H. A. STILLWELL.

SHUTTLE FOR HOLDING SHELLS.

APPLICATION FILED MAR. 19, 1908.

918,606. **Patented Apr. 20, 1909.**

2 SHEETS—SHEET 1.

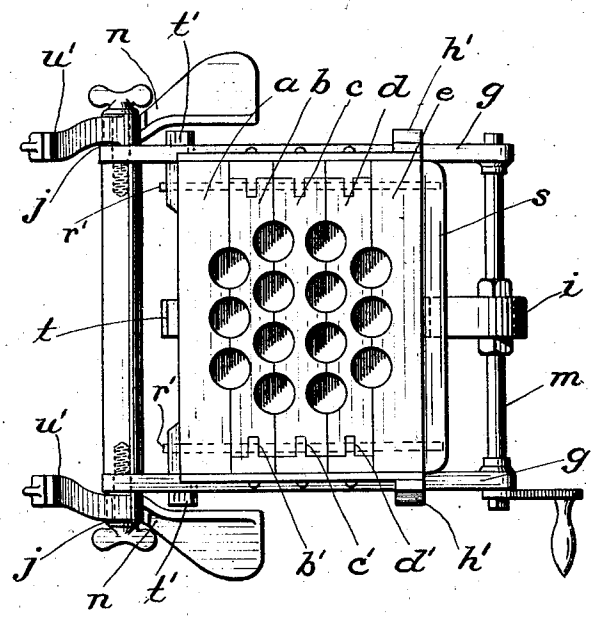


FIG. 1.

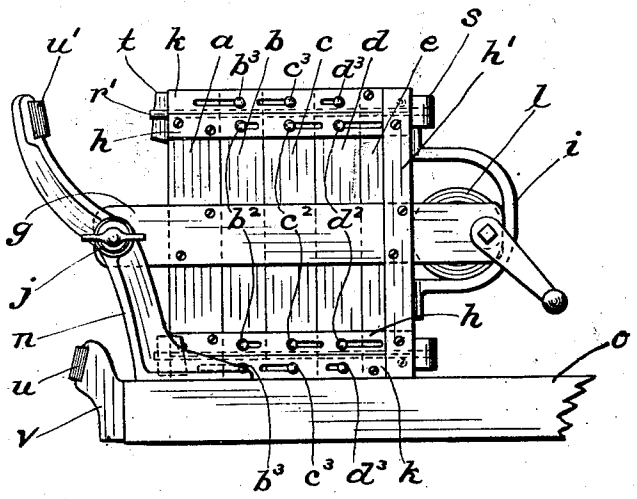


FIG. 2.

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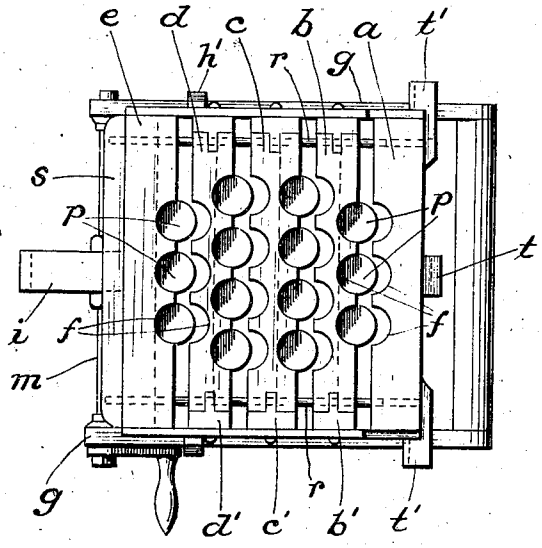


FIG. 4.

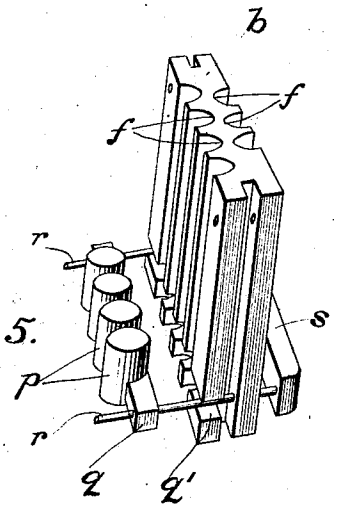


FIG. 5.

