F. LEMING.

PRESS FOR ASSEMBLING SHELLS.

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1.302.185.

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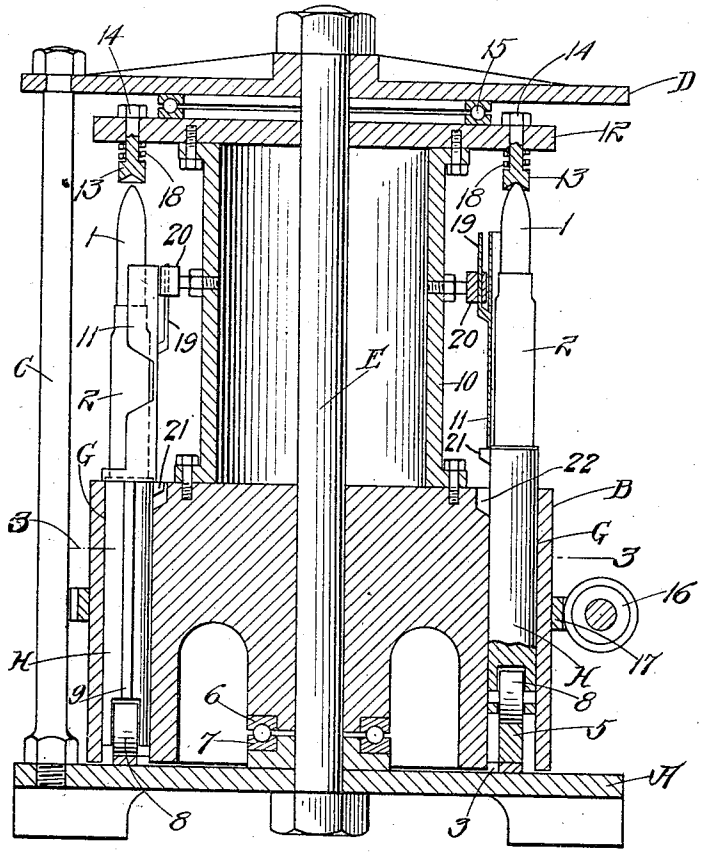


Fig. 2.

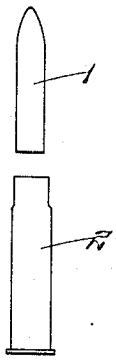


Fig. 1.

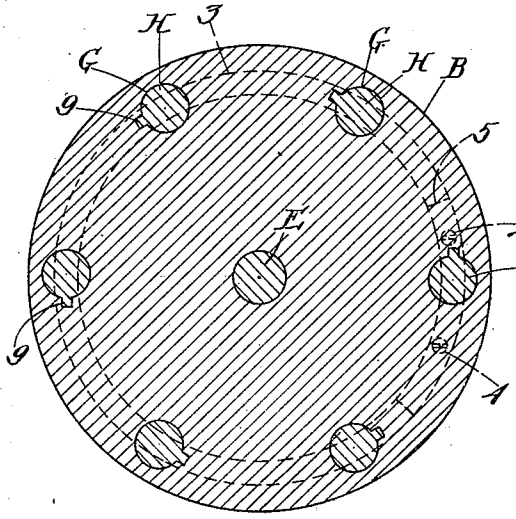


Fig. 3.

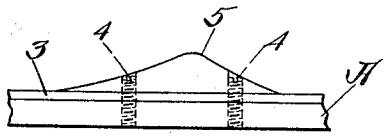


Fig. 4.

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UNITED STATES PATENT OFFICE.

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PRESS FOR ASSEMBLING SHELLS.

1,302,185. Specification of Letters Patent. Patented Apr. 29, 1919.

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To all whom it may concern:

Be it known that I, FRANK LEMING, a citizen of the United States, residing at Hingham, county of Plymouth, State of Massachusetts, have invented a certain new and useful Improvement in Presses for Assembling Shells, of which the following is a specification, reference being had therein to the accompanying drawings.

In the manufacture of ammunition commonly called "shells" the last or finishing operation consists in forcing the projectile bullet into the casing. As these two pieces fit together very closely it is a difficult operation and requires considerable time, and so far as I am aware it has always been done by hand, the workman taking the two pieces, fitting them together and driving the bullet into the casing by means of a hand press. My invention provides a machine by which the bullet may be forced into the casing quickly, and without any other movement on the part of the workman than the simple placing of the two parts together and putting them on the machine. By my improved device I am enabled to perform the operation very quickly, the workman being able to do a minimum of about sixty in a minute, whereas by the old method he could do only about one hundred and fifty in an hour, or about twelve hundred in an eight hour day.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features thereof are pointed out and clearly defined in the claims at the close of this specification.

