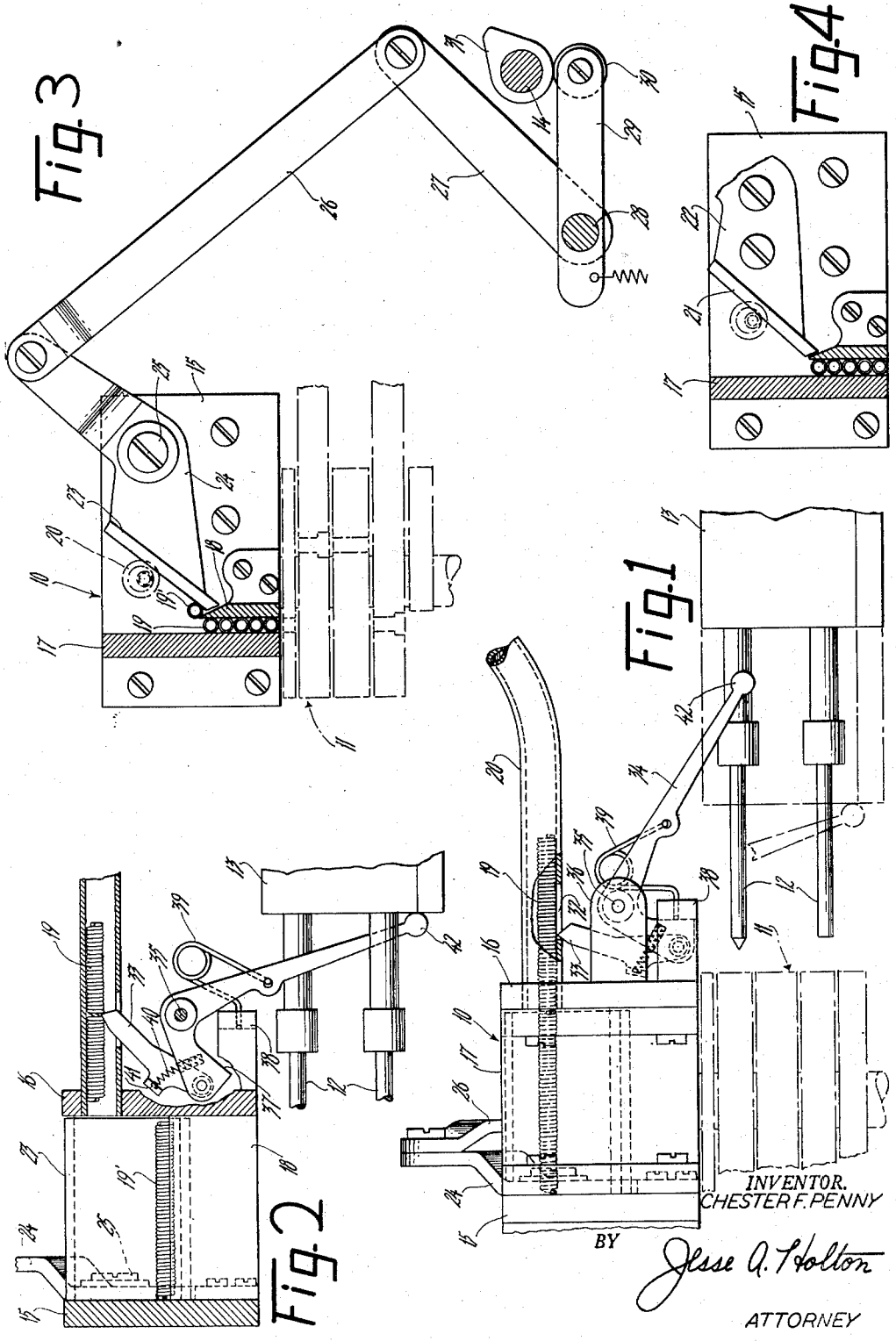
April 13, 1954 C. F. PENNY 2,675,031

SPRING DISPENSING MEANS

Filed Dec. 26, 1952



Patented Apr. 13, 1954

2,675,031

UNITED STATES PATENT OFFICE

2,675,031

SPRING DISPENSING MEANS

Chester F. Penny, Bridgeport, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware

Application December 26, 1952, Serial No. 327,987

5 Claims. (Cl. 140—103)

1

The present invention relates to a device for dispensing spiral springs one at a time, and in its more particular aspects to such a device arranged to be operated by and forming the feeding means for a spring looping machine.