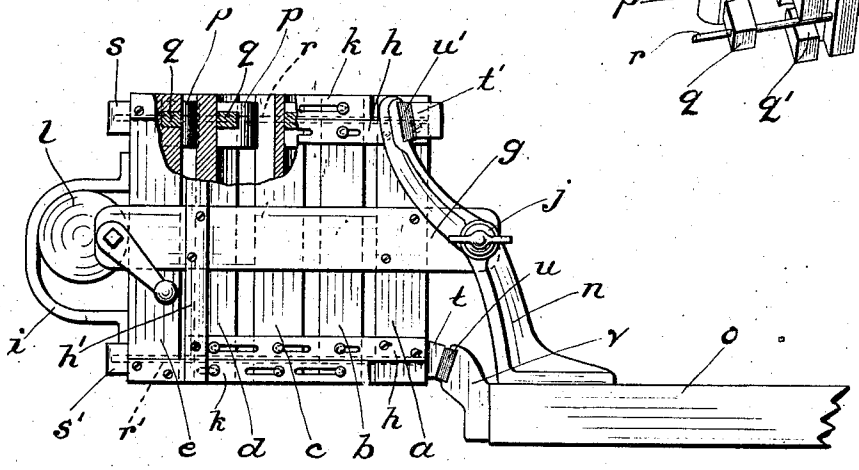


FIG. 3.

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UNITED STATES PATENT OFFICE.

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SHUTTLE FOR HOLDING SHELLS.

No. 918,606. Specification of Letters Patent. Patented April 20, 1909.

Application filed March 19, 1908. Serial No. 422,179.

To all whom it may concern:

Be it known that I, HOWARD A. STILLWELL, a citizen of the United States, residing at Woodbury, county of Gloucester, and State of New Jersey, have invented a new and useful Improvement in Shuttles for Holding Shells, 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.

My invention relates to shuttles adapted to form receptacles for shells while they are being filled with explosive material.

The object of the invention is to so construct the shuttle that it may be readily manipulated and adjusted to receive, retain, and discharge the shells.

In the accompanying drawings I have illustrated one embodiment of my invention designed for application to a shuttle adapted to be secured to a revolving table that is brought into line successively with the shell-feeding and shell packing devices, and adapted to be operated to discharge the shells without removal from the table. It will be understood, however, that the invention is also adapted for application to a shuttle intended to be filled and discharged by means of any appliances or even by hand, and I have therefore not illustrated any appliances for coacting therewith except the table to which it will ordinarily be secured.

In the drawings, Figure 1 is a plan view of the shuttle with the leaves in position to hold the shells; Fig. 2 a side elevation of the same applied to a table; Fig. 3 is a side elevation partly in section of the shuttle swung into the discharge position and with the leaves in position to permit ready discharge; Fig. 4 is a plan view of the same; Fig. 5 is a perspective detail view.

a, *b*, *c*, *d*, *e* represent the leaves of the shuttle; each leaf except the front leaf *a* and rear leaf *e* have in each side semi-cylindrical vertically extending grooves or recesses *f* complementary to similar grooves or recesses in the opposing side of the next adjacent leaf; the leaves *a* and *e* having such recesses only in their inner sides. The intermediate leaves are shorter, horizontally considered, than the outer leaves, and are grooved in their ends to receive tongues formed on the plates *b'*, *c'*, *d'*, the outer faces of the latter being flush with the ends of the leaves *a* and *e*.

The front leaf *a* is secured to the side bars *g* and has secured to it the slide bars *h* having horizontal slots engaging pins b^2, c^2, d^2 on the plates *b'*, *c'*, *d'* respectively. The latter also have pins b^3, c^3, d^3, engaging horizontal slots in the slide bars *k* secured to the rear leaf *e*. The slide bars *h* are connected together on each side of the shuttle by spacing bars *h'*. The rear leaf *e* has secured to its outer face a cam *i* engaged by a roller *l* secured to a crank shaft *m* turning in bearings in corresponding ends of the side-bars *g*. The opposite ends of the side bars *g* are pivoted on trunnions *j* supported on standards *n* bolted to the table *o* and threaded in the ends of a spacing bar extending between the side bars.