In the drawings, Figure 1 is a view of the parts of a shell, namely the bullet and casing.

Fig. 2 is a vertical section of a machine for assembling the parts of the shell shown in Fig. 1, embodying my invention.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a detail view of the cam.

Referring to the drawings, at 1 and 2 respectively are shown the bullet and casing of a shell, before they are assembled.

A is a base plate, which may be attached to the floor or table, or other convenient support. B is a revolving drum or head rotatably mounted on a central shaft E. The top plate or head D, which is stationary is fixed on the central shaft E and is supported by a plurality of posts or supports C, the exact number being immaterial.

The base plate A has a circular track 3 on which is removably mounted by means of screws 4, a cam 5 of hard metal, which also forms a part of the track 3. The lower face of the drum B is provided with one element 6 of a ball bearing which coöperates with the other element 7 which is mounted on the base plate A.

In the drum B there are formed a plurality of circular openings G, which I have shown as six in number, and in practice I have found this to be the preferable number. In the six openings G are fitted long cylindrical plungers H, which are provided at their lower ends with rollers 8 by which they are enabled to run along the track 3 which is placed on the base plate A directly beneath the openings in the drum B. The rods or plungers H are provided with keys 9 which are seated in keyways in the drum B in order to keep the rollers 8 always in proper alinement with the track 3. The rods H are freely movable in the openings G so that when they reach the portion of the track on which the cam 5 is mounted they may slide or push up through the top of the drum, as will be later described. The upper surfaces of the plungers H are normally flush with the top of the drum, the rollers resting on the track 3. The amount which the rods H will rise above the top of the drum will vary with the height of the cam 5 and the height of the cam will be governed by the size of the shell which the workman is assembling. If the workman desires to assemble a shell of larger caliber, he simply puts on a cam of the proper size by means of the screws 4.

On top of the drum B and fastened thereto and revolving therewith is a second drum 10 of hollow construction on which are fitted holders 11 for the shells. The shells are placed in these holders for the operation of pressing in the bullet. The holders may be of any preferred form, but in the drawings I have shown them as consisting of a spring metal clamp, semi-circular in cross section to conform to the rounded shape of the casing of the shell. The casing and bullet fit within this clamp which is held during the revolution of the drum and may be easily removed. These holders are freely movable in a vertical direction and move with the

shell during the pressing operation. In order to connect the holders 11 with the drum 10 each holder is formed with a finger 19 which is connected with the side of the holder toward the drum being slightly offset therefrom and then extending vertically upward as shown in Fig. 2 and the drum 10 has secured to one side thereof a projection 20 formed with a vertical guide slot therein in which the finger 19 is loosely engaged. This projection 20 is shown in the drawings as being connected with the drum 10 by means of a screw threaded shank portion which is screwed into a hole in the side of the drum 10. The lever end of the holder is formed with a projection 21 which when the holder is in its lowermost position as shown in the left hand side of Fig. 2, engages with the slot 22 in the lower drum B. The base of the holder 20 is of a little larger diameter than the diameter of the plunger socket and when in its lowermost position the holder will rest upon the rim of the plunger socket in the drum B.

Mounted fast on the drum 10 is a plate 12 which has holes corresponding in number with the holes G in the drum B and registering therewith. In these holes are fitted yielding abutments 13. These abutments are exactly in line with the plungers H and are provided with heavy coil springs 18, on the underside of the plate 12 and with nuts 14 on the top of the plate 12 to hold the abutments in place.

Between the plate 12 and the head D are a second set of ball bearings 15 to provide for the smooth running of the machine.

The whole device rests at a convenient height for the workman to work at the holders, and is driven by a worm and worm gear, as indicated at 16 and 17, or by any other convenient means.

The machine is running constantly, and the operator standing in front of the machine simply puts together the two parts of the shell, that is the casing 2 and the bullet 1, and places them within the holder 11, on top of one of the plunger rods H in the drum B. The revolving drum carries it around, and when the rod H reaches the cam 5 in its travel it rises carrying the shell up with it, thus forcing the bullet firmly against the abutment 13 which acts as a yielding stop and the continued upward movement of the rod carrying the casing presses the bullet into the casing.

When the rotation of the drum has carried the plunger rod past the high point of the cam the plunger will descend again to its normal position on the level of the track, its descent being facilitated by the expansion of the spring 18. The operator simply has to remove the finished shell as it reaches him and replace it with another to be pressed as described.

