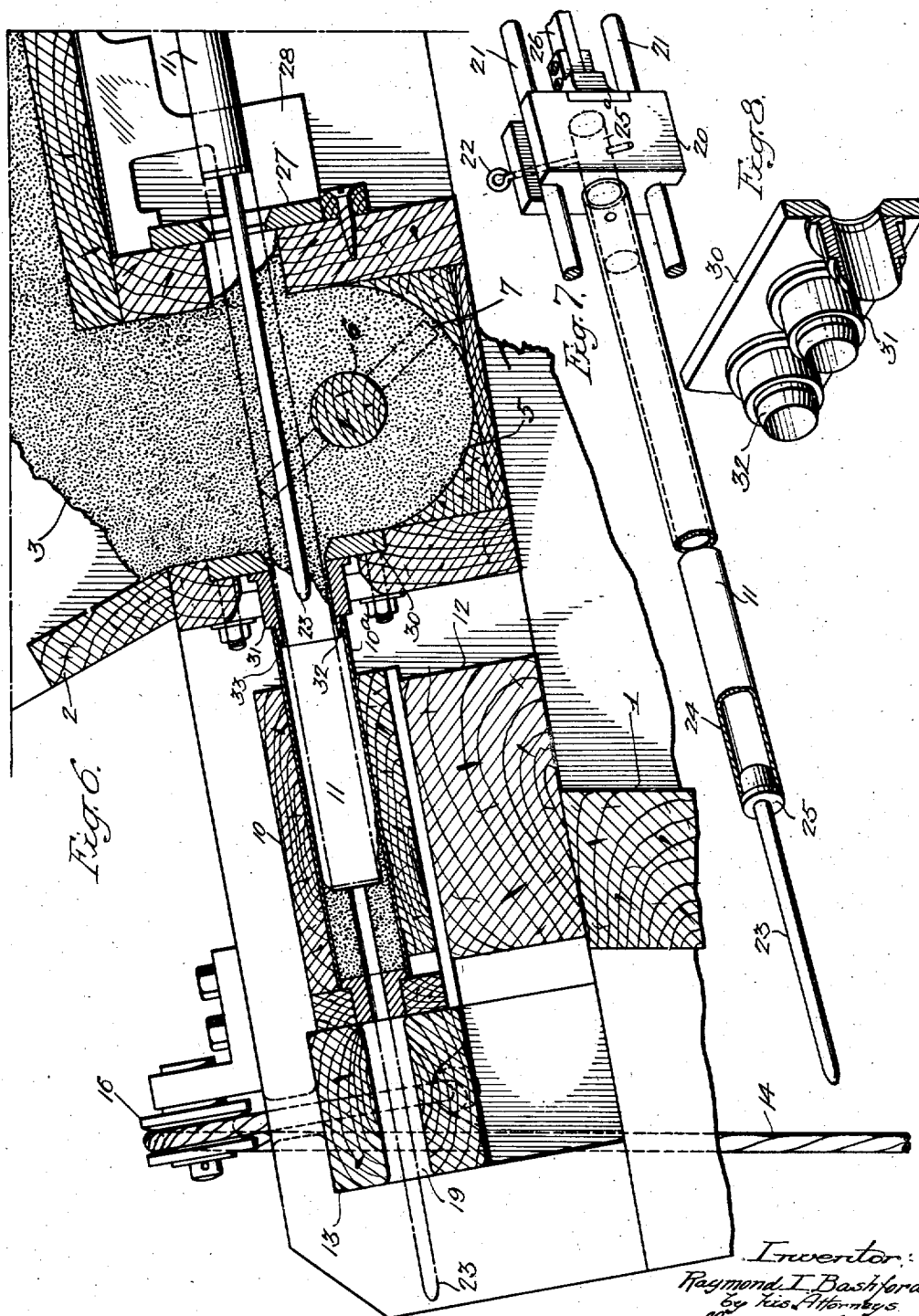
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POWDER PACKING MACHINE