To close the lower ends of the shell receptacles formed by the semi-cylindrical recesses *f*, there are provided a number of plugs *p*, which are preferably removable. In the drawings (see particularly Fig. 5) each row of plugs corresponding to each row of shell receptacles formed by complementary recesses in adjacent leaves is shown as secured to a bar *q* adapted to enter a transverse groove *q'* formed in one of such leaves. A pair of rods *r* extend through alining orifices formed in the lower end of all the leaves, in the lower ends of the tongues of the plates *b'*, *c'*, *d'*, and in the bars *q*, the rods being connected at one end by the yoke *s*. Similar rods *r'* extend through orifices in the upper ends of the leaves and plates and these rods are connected at one end by the yoke *s'*. Thus the leaves are secured to the end plates and the plugs retained within the receptacles. By making the intermediate leaves separate from the end plates, the leaves with the plugs, may be removed by withdrawing the rods *r*, *r'*, without disturbing the plates and thus without disturbing the pin and slot actuating mechanism; and by passing the rods *r*, *r'* through both the intermediate leaves of the tongues of the corresponding plates, each intermediate leaf and its corresponding plate is rigidly secured together in operation. The removability of the plugs is not only desirable for purposes of inspection and repair, but also for the purpose of enabling other plugs of different length to be substituted, thus making provision for adjusting the length of the receptacles to accommodate shells of different length.

Preliminary to filling the shuttles, the latter rests on the table, as shown in Fig. 2; and the leaves are moved from the closed posi-

tion shown in that figure and in Fig. 1 to the open position shown in Figs. 3 and 4, this being effected by turning the crank shaft m, thereby causing the roller l to work against the cam i. This causes the leaf e to move away from its adjacent leaf d the slide bars k moving with the leaf e. When the end walls of the slots registering with the pins d^3 in the end plates d' of leaf d engage said pins, the leaf d begins to partake of the movement of leaf o. The leaf d now moves away from its adjacent leaf c. When the end walls of the slots registering with the pins c^3 in the end plates c' of leaf c engage said pins, the leaf c begins to partake of the movement of leaves e and d. The leaf c now moves away from its adjacent leaf b. When the end walls of the slots registering with the pins b^3 in the end plates b' of leaf b engage said pins, the leaf b begins to partake of the movement of leaves e, d and c. The leaf b now moves away from the outer leaf a. During the foregoing movements, the pins d^2 have been moving in their corresponding slots in the slide-bars h; and after the leaf b has moved away from leaf a a certain distance, the pins d^2 will all have advanced to the ends of their corresponding slots thus limiting their further movement.

It will be observed that the slots registering with pins d^3 are of progressively increasing length from d and b, thus causing the movement of leaf e to be picked up successively by the leaves d, c and b. It will also be observed that the slots registering with pins d^2, c^2, b^2, are also of progressively decreasing length, so that the movement of all the movable leaves will be simultaneously stopped. It will be understood, however, that the length of the slots might be prolonged in one direction, although such prolongation would be functionless, the only requirement being that the distance between the pins and the farther ends walls of their respective slots, when the shuttle is closed, shall vary as described.

When the shuttle is in the open position to which it has been brought by the operation just described, the shuttle is ready to receive the shells, which may be done either by hand or by automatic mechanism. When the shuttle is filled, the crank shaft m is returned to its original position, thus causing the cam i to work against the leaf e, and causing the several leaves e, d, c, and b to successively begin to move forward and all of them to simultaneously return to their original position. After the shuttle is thus closed the shells are firmly held in their receptacles and are ready to be filled. After they are filled, they are ready to be discharged. This may be done by again opening the shuttle as hereinbefore described and withdrawing the shells by hand; but more conveniently, the shuttle may be first swung on its pivot from the position shown in Figs. 1 and 2 to the reversed position shown in Figs. 3 and 4, and then the shuttle may be opened, permitting the shells to drop out.

I have shown stops t and t' secured to the front shuttle a and adapted, when the shuttle is swung into its reversed position, to respectively engage stops u and u' secured respectively to brackets v on the table o and to the top of the standards n.

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

1. A shell holding shuttle comprising a series of leaves, adjacent leaves having complementary shell recesses formed in their opposing sides and forming shell receptacles, plugs in said receptacles, and means for removably holding said plugs in position.

