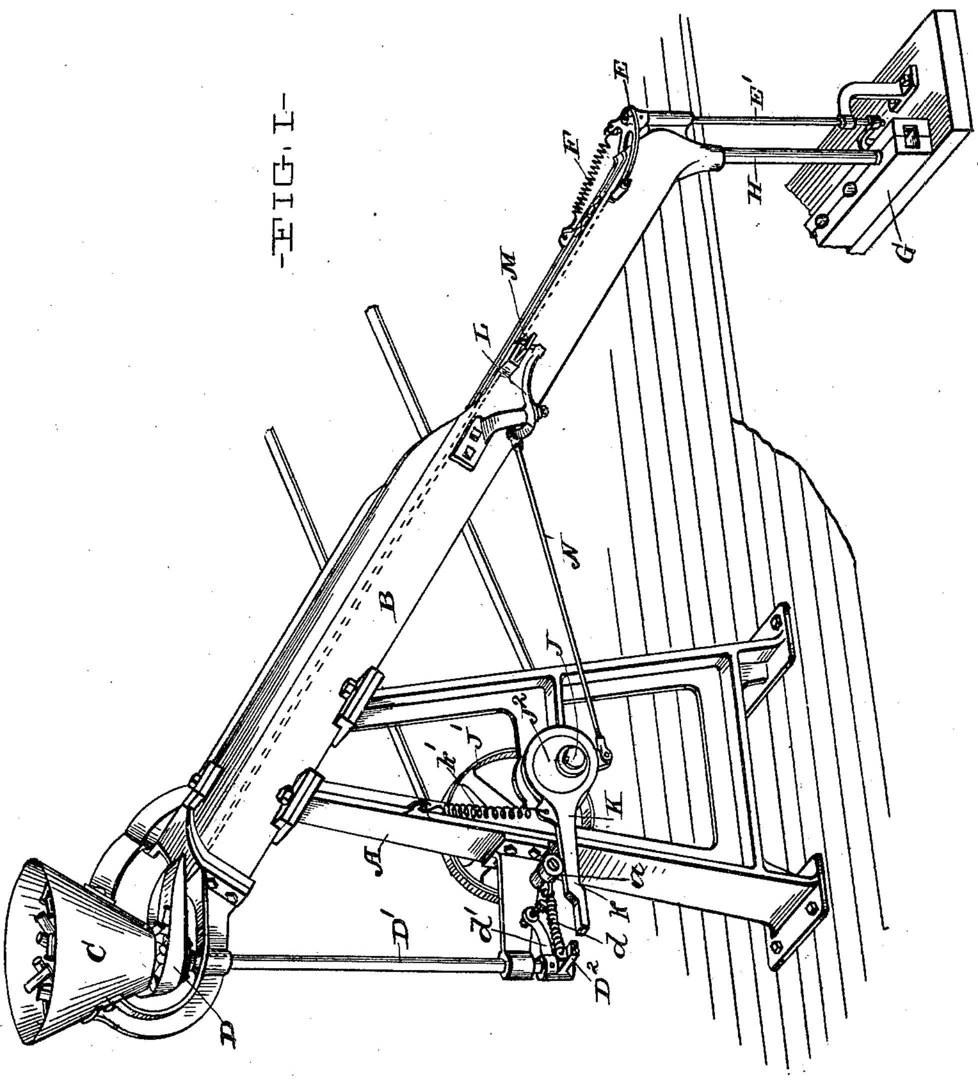
No. 676,761. Patented June 18, 1901.

W. L. MORRIS.
SHELL FEEDING DEVICE.

(Application filed June 4, 1900.)

(No Model.) 3 Sheets—Sheet 1.

FIG. I



Witnesses,
J. C. Turner
A. E. Merkel

Inventor,
Wm L. Morris
By J. D. Fay
Atty.