While I have shown my invention as embodied in a machine for forcing a bullet into a casing, it is obvious that it is applicable to other machines for similar operations.

What I claim is—

1. A machine for automatically forcing a bullet into a casing of a shell having a movable carrier provided with a plurality of movable plungers, a plurality of casing and bullet holders mounted on the carrier, and means whereby each plunger forces a casing into engagement with a bullet each time a plunger reaches a predetermined point in its travel with the carrier.

2. A machine for assembling a casing and a bullet to form a shell, said machine having a movable holder to hold the casing and the bullet in alinement with each other, a movable plunger which engages the lower end of the holder and casing, means for moving the plunger and thereby the holder and casing and bullet in a lineal direction, and an abutment with which the bullet is brought into engagement by the lineal movement of the holder and casing to thereby press the bullet into the casing.

3. A machine for automatically assembling a casing and a bullet to form a shell, said machine having a rotary carrier formed with a hole therein, a plunger rod movable in said hole, one end of said plunger forming a seat for the casing of a shell, a holder to hold a casing and bullet in axial alinement with each other, a yielding abutment above each holder, means for rotating said carrier and means which during the rotation of the carrier actuate said plunger longitudinally to press the bullet against the abutment and force the casing and bullet into assembled relation to each other.

4. A machine for assembling a casing and a bullet to form a shell, said machine having a rotary member formed with a vertical hole therein, means for rotating said rotary member, a plunger mounted in said hole and vertically movable therein, the plunger being carried by said rotary member during its rotation, a track beneath said rotary member on which the lower end of said plunger is seated, the upper end of said plunger forming a seat for the casing of a shell, a holder to hold the casing and bullet in axial alinement with each other, an abutment above the holder, means whereby when the plunger reaches a certain point in its travel on the track during the rotation of its carrier, it will be given a vertical movement, whereby the casing mounted thereon will be given an axial movement and press the bullet against said abutment and thereby force the casing and bullet into assembled relation to each other.

5. A machine for assembling a casing and a bullet to form a shell said machine having in combination a rotary member having a

vertical hole therein, means for rotating said rotary member, a plunger mounted in said hole and vertically movable therein, the plunger being carried by said rotary member during its rotation, a track beneath said rotary member on which the lower end of said plunger is seated, the upper end of said plunger forming a seat for the casing of a shell, a holder to hold the casing and bullet in axial alinement with each other, a yielding abutment in alinement with the bullet, means whereby when the plunger reaches a certain point in its travel over the track during the rotation of the carrier the plunger will be given a vertical movement and thereby move the casing to press the pullet into engagement with the abutment and force the bullet into the casing.

6. A machine for assembling a casing and a bullet to form a shell, said machine comprising a rotary member having a plurality of vertical holes therein, means for rotating said member continuously, a plunger mounted in each of said holes and vertically movable therein, the said rotary member forming a carrier for the plungers, a track beneath said rotary member on which the lower end of each plunger rests and on which it rides during the rotation of the said carrier, the upper end of each plunger forming a seat for the casing member of a shell, a holder to hold the casing in axial relation to the bullet during said rotation, means whereby when the plunger reaches a predetermined point in its travel on the track the plunger will be given an upward movement to press the casing and bullet into assembled relation to each other, an abutment for the upper end of the bullet during the pressing operation and means whereby in the continued rotation of the carrier the plunger will be retracted and carry the assembled casing and bullet to a position to be removed.

7. A machine for assembling a casing and a bullet to form a shell, said machine comprising a rotary frame, a plunger mounted in said frame and vertically slidable therein, the upper end forming a seat for the casing part of the shell, a holder for a casing and bullet, means for rotating the frame and means whereby at a predetermined point in the rotation of the frame the plunger will be given a vertical movement in a direction to force the casing and the bullet into assembled relation to each other.

8. A machine for assembling a casing and a bullet to form a shell, said machine comprising a rotary frame, a plunger mounted in said frame and vertically slidable therein, the upper end forming a seat for the casing part of the shell, a holder for a casing and bullet, means for rotating the frame, means whereby at a predetermined point in the rotation of the frame the plunger will be given a vertical movement in a direction to force the casing and the bullet into assembled relation to each other, and means whereby in the further movement of the frame the plunger is retracted.