2. A shell holding shuttle comprising a series of leaves, adjacent leaves having complementary shell recesses formed in their opposing sides, extensible devices connecting the several leaves, and actuating mechanism for moving said devices into their extended positions, thereby opening the leaves of the shuttle.

3. A shell holding shuttle comprising a series of leaves, adjacent leaves having complementary shell recesses formed in their opposing sides, extensible devices connecting the rear leaf of the series with each of the other leaves except the front leaf, and actuating mechanism, engaging the rear leaf, for retracting the same, thereby, through said extensible devices, retracting all the leaves except the front leaf from the next adjacent leaf.

4. A shell holding shuttle comprising a series of leaves, side-bars connected with the front leaf of the series, coöperating leaf actuating mechanism connected respectively to said side bars and the rear leaf of the series, and extensible connecting devices between adjacent leaves.

5. A shell holding shuttle comprising a series of leaves, side-bars connected with the front leaf of the series, a cam connected with the rear leaf of the series, a cam-roller connected to the side-bars, and extensible connecting devices between adjacent leaves.

6. A shell holding shuttle comprising a series of separable leaves, slotted slide bars secured to the rear leaf of the series, pins on the intermediate leaf or leaves working in said slots and at varying distances from corresponding end walls thereof, and actuating mechanism for moving the adjacent leaves away from or toward each other.

7. A shell holding shuttle comprising a series of leaves, slotted slide bars secured to the rear leaf of the series, pins on the intermediate leaves working in said slots, the arrangement of the slots being such that when the leaves are closed the distance from the

pins to the front walls of their respective slots progressively increases toward the front leaf, and actuating mechanism for applying a pulling force to the rear leaf of the series.

8. A shell-holding shuttle comprising a series of leaves, extensible connecting devices between adjacent leaves, actuating mechanism for applying a pulling force to the rear leaf of the series, and stop mechanism connecting adjacent leaves to limit their relative movement.

9. A shell holding shuttle comprising a series of leaves, slotted slide bars secured to the rear leaf of the series, pins on the intermediate leaf or leaves working in said slots, slotted slide bars secured to the front leaf of the series, pins on the intermediate leaf or leaves working in the last-named slots, the arrangement of the latter being such that when the leaves are closed the distance from the pins to the rear walls of such slots progressively decreases toward the front leaf, and actuating mechanism for applying a pulling pressure to the rear leaf of the series.

10. A shell-holding shuttle comprising a series of leaves, a plate removably secured to and forming the ends of each intermediate leaf, and extensible connecting devices between adjacent leaves, said connecting devices being connected to the plate of each intermediate leaf, thereby enabling the leaves to be separately withdrawn without disturbance of the connecting devices.

11. A shell holding shuttle comprising a series of leaves, adjacent leaves having complementary shell recesses formed in their opposing sides and forming shell receptacles, plugs in said receptacles, bars, each extending into grooves in one of the leaves and carrying a row of said plugs, and rods extending through said leaves and bars.

12. A shell holding shuttle comprising a series of leaves, adjacent leaves having complementary shell recesses formed in their opposing sides and forming shell receptacles, plugs in said receptacles, a plate, forming the end of each intermediate leaf, having a tongue extending within a groove in said leaf, bars, one between each two adjacent leaves extending within a groove in one of such leaves and carrying a row of said plugs, and rods extending through said leaves, plate and bars.

13. A shell holding shuttle comprising a series of separable leaves, side bars extending along opposite ends of the leaves, a table, and a bracket thereon on which said side bars are pivotally mounted.

14. A shell holding shuttle comprising a series of separable leaves, a table, said shuttle being pivotally mounted thereon so as to be capable of reversal, and coacting stops, on the table and shuttle respectively, adapted to limit the movement of the shuttle when reversed.

15. A shell holding shuttle comprising a series of three or more leaves, means to apply a pulling face to the first leaf, and devices secured respectively to the first leaf and the second leaf adapted to contact one with the other after the first leaf has been pulled a predetermined distance, thereby successively spacing the first leaf from the second leaf and the second leaf from the third leaf.

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

HOWARD A. STILLWELL.

Witnesses:
EDWARD P. HENRY,
DAVID O. WATKINS.