E. V. AND V. SWANGREN.

WORK PIECE FEEDING MECHANISM.

APPLICATION FILED FEB. 5, 1921.

1,389,790. **Patented Sept. 6, 1921.**

Fig. 1.

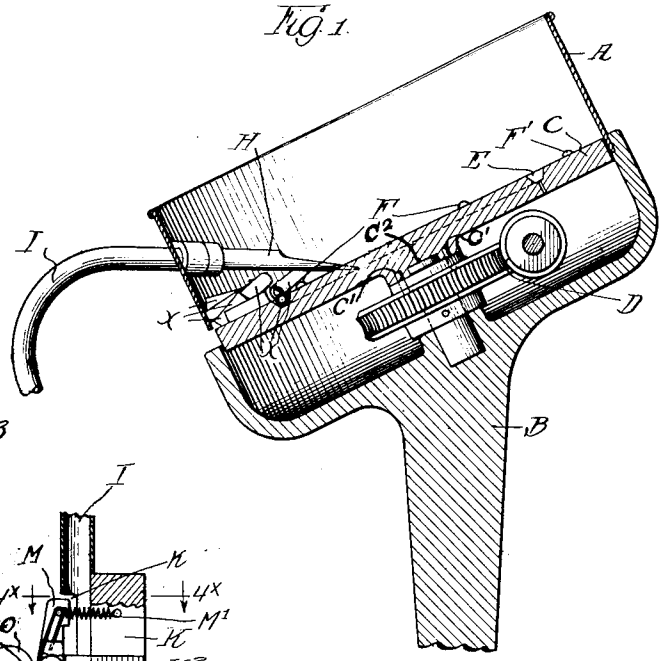


Fig. 5

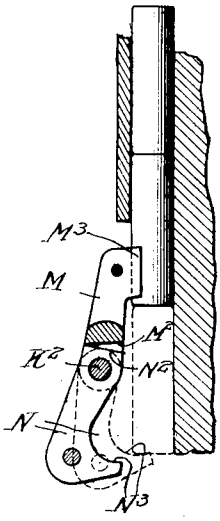


Fig. 3

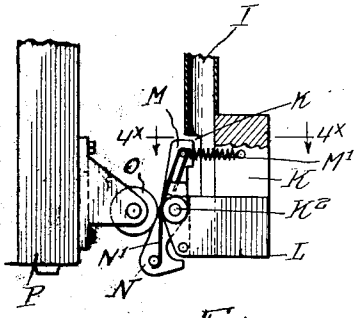


Fig. 4

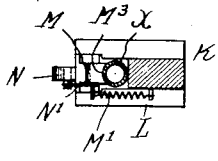
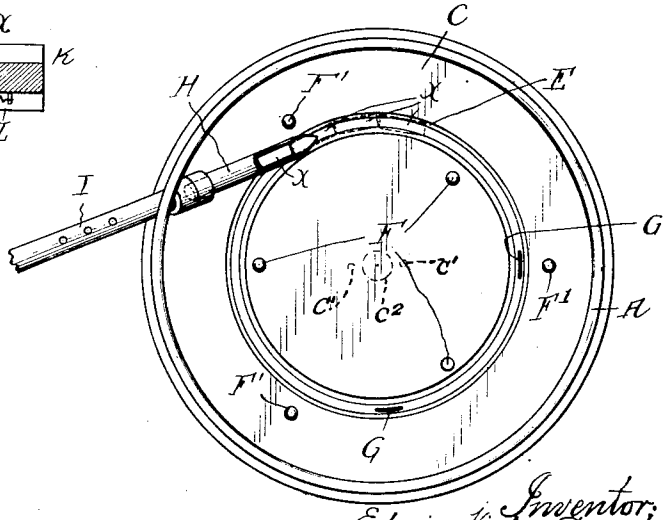


Fig. 2



Witness:
R. Burkhardt.

Inventor;
Edwin Victor Swangren,
and Victor Swangren,
By Wilkinson, Huxley, Byron & Knight,
Attys.

UNITED STATES PATENT OFFICE.

EDWIN V. SWANGREN AND VICTOR SWANGREN, OF MAYWOOD, ILLINOIS, ASSIGNORS TO F. J. LITTELL MACHINE CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

WORK-PIECE FEEDING MECHANISM.

1,389,790. Specification of Letters Patent. Patented Sept. 6, 1921.

Application filed February 5, 1921. Serial No. 442,648.