9. A machine for assembling a casing and a bullet to form a shell, said machine comprising a rotary head having a plurality of plungers vertically slidable therein, the upper end of each plunger forming a seat for the casing member of a shell, means for rotating said head on its axis, a circular track beneath the said head on which the lower ends of the plungers ride, the upper end of each plunger forming a seat for a bullet, a plurality of holders mounted to rotate with the said head, each holder being positioned to hold a casing and a bullet in axial alinement with each other above one of the plungers during its rotation, means whereby when a plunger reaches a predetermined point in its travel on the track the plunger will be given a vertical movement upward to press the casing and the alined bullet into assembled relation to each other and a stop for the upper end of the bullet.

10. A machine for assembling a casing and a bullet to form a shell, said machine comprising a rotary head having a plurality of plungers vertically slidable therein, the upper end of each plunger forcing a seat for the casing member of a shell, means for rotating said head on its axis, a circular track beneath the said head on which the lower ends of the plungers ride, the upper end of each plunger forming a seat for a bullet, a plurality of holders mounted to rotate with the said head, each holder being positioned to hold a casing and a bullet in axial alinement with each other above one of the plungers during its rotation, a cam formation in the track which when the plunger rides over the cam will cause the plunger to move vertically upward, and then down again, the plunger in its upward movement pressing into assembled relation the casing seated thereon and the alined bullet, and a spring seated stop above the bullet with which the bullet is caused to engage when the shell is forced into engagement with the bullet.

11. Mechanism for automatically forcing a bullet into a casing to form a shell, said mechanism consisting of a movable carrier having a plurality of vertically slidable plungers mounted therein, the upper end of each plunger forming a seat for a casing of a shell, a plurality of holders moving with said carrier, each holder being positioned to hold a casing and bullet in axial alinement with one of the plungers, an abutment above the plunger and means whereby at a predetermined point in the movement of the carrier one of the plungers will be moved in a direction to press the bullet in the casing seated thereon into engagement with the abutment alined therewith.

12. Mechanism for automatically forcing a bullet into a casing to form a shell, said mechanism consisting of a movable carrier having a plurality of vertically slidable plungers mounted therein, the upper end of each plunger forming a seat for a casing of a shell, a plurality of holders moving with said carrier, each holder being positioned to hold a casing and a bullet in axial alinement with one of the plungers, an abutment above the plunger, means whereby at a predetermined point in the movement of the carrier one of the plungers will be moved in a direction to press the bullet in the casing seated thereon into engagement with the abutment alined therewith, and means whereby the said bullet with its casing are separated from engagement with the abutment in the continued movement of the carrier.

13. A machine for assembling a casing and a bullet to form a shell comprising a holder for a casing and bullet, an abutment for the outer end of the bullet, a plunger on which the lower end of the casing is seated, and means for automatically moving said plunger and the casing holder in a direction to press the bullet against the abutment and thereby force the bullet into the casing.

14. A machine for assembling a casing and a bullet for a shell, said machine having in combination a carrier rotatable on its axis and formed with a plurality of plunger openings therein, a plurality of plungers vertically slidable in said openings, a plurality of yielding presser members mounted in alinement with said plungers, the upper end of each plunger forming a seat for the casing member of a shell, means for rotating said carrier and carrying with it said plungers and presser members, and means whereby when a plunger reaches a certain point in its circular path of movement with the rotating carrier it will be also moved longitudinally upward carrying the casing seated thereon toward one of the presser members.

15. A machine for pressing together elements of a munition shell having mechanism for holding two of the elements in axial relation to each other, means for pressing one of said elements into engagement with the other, means for causing said holder and said presser to travel in an endless path, means for causing the presser to become operative at a certain point in the path of travel, and means for retracting the presser at a certain point after it has been operative.

16. A machine for pressing together elements of a munition shell comprising a carrier having a plurality of mechanisms for holding two of the elements in axial relation to each other, mechanism for pressing said two elements together into assembled relation, means for moving the carrier so as to cause the said holder and pressing mechanisms to travel in an endless path, and means for bringing the presser member and the said two elements into operative action at a predetermined point in their path of travel.

17. A machine for pressing together elements of a munition shell comprising a carrier having a plurality of mechanisms for holding two of the elements in axial relation to each other, mechanism for pressing said two elements together into assembled relation, means for moving the carrier so as to cause the said holder and pressing mechanisms to travel in an endless path, means for bringing the presser member and the said two elements into operative action at a predetermined point in their path of travel, and means for causing the presser mechanism to be moved out of engagement with the assembled elements at a point in their travel after they have been pressed together.

In testimony whereof I affix my signature.

FRANK LEMING.