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4 Sheets-Sheet 3



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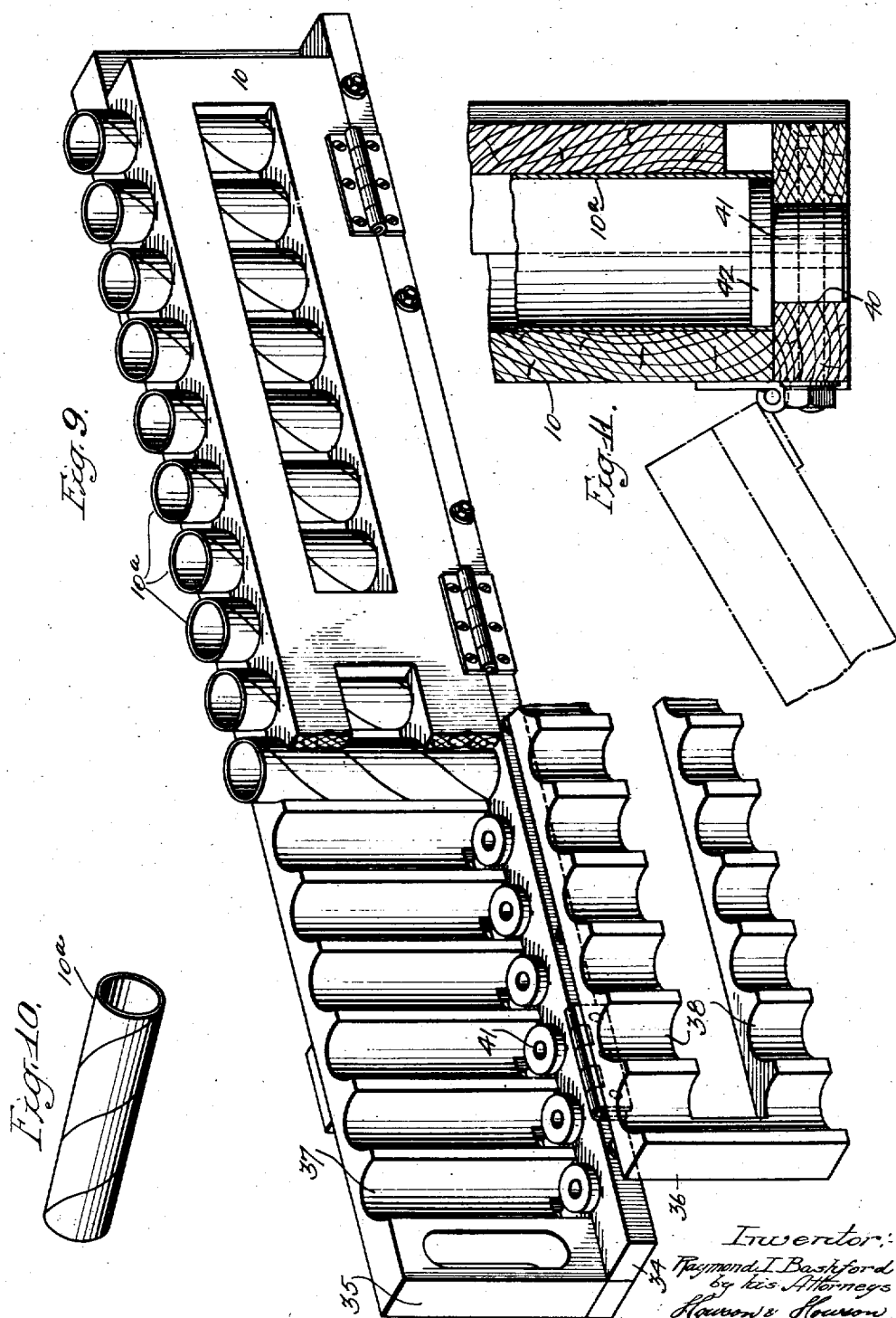
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POWDER PACKING MACHINE

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4 Sheets-Sheet 4



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POWDER PACKING MACHINE

Application filed July 16, 1932. Serial No. 622,979.

This invention relates to powder packing machines and more particularly to machines for packing explosive powder in shell or cartridge containers.

5 An object of the invention is to provide a machine which, by virtue of certain novel features hereinafter set forth, functions more efficiently than known machines of the same general class.

10 Another object of the invention is to provide a machine which is adapted to pack or tamp explosive powder in shells and at the same time maintain a central longitudinal passage through each shell, which pas-
15 sage serves as a receptacle for the fuse of the completed explosive cartridge.