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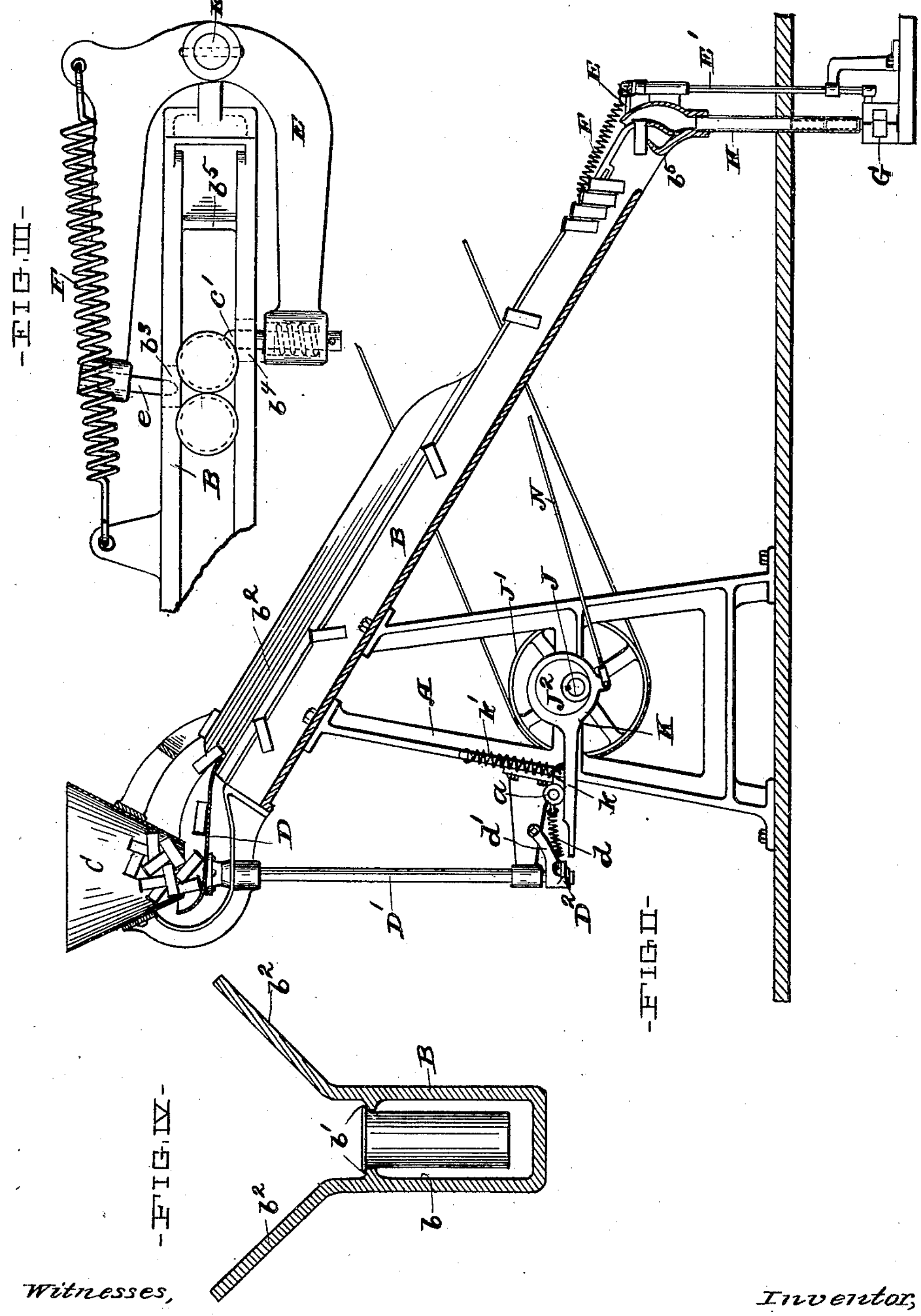

Witnesses,

J. C. Turner

N. E. Merkel

Inventor,

Wm L. Morris

By J. B. Fay

Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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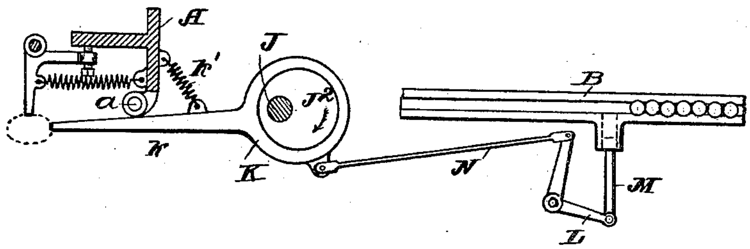
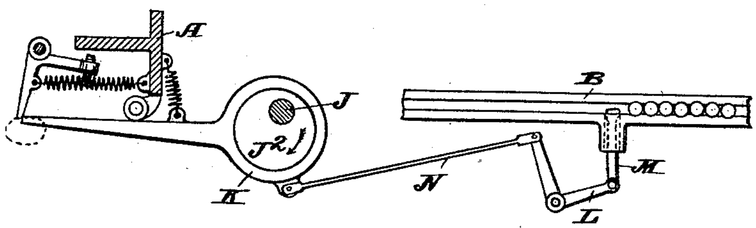
3 Sheets—Sheet 3.