To all whom it may concern:

Be it known that we, EDWIN VICTOR SWANGREN and VICTOR SWANGREN, citizens of the United States, residing at Maywood, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Work-Piece Feeding Mechanism, of which the following is a specification.

This invention relates to mechanism for feeding work-pieces to riveting machines, assembly machines, or the like, and is designed primarily to feed work-pieces of elongated cylindrical form, or of such other forms as will adapt the work-pieces to be fed in a column.

One object of the invention is to provide a mechanism that will collect work-pieces of this nature and assemble them with their longitudinal axes arranged in a column and transfer them in such a column through a chute to the place of use. Accordingly, one feature of the invention consists in providing the rotary bottom of a feed hopper of known general arrangement with an annular channel of such form that it will receive and arrange the objects with their longitudinal axes in alinement, and a stripping stylus of tubular form adapted to receive the column of objects, and having an end that coincides with the annular channel and stands in such relation thereto that the column of objects to be thrust into the stylus and along the interior of the conduit by the end thrust upon the objects developed by the revolving plate; the annular channel being of such form, for instance, having angular sides of relatively low pitch, as will readily permit the column of objects to buckle up and fall out of the channel in case of obstruction to the advancement of the column through the conduit, as for instance, when the feed is faster than the consumption, and thus permit the feeding plate to be rotated continuously without reference to the rate of consumption and without complication of mechanism incident to timing the advancement of the work-pieces in the hopper synchronously with the discharge of the pieces from the distant end of the conduit.

Another object is to provide an escapement for the delivery end of the conduit which will control the discharge of the work-pieces synchronously with the strokes of the machine that is to operate upon them, and which escapement will be adapted to control articles advancing in a solid column and without the necessity of intersecting the column or accurately locating the releasing member in relation to the end of the work-piece which it engages. Accordingly, another feature of the invention consists in providing the escapement with a pair of detents, namely, a releasing detent and a discharging detent, with the releasing detent located to grip the column in advance of the discharging detent and normally pressed into gripping position, and the discharging detent normally out of arresting position and movable into the path of the column when the releasing detent is withdrawn to allow the lowermost piece to feed past the releasing detent and holding the column until the releasing detent returns to grip the next piece above, when it withdraws to discharge the lowermost piece; the releasing detent being constructed for lateral engagement with a piece in the column without particular reference to the location of the end of the piece; and the detents being movable independently so that the releasing detent does not relinquish its grip upon the piece in the column until the discharging detent has entered the path of the column, and, conversely, the releasing detent returning into gripping relation with a newly presented piece of the column after the column has advanced until arrested by the discharging detent, and this resumption of grip taking place before the discharging detent is withdrawn. Preferably, the discharging detent is positively moved by a working part of the machine which is to be fed, and the releasing detent is actuated by the discharging detent but through a lost motion connection which times the relative and reciprocal movements of the detents in the manner stated.

In the accompanying drawings—

Figure 1 is a vertical axial section of a feed hopper embodying one feature of the present invention.

Fig. 2 is a plan view of the same.

Fig. 3 is a side elevation, partly in section, of the escapement used for controlling the discharge end of the chute leading from the hopper of Fig. 1.

Fig. 4 is a section on the line 4×—4× of Fig. 3.

Fig. 5 is a sectional detail view of the detents shown in Fig. 3.

A represents a hopper mounted upon a standard B, and C represents a rotary plate forming the bottom of such a hopper, driven, preferably continuously, by worm mechanism D. Plate C is constructed with an annular channel E of such form that it will receive and assemble, with their longitudinal axes in column, workpieces that are to be fed, for instance, tubular rivets X. The sides of the channel E are at a relatively low pitched angle so that while the column of pieces is being advanced by frictional engagement of the pieces with the walls of the groove, in the event that the advancement of the column is obstructed the pieces will buckle up with a toggle-like motion and fall out of the column. Plate C is removably positioned on the worm wheel of the turning gear D by means of driving pins C′ and centering boss C^2 so that it may readily be removed and substituted by a plate having a different construction of work-piece groove.

F, F′ represents studs or obstructions on the plate C which keep the body of work-pieces stirred up so that a sufficient number of them find their way into the groove.

Introduced into the hopper A, and preferably in the side wall thereof, is a stripping stylus H of tubular form supported through means of its reduced shank H′ to render it readily removable for clearing in case of obstruction; and adapted to receive and maintain alinement of the column of work-pieces. The end coincides with the channel E and assumes such a position with relation to the channel that the work-pieces are thrust endwise into the chute by frictional feed of the plate upon the column. The stylus H fits snugly around the work-pieces. It delivers to a conduit I which is preferably flexible and of any desired length, and of sufficiently larger diameter to insure free feeding of any work-piece that can pass the stylus H.