A further object of the invention is to provide a machine which is adapted to pack or tamp explosive powder in shells having
20 open ends, the device serving to substantially close one of the open ends of each shell during packing thereof.

Other objects of the invention will be apparent hereinafter. The accompanying
25 drawings disclose a machine constructed in accordance with the invention. In the drawings:

Figs. 1 and 2 are partial sectional and end elevational views, respectively, Fig. 1
30 being a section along line 1-1 of Fig. 2;

Fig. 3 is a plan view of the portion of the machine shown in Fig. 1;

Fig. 4 is a sectional view along the line
4-4 of Fig. 1;

35 Fig. 5 is a sectional view along the line 5-5 of Fig. 1;

Fig. 6 is an enlarged sectional view similar to Fig. 1;

40 Figs. 7 and 8 are detail perspective views of certain parts of the machine;

Fig. 9 is a perspective view of the shell-supporting shuttle of the machine;

Fig. 10 is a perspective view of one of the shells;

45 Fig. 11 is a partial sectional detail view of the shuttle; and

Fig. 12 is a partial sectional detail view of a modification of the machine.

In Patent No. 813,435, granted February
50 27, 1906, to S. B. Kimber, there is disclosed

a machine of the general type contemplated herein, the present machine being in the nature of an improvement over the Kimber machine and being adapted to pack a particular type of explosive cartridge. Only
55 such parts of the machine as involve the novel features of the invention are disclosed herein, it being understood that the parts not shown are constructed in accordance with prior art teachings, such as those of the
60 said Kimber Patent.

Referring to the drawings and particularly to Fig. 1, the machine comprises a supporting framework designated generally by
65 reference character 1, which serves to support the various parts described hereinafter. An inclined hopper 2 extending the width of the machine serves to carry the explosive powder 3 (see Fig. 6), the powder being fed
70 into the hopper in any suitable manner. The hopper has at its lower end an elongated opening 4, leading into trough 5. The explosive powder moves gravitally into the trough from whence it is forced into the
75 shells and packed therein. A rotatable shaft 6 extends longitudinally through trough 5 and carries a plurality of spaced paddles 7 which serve to stir the explosive powder and prevent packing thereof in the trough,
80 and also bring the powder to the front of the tamps described hereinafter. Shaft 6 carries at one end a pulley 8 which may be driven by any suitable source of power through belt 9. During operation of the
85 machine, shaft 6 is continuously rotated.

A removable shell-supporting shuttle 10 holds the shell 10a in place, while a plurality of tamps 11, which are adapted to enter the respective shells, tamp or pack
90 the explosive powder in the shells. A supporting beam 12 is provided upon which the removable shuttle is adapted to be placed, the beam serving to support the shuttle from the bottom thereof. A movable
95 supporting beam 13 serves to additionally support the shuttle, as illustrated clearly in Figs. 1 and 6. Beam 13 is normally held in operative position by ropes 14 having counterbalancing weights 15 attached thereto.
100 These ropes are attached to the supporting

beam and they pass over pulleys 16 carried by the supporting frame of the machine. Rope 17 has its ends likewise attached to the supporting beam and is also attached to treadle 18, the purpose of this arrangement being to enable an operator to remove the supporting beam 13 downward into inoperative position against the counterbalancing action of weights 15. By stepping upon treadle 18, then, the operator is enabled to move beam 13 downward to free shuttle 10, permitting its removal and the insertion of a shuttle carrying empty shells in its place. Beam 13 is provided with slot opening 19 extending therethrough, the purpose of which will be clearly understood later.

Tamps 11 are removably carried by coupler blocks 20, which are slidably mounted upon guide rods 21 carried on the underside of hopper 2. One of the tamps is illustrated in detail in Fig. 7 and it will be noted that a removable pin 22 serves to removably attach each tamp to its coupler block, the pin extending in an inclined position through the coupler block and tamp, at the same time clearing the guide rods 21. The reason for removably attaching the tamps is to facilitate changing thereof when it is desired to pack different sized shells. Each tamp carries at its forward end a long pin 23. Each tamp preferably comprises a metal tube 24, a flat head plug 25 inserted in one end of the tube, and a wooden rod 25a inserted in the other end. The plugs may be sweated into the tubes or attached thereto in any other suitable manner. The flat surfaces of the heads of plugs 25 constitute tamping surfaces. Pins 23 may be formed integral with plugs 25 or may be attached thereto in any suitable manner. The pins are centrally located with respect to the tamping surface of plugs 25.