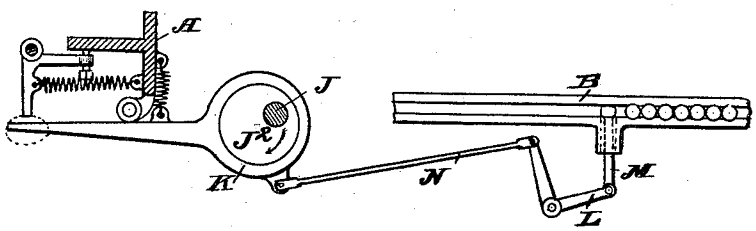
-FIG.V-



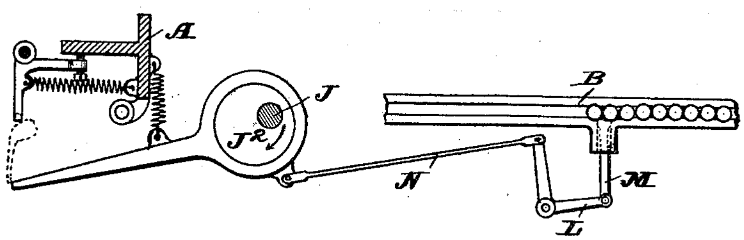
-FIG.VI-



-FIG.VII-



-FIG.VIII-



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Atty.

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UNITED STATES PATENT OFFICE.

WILLIAM L. MORRIS, OF CLEVELAND, OHIO, ASSIGNOR TO THE AUSTIN CARTRIDGE COMPANY, OF SAME PLACE.

SHELL-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 676,761, dated June 18, 1901.

Application filed June 4, 1900. Serial No. 18,997. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. MORRIS, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Shell-Feeding Devices, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to devices for feeding empty shells to shell-loading machines; and it consists of means hereinafter fully described.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a perspective view of my improved shell-feeding device, showing also a shell-carrier of a shell-loading device. Fig. II represents a partial longitudinal section of the device, showing the frame and certain portions in elevation. Figs. III and IV represent enlarged detail views. Figs. V, VI, VII, and VIII represent diagrammatic views of a portion of the mechanism.

Upon an upright frame A is secured an inclined runway B, to the topmost portion of which is secured in a stationary manner a shell-hopper C, which discharges into a shell receiver or pan D, Fig. II. Said runway is formed with a groove or shell-channel b, formed throughout its length, as shown, and having a transversely-projecting rib b' on each of its respective sides, forming a contracted channel portion. The width of such contracted portion is made somewhat greater than the diameter of the size of shell which it is desired to feed, but somewhat less than the diameter of the shell-flange at the closed shell end, whereby it is seen that shells may be supported and conducted in said channel with their closed ends up, as shown in Fig. II. Extending upwardly and laterally from the upper edge of each side wall of said channel is an inclined wall b^2 b^2, Figs. I and IV, such walls extending from the top of the runway downwardly and terminating at a point intermediate of the extremities thereof, as shown, forming a trough at the upper portion of said runway. At the lower extremity of the runway is secured upon an upright shaft E′ a transversely-movable bell-crank E, of U shape, as shown in Fig. III, having in its extremities two oppositely-projecting and substantially parallel pins e and e', respectively, the one being located at a distance from the pivotal center greater by substantially the diameter of a shell than is the other. To one arm of said crank is secured one end of a spring F, whose opposite end is secured to the runway, as shown in said Fig. III. The lower end of said shaft E′, Fig. II, is provided with a suitable connection with the shell-carrier G of the loading device, whereby it may be given one oscillatory stroke against the action of spring F, then released, said spring imparting the opposite stroke to complete the oscillation. The pins e and e' are respectively located opposite two apertures b^3 and b^4, Fig. IV, which penetrate the side walls of the channel b, whereby said pins may be caused to intersect the path of the shells on their downward movement. Said pins are of a length such that upon oscillation of the crank E the one pin leaves the shell-path simultaneously with the entrance of the other.