The conduit I leads to the place of consumption of the work-pieces, where it is provided with a controlling escapement K consisting of a block or piece L upon which are mounted detents M and N adapted to act reciprocally in arresting the column of work-pieces and at a distance from the point of discharge and at such point of discharge, respectively; the detent M, arresting the column in advance of the point of discharge, being normally drawn into gripping relation with the work-piece by a spring M′; and the detent N, which is adapted to intersect the column at the point of discharge, being held normally out of intersecting position by a spring N′. Preferably, the detents are mounted upon a common pivot K^2, but they are independently movable upon said pivot so that while the detent M normally presses upon the side of the work-piece exposed through the opening K′ and the detent N normally stands away from the path of the work-pieces, detent N may be moved into said path and to a position which will insure catching the column of pieces before the grip of detent M is relinquished.

The detents thus act not only reciprocally but successively with a time interval between them. This is preferably accomplished by having the detent M controlled by the detent N, as, for instance, through the medium of the spaced faces M^2, N^2 shown more clearly in Fig. 4, and the spacing of time is such that the arresting toe N^3 of detent N will be well beneath the column of pieces before the faces M^2 and N^2 meet, and by a further swinging movement of the detent N withdraw the detent M sufficiently to release the column and permit it to fall upon the toe N^3. Conversely, upon the withdrawal of the detent N, and before the toe N^3 has left the path of the column, detent M will have resumed its grip upon a newly presented piece of the column, after which toe N^3 will be completely withdrawn and deliver the lowermost workpiece. In order that detent M, which coacts with the column in advance of the point of the discharge, may do so without the necessity of entering in between two work-pieces, it is provided with a gripping jaw M^3 that conforms to the surface of the work-piece and controls the same by friction rather than by intersection, or at any rate, by lateral pressure upon it at any point intermediate of the ends of the piece.

In order to positively actuate the detent N any suitable means may be employed, which is timed with mechanism to which the work-pieces are to be delivered. For instance, roller bracket O may be mounted upon the plunger P of a rivet press in position to encounter the inclined face of the detent N and swing said detent into the path of the column at each downward stroke of the plunger, so that as the column is advanced the lowermost piece is ready to be released upon the upward stroke of the plunger.

We claim:

1. In a device for feeding objects in column, a hopper, a rotary feed-plate having an annular channel adapted to collect and arrange the objects with their longitudinal axes in column, and a stripper constructed with a bore corresponding to the channel and with an end coinciding therewith.

2. In a device for feeding objects in column, a hopper, a rotary feed-plate having an annular channel adapted to collect and arrange the objects with their longitudinal axes in column, and a stripper constructed with a bore corresponding to the channel and with an end coinciding therewith; said chan-

nel having angular sides which permit the escape of work-pieces when the advance of the column is obstructed.

3. In a device for feeding objects in column, a hopper, a rotary feed-plate having an annular channel adapted to collect and arrange the objects with their longitudinal axes in column, and a stripper constructed with a bore corresponding to the channel and with an end coinciding therewith; said stripper comprising a tubular stylus adapted to receive and confine the objects in column, and being related to the channel to permit the objects to extend in continuous column from the channel into the stripper.

4. In a feeding device, releasing and discharging detents pivotally mounted upon a common center and having spaced abutting faces that cause the releasing detent to be moved by the discharging detent, springs normally holding the releasing detent in gripping position and the discharging detent out of arresting position, and means for pressing one of said detents in opposition to its spring and, through it, actuating the other detent.

5. In a device for feeding objects in column, a hopper, a rotary feed plate having an annular channel adapted to collect and arrange the objects with their longitudinal axes in column, a stripper constructed with a bore corresponding to the channel and with an end coinciding therewith, and means for mounting said hopper plate and rotating it relatively to the stripper; said plate being removably positioned on said mounting and adapted to be replaced by other plates having grooves adapted for different sections of work-pieces.

6. In a device for feeding objects in column, a hopper, a rotary feed plate having an annular channel adapted to collect and arrange the objects with their longitudinal axes in column, a conduit for conducting the work-pieces away from the hopper, and a stripper communicating with said conduit constructed with a bore corresponding to the channel and having an end coinciding with said channel; said stripper being readily removable from its conduit for clearance in case of obstruction.

Signed at Chicago, Illinois, this 29th day of January, 1921.

EDWIN V. SWANGREN.
VICTOR SWANGREN.