Actuating rods 26 are attached to coupler blocks 20 and these rods are reciprocally moved by any suitable means, such as the means illustrated in the above-mentioned Kimber patent. It is desired that the rods be actuated individually and automatically so as to pack the proper quantity of explosive powder in each of the shells, the respective rods and the tamps actuated thereby ceasing to operate when their particular shells are properly packed. The actuating mechanism which accomplishes this purpose forms no part of the present invention and need not, therefore, be described herein. Reference may be had to the Kimber patent for a complete disclosure of mechanism which is suitable for this purpose.

Tamps 11 are adapted to extend through openings in guide plates 27 carried by cross-beams. These plates are removably secured to the cross-beams by spaced metal wedges 28 (see Fig. 4). Rollers 29 secured to the cross beams insure registry of the guide

plate openings. A gang plate 30, through which the tamps are adapted to extend carries nipples 31 (see Figs. 5 and 8) through which the tamps also extend. These nipples are each formed so as to provide a beveled lip 32 at the forward end thereof. When a shell filled shuttle is in place in the machine, these lips seat nicely within the open ends of the various shells, as illustrated clearly at 33 in Fig. 6. By virtue of the lips and shoulders of the nipples, an effective seal is had about the open ends of the shells. Gang plate 30 is removably attached to its supporting beam so as to permit the use of different plates for varying sized shells.

In Figs. 9 to 11, the details of the shells and their supporting shuttle are more clearly illustrated. The machine is particularly adapted to pack explosive powder in a cylindrical shell having open ends. Such a shell is shown in Fig. 10, being preferably formed of two or more layers of kraft, manila or sulphite paper or combinations of these grades of paper. It may however be formed of other material, such as other paper or thin cardboard. This shell forms only one part of the explosive cartridge, but since the cartridge structure forms no part of the present invention, it is unnecessary to describe the details thereof herein. It suffices to state that the shell 10a serves as an envelope container for the powder. Reference may be had to copending application, Serial No. 623,651, filed July 20, 1932 for a disclosure of a preferred form of cartridge and method of making the same.

As clearly illustrated in Figs. 9 and 11, the shuttle, which may be formed of wood, comprises a base 34, a stationary part 35, and a movable part 36, the latter part being hinged to the base as illustrated. The parts 35 and 36 are provided with complementary recesses 37 and 38, respectively, each of the complementary pairs of these recesses being adapted to hold a shell, as clearly illustrated. Base 34 has a plurality of openings 40 therein, through which bushings 41 extend. These bushings are made of non-sparking metal or other suitable material such as wood, fibre, etc., since their bore openings serve as guides for pins 23, as set forth hereinafter. The circular heads 42 of the bushings are of substantially the same diameter as the inner diameter of shells 10a, so that the shells fit snugly over the heads of the bushings, as illustrated in Fig. 11. It will be apparent then that bushings 41 serve to partly close one open end of each of the shells. The shells may be placed in and removed from the shuttle in a manner which is obvious. It is contemplated, of course, that various sized shells will be loaded in the manufacture of various sized explosive cartridges and, therefore, the dimensions of

the shuttle will vary with the particular sized shell which it is to support.

Considering now the operation of the machine, a shuttle is first loaded with the required number of shells and is then placed in the machine as previously explained, the operator moving beam 13 downward to accomplish this operation. With beam 13 in lowered position, the shuttle may be readily placed upon beam 12 in such manner that the open ends of shells 10a encompass their respective nipples 31. The operator then allows beam 13 to rise under the influence of weights 15 and this beam, in conjunction with beam 12, firmly holds the shuttle with its supported shells in place. At this time, the slot opening 19 through beam 13 is in alignment with the openings through bushings 41. The tamp-actuating mechanism now functions, and the tamps insert the explosive powder within the shells and firmly pack or tamp it. During this operation, pins 23 extend through the shells, bushings 41 and beam 13. The pins are of such length that some part thereof always extends at least partially through the powder in the shell during tamping, even when the tamps are in their rearward position. The reciprocating action of the tamps and the tamping operation thereof is illustrated in Fig. 6, wherein a tamp is illustrated in its inoperative position and is also illustrated in broken lines in its operative or tamping position. The reciprocating movement of pins 23 through the packed powder maintains a central passage through the powder and also insures a smooth surface of the powder in the said passage. Opening 19 is purposely made larger than pins 23 so as to permit any slight amount of powder which rides through on the pins to fall away from them and not cause increased resistance to the free working of the tamps.