Secured to the bottom of the lower end of the runway is a delivery-tube H, forming a duct for conducting the shells to a receiving-aperture in the shell-carrier G. Intermediately of the contiguous ends of the said tube and the shell-channel is an upright wall b^5, whose upper edge projects into the path of the lower part of the shells while traversing the lower extremity of its path of movement in the runway. The side walls of the channel terminate at a point such that a shell upon striking said wall may be caused to be inverted, escaping the wall-terminals, and be discharged into the delivery-tube in such inverted position, a shell during such inverting operation being illustrated in Fig. II.

The shell-receiver D is mounted upon and secured to the upper end of an oscillatory shaft D′, mounted in suitable bearings in brackets secured to the machine-frame, as shown in Figs. I and II. Secured to the lower extremity of said shaft is a laterally-extending arm D^2, having secured thereto one end of a helical spring *d*, the other extremity of which is secured to the frame A or any suitable portion of the machine stationarily secured or attached to said frame. A stop-arm *d'* is so secured to or formed upon said shaft as to contact the lower bracket supporting the latter and limit the movement of the shaft resulting from the force exerted by spring *d* upon it.

A driving-shaft J is transversely mounted in suitable bearings in the frame A, having secured thereto at one end a driving-pulley J' and at the opposite end an eccentric J^2. An eccentric-strap K is supported upon said eccentric and has formed on or secured thereto an extension *k*. One end of a spring *k'* is secured to said extension, the opposite end of which is secured above to the frame, as shown in Figs. I and II. Said spring maintains contact between the upper surface of the extension and a roller *a*, bearing upon a journal secured to the frame. During such contact the direction of the extension is such that the path of its free extremity resulting from the reciprocal movement derived from the eccentric intersects the extremity of the arm D^2, as shown in dotted lines in Figs. V, VI, and VII.

A bell-crank L is pivoted upon the runway at a point intermediate of the extremities thereof, one arm of which engages a slide M, mounted in a slide-bearing located transversely with respect to the shell-channel, such bearing penetrating the side wall and permitting the slide to be reciprocated, so as to intersect the channel—that is, the path of the shells in said channel. To the other arm of crank M is secured one end of a rod N, whose opposite end is secured to the eccentric-strap K, as shown in Fig. I. The lengths of the arms of the crank L are such that the reciprocal movement of the slide M will be of a length such that its inner extremity may be caused upon one stroke to be completely withdrawn from the path of the shells in the channel.

In the diagrammatic views, Figs. V, VI, VII, and VIII, the plane of movement of the bell-crank L and the plane of the shell-channel are for convenience and for greater facility in illustration and for understanding the movement of the connected parts shown to be parallel with the plane of movement of the eccentric-strap and the extension *k*, these planes being located transversely relatively to each other in the machine, as illustrated in Figs. I and II.

The device operates as follows: The hopper C is filled with shells, promiscuously placed therein, as illustrated, a part of such shells falling upon and resting in the receiver D. The driving-pulley J' being now rotated and the shell-carrier G reciprocated, the eccentric-strap extension is reciprocated, its extremity describing an elliptical path, (indicated in dotted lines in Fig. V,) and the slide M is reciprocated into and out of the shell-channel. The bell-crank E is oscillated by the shell-carrier, such oscillation effecting the alternate entrance and withdrawal of the pins into and from the shell-channel. At a point in the path of the extremity of extension *k*, Fig. V, the arm D^2 is engaged thereby, shaft D' and receiver D given one oscillatory stroke, and upon further movement of said extension are released, spring *d* returning said arm, shaft, and receiver to their original positions, thereby completing the oscillation of the receiver. Such oscillation causes one or more shells to be discharged from the receiver between the side walls b^2, whence they are caused to fall into the channel *b*. The width of such channel being, as before described, greater than the diameter of the shell-body, but less than the diameter of the head-flange, such shells are placed therein with their open ends down and are conducted downwardly in the runway in such position, the inclination of said runway being sufficiently great to cause the shells to travel in such direction as a result of the action of gravity. On reaching the lower portion of the channel the endmost shell strikes one of the pins *e* or *e'* and is arrested. In case such arrest is made by pin *e* the subsequent oscillatory stroke of crank E withdraws same from the channel, releasing such shell, which thereupon continues downwardly until it strikes pin *e'* and is again arrested. The subsequent stroke of said crank withdraws this pin, releasing the shell, which progresses farther toward the channel end until its lower end is engaged by the wall b^5. The upper portion of the shell continues in its movement, is inverted, and is so discharged into the delivery-tube, through which it drops head down into the shell-carrier. In case such shell first strikes pin *e'* the subsequent stroke of the crank E releases it, whereupon it travels directly to the extremity of the channel and is discharged, as above described, into the delivery-tube. The pins *e* and *e'* are located at a distance from each other in the direction of the channel such that when a column of shells is arrested but one shell at a time will be released, such distance, as before stated, being substantially equal to the outer diameter of the shell-body. It is thus seen that each reciprocal movement of the shell-carrier may be caused to discharge a shell into the delivery-tube and thence into said carrier itself. In order to insure a supply of shells in the shell-channel such as to insure such discharge on each stroke of the carrier, the discharge from the receiver D is caused to be at a greater rate than the discharge from the channel. Such action effects the formation of a column of shells in the channels, which increases in length until it reaches the point at which such channel is being periodically intersected by the slide M. When such point is reached, said slide during its subsequent return or reentering stroke strikes and is arrested by the shell obstructing its path. The eccentric J^2, however, continues its rotation and by reason of such obstruction throws the extremity of the extension downwardly, disengaging the extension itself from the roller *a*, during a part of its movement, as shown. Such action causes said extremity to now traverse a path such as does not intersect the end of arm, so as to oscillate the shaft D′ and receiver D, whereupon the feeding of shells into the shell-channel is discontinued, and the length of the column is not permitted to reach beyond a certain point intermediate of the channel extremities. Blocking and clogging of the shells in the runway are hence prevented. Upon such discontinuance of the feeding by the action of the controlling means to render the means for actuating the feeding mechanism inoperative the column becomes depleted of shells and grows shorter until the obstructing shell is removed from the path of the slide M, and the eccentric-strap and extension are permitted to resume their normal positions, whereupon the feeding operation is resumed. A sufficient quantity of shells is hence always present in the shell-channel to insure the discharge of a shell into the carrier during each reciprocal stroke of the latter.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means covered by any one of the following claims be employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a shell-feeding device, the combination of an inclined shell-positioning channel, a duct located at the lower end of same, and means located in and forming a part of said channel for discharging shells from said channel into said duct in predetermined position, substantially as set forth.

2. In a shell-feeding device, the combination of an inclined channel having a transversely-projecting rib on its respective sides for positioning the shell, a shell-hopper and vibrating means for discharging shells from said hopper into said channel, substantially as set forth.

3. In a shell-feeding device, the combination of an inclined channel having a transversely-projecting rib on its respective sides and an inclined side wall projecting laterally from each side of said channel for positioning the shell, a shell-hopper and vibrating means for discharging shells from said hopper between said side walls, substantially as set forth.

4. In a shell-feeding device, the combination of an inclined shell-positioning channel for conducting shells by gravity, a shell-hopper and vibrating means for discharging shells from said hopper into said channel, substantially as set forth.

5. In a shell-feeding device, the combination of channel for conducting shells, a shell-receiver, a shell-hopper discharging into said receiver, and means for oscillating the shell-receiver whereby shells may be discharged into said channel, substantially as set forth.

6. In a shell-feeding device, the combination of an inclined channel for conducting shells, a shell-receiver, a shell-hopper discharging into said receiver, and means for oscillating the shell-receiver whereby shells may be discharged into said channel, substantially as set forth.

7. In a shell-feeding device, the combination of a channel for conducting shells, a shell-receiver, a shell-hopper discharging into said receiver, means for oscillating the shell-receiver whereby shells may be discharged into said channel and means operatively connected with said oscillating means and projecting into said channel for controlling the oscillatory movement of said receiver, substantially as set forth.

8. In a shell-feeding device, the combination of a channel for conducting shells, a shell-receiver, a shell-hopper discharging into said receiver, means for oscillating the shell-receiver whereby shells may be discharged into said channel, and means for rendering said oscillating means inoperative and controlled by the shell-column in said channel, substantially as set forth.