As previously stated, the tamps are individually operated so that as each shell becomes filled with the proper quantity of powder, the tamp ceases its operation. At this time the powder is packed in immovable form in the shell and a smooth central passage through the powder is provided. Upon cessation of all of the tamps, the shuttle with its packed shells is removed from the machine and another shuttle loaded with empty shells is inserted.

In Fig. 12, there is illustrated a modification in which the pins 23a, instead of being carried by the tamps, are fixedly mounted on bar 43 which extends longitudinally of beam 13 and is removably secured thereto by bolts or the like. Pins 23a extend transversely of the beam and through the slot opening 19 thereof. The pins also extend through bushings 41 and shells 10a. The tamps 11a are in this case provided with longitudinal recesses 44 adapted to slidably

receive pins 23a during the tamping operation. It will be apparent that the fixed pins will maintain the desired longitudinal passages through the shells, the tamps packing the powder about the pins. While attaining the desired end, this modification is less desirable than the preferred form, since it requires removal of bar 43 and the pins carried thereby when changing shuttles, and the central passage through the powder is not as nicely formed as in the case of reciprocating pins.

Although only two embodiments of the machine are disclosed herein, it will be understood that other changes and modifications in the construction of the machine may be resorted to without departing from the spirit and scope of the invention.

I claim:

1. In apparatus for packing explosive material in shells, shell supporting means, and means for tamping said material in the supported shells while maintaining central longitudinal passages therethrough, said last means comprising tamps adapted to enter said shells and carrying pins at the front ends thereof.

2. In apparatus for packing explosive material in shells having open ends, shell supporting means adapted to partly close one of the open ends of each shell, and means for tamping said material in the supported shells while substantially completely closing said one end of each shell and maintaining central longitudinal passages through the shells, said last means comprising tamps adapted to enter said shells and carrying pins at the front ends thereof, said pins extending into and filling the unclosed portion of the partly closed open ends during the tamping.

3. In apparatus for packing explosive material in shells, a shell-supporting shuttle, a plurality of reciprocally operable tamps adapted to enter said shells to pack said material therein, and means carried by said tamps for maintaining central longitudinal passages through said shells.

4. In apparatus for packing explosive material in shells, a shell-supporting shuttle, a plurality of reciprocally operable tamps adapted to enter said shells to pack said material therein, and pins carried by said tamps at the front ends thereof for maintaining central longitudinal passages through said shells.

5. In apparatus for packing explosive material in shells having open ends, a shell-supporting shuttle adapted to partly close one of the open ends of each shell, a plurality of reciprocally operable tamps adapted to enter said shells to pack said material therein, and means carried by said tamps for substantially completely closing said one

end of each shell and maintaining central longitudinal passages through said shells.

6. In apparatus for packing explosive material in shells having open ends, a shell-supporting shuttle adapted to partly close one of the open ends of each shell, a plurality of reciprocally operable tamps adapted to enter said shells to pack said material therein, and pins carried by said tamps at the front ends thereof for substantially completely closing said one end of each shell and maintaining central longitudinal passages through said shells.

7. In apparatus for packing explosive material in shells having open ends, a shell supporting shuttle adapted to partly close one of the open ends of each shell, said shuttle having openings centrally aligned with said shells and leading into the partly closed ends thereof, a supporting beam for said shuttle having a relatively wide slot aligned with said openings, a plurality of reciprocally operable tamps adapted to enter said shells to pack said material therein, and pins carried by said tamps for maintaining central longitudinal passages through said shells, said pins extending through said openings and said slot during tamping and filling the openings to substantially completely close said one end of each shell, said slot permitting material on said pins to drop off the same.

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