9. In a shell-feeding device, the combination of a channel for conducting shells, a shell-receiver mounted upon an oscillatory shaft and adapted to deliver shells to said channel, a shell-hopper discharging into said receiver, an arm and means for actuating said arm to periodically engage and oscillate said shaft, substantially as set forth.

10. In a shell-feeding device, the combination of a channel for conducting shells, a shell-receiver mounted upon an oscillatory shaft and adapted to deliver shells to said channel, a shell-hopper discharging into said receiver, an arm secured to an eccentric-strap and an eccentric for actuating said strap and arm to cause the latter to periodically engage and oscillate said shaft, substantially as set forth.

11. In a shell-feeding device, the combination of a channel for conducting shells, a shell-receiver mounted upon an oscillatory shaft and adapted to deliver shells to said channel, a shell-hopper discharging into said receiver, an arm secured to an eccentric-strap, an eccentric for actuating such strap and arm to cause the latter to periodically engage and oscillate said shaft, and means connected with said strap and adapted to periodically reciprocate, the path of such reciprocation intersecting said shell-channel, whereby upon excessive feeding said arm may be caused to become inoperative, substantially as set forth.

12. In a shell-feeding device, the combination of a shell-channel, a shell-hopper, means for discharging shells from said hopper into said channel, means for actuating said dis-

charging means, and reciprocating means having a reciprocatory path intersecting the shell-channel, whereby upon excessive feeding said actuating means may be caused to become inoperative, substantially as set forth.

13. In a shell-feeding device, the combination of a shell-channel, a shell-hopper, means for discharging shells from said hopper into said channel, means for actuating said discharging means, and reciprocating means operatively connected to said actuating means and having a reciprocatory path intersecting the shell-channel and located intermediately of the channel ends, whereby an obstruction to such reciprocating movement located at such intermediate point may be caused to render the said actuating means inoperative, substantially as set forth.

14. In a shell-feeding device, the combination of shell-feeding mechanism, and means for actuating the same including an eccentric, an eccentric-strap having an extension, a stationary stop, a spring secured to said extension and to a stationary support and adapted to maintain contact between said extension and stop, substantially as set forth.

15. In a shell-feeding device, the combination of a shell-receiver, a spring-actuated shaft connected with same and having a projecting arm, an eccentric and eccentric-strap, the latter having an extension, a stationary stop, a spring for maintaining said extension in contact with said stop, said arm located in the reciprocal path of said extension, substantially as set forth.

16. In a shell-feeding device, the combination of a shell-receiver, a spring-actuated shaft supporting said receiver and provided with a projecting arm, an eccentric and eccentric-strap, the latter having an extension, a stationary stop, a spring for maintaining said extension in contact with said stop, said arm located in the reciprocal path of the end of said extension, a reciprocal bolt and means for connecting same with said eccentric-strap, said bolt being adapted to vary the path of movement of the extension upon contact with an obstruction, substantially as set forth.

17. In a shell-feeding device, the combination with an inclined shell-positioning channel having a contracted groove whereby shells will be conducted with their heads or closed ends up, of means located in and forming a part of said channel for inverting such shells, substantially as set forth.

18. In a shell-feeding device, the combination of a shell-positioning channel having a contracted groove whereby shells will be conducted with their heads or closed ends up, a delivery-tube and means located in and forming a part of said channel for inverting such shells, whereby they will be discharged into said tube with their heads down, substantially as set forth.

19. In a shell-feeding device, the combination with an inclined shell-positioning channel for conducting said shells with their heads or closed ends up, of means located in and forming a part of said channel for inverting said shells, and means operating within said channel for delivering said shells to the inverting means singly and at predetermined intervals.

20. In a shell-feeding device, the combination of a shell-positioning channel having a contracted groove whereby shells will be conducted with their heads or closed ends up, a delivery-tube located in the vicinity of the ends of said channel and means located at the end of and below the contracted portion of said groove for engaging the open shell ends, whereby such shells will be inverted and discharged into said delivery-tube, substantially as set forth.

Signed by me this 28th day of May, 1900.

WILLIAM L. MORRIS.

Attest:
D. T. DAVIES,
A. E. MERKEL.