There are numerous instances where it is desirable to have a plurality of springs deposited horizontally one at a time at a station where a manufacturing operation is to be performed. One such instance occurs in certain forms of spring looping machines, wherein it is known to conduct unlooped springs end-to-end by gravity through a tube from which they are discharged into a hopper from whence they are fed one-by-one into the looping mechanism. By having the lower end of the tube enter the hopper from the side, the springs are made to drop horizontally into the hopper and become aligned therein for horizontal movement through a passage in the bottom of the hopper.

The springs as fed to the looping machine have previously been cut to uniform length and the cutting operation sometimes produces burrs, so that as the springs are fed end-to-end through the tube leading to the hopper, the cut ends of abutting springs occasionally become tangled, so that after a spring leaves the tube, it does not drop down into the hopper but remains suspended in a position to block the tube and prevent other springs from coming through.

It is an object of this invention to provide a spring feeding or dispensing device of the above type with periodically operating means to break up any entanglements which may occur, whereby the springs will be fed or dispensed without interruption due to accidental entanglement of one spring with another.

This and further objects, features and advantages will become apparent as the description of certain preferred embodiments of the invention proceeds.

Referring now to the drawing:

Figure 1 is a front elevational view showing the mechanism of the present invention in normal position and showing also a portion of a spring looping machine of which said mechanism may form a part,

Figure 2 is a view similar to Figure 1 but showing the parts in operated position,

Figure 3 is a side elevational view showing fully a feature of the invention which is only partially shown in Figures 1 and 2, and

Figure 4 is a side elevational view showing a modification.

This invention is illustrated as forming the

2

feeding means for a spring looping machine such as described and claimed in my copending application Serial No. 276,555, filed March 14, 1952. As described in said application, unlooped spiral springs drop horizontally one-by-one from a hopper, generally indicated herein at 10, into a series of slotted disks, shown in dot-and-dash lines and indicated generally at 11, from whence they are shoved, first one end and then the other, to position wherein they are operated upon by the looping mechanism, so that when the springs leave the looping machine they have a loop at each end, whereby they may be conveniently connected to whatever device they are to operate.

Since the details of construction of the spring looping machine do not form a part of the present invention, the details have not been shown and it need merely be described that there are a pair of plungers 12 mounted in a reciprocating head 13, which plungers, as the head 13 moves to the dotted line position shown in Figure 1, shove the ends of the springs out of the disks 11 and into position to be operated upon by the looping mechanism. The looping mechanism itself has not been illustrated, but said mechanism is operated by a rotating shaft 14, shown in section in Figure 3, which shaft is the shaft 84 shown in the application referred to above.

The hopper 10 comprises a pair of vertically extending side plates 15 and 16 between which is fixed a U-shaped end wall 17. A formed plate 18 is suitably secured between the side plates 15 and 16 and forms together with the end wall 17, a narrow passage or slot within which unlooped springs 19 become stacked, as shown in Figure 3 and as will presently be explained, from which said springs drop into the disks 11.

Leading into the hopper 10 is a tube 20. The tube 20 has its discharge end opening through the side wall 16 and extends outwardly of the hopper in a substantially horizontal direction for a short distance and then slopes upwardly to a point substantially above the hopper. The unlooped springs 19 are fed endwise into the tube in any suitable manner and move end-to-end down the sloping portion of the tube under the force of gravity. The weight of the springs in the sloping portion of the tube is sufficient to force the springs one at a time out of the horizontal portion thereof so that they will normally drop into the hopper.

In that form of the invention shown in Figure 4, a sloping plate 21 has a flange 22 connected to the side plate 15 of the hopper and extends between the side plates 15 and 16 to conduct the

spring dropping out of the tube into the narrow passage between the end wall 17 and the formed plate 18.

In that form of the invention shown in Figures 1, 2 and 3, a plate 23 on a pivotally mounted arm 24 extends between the side plates 15 and 16. The plate 23 extends behind the formed plate 18, as shown in Figure 3, so that after a spring 19 leaves the tube it rolls down the plate 23 and instead of falling directly into the passage between the end wall 17 and formed plate 18, becomes positioned behind the upper end of the plate 18 as shown at 19'. The arm 24 is pivoted at 25 to the side plate 15 of the hopper and is connected by a link 26 to an arm 27 fast on a rockshaft 28. Also fixed to the rockshaft 28 is an arm 29 having a roller 30 resting on a cam 31 fixed to the shaft 14. With this arrangement, it will be apparent that rotation of the shaft 14 will cause the plate 23 to swing upwardly and lift the spring 19' over the upper edge of the formed plate 18, whereupon said spring will fall into the narrow passage between said formed plate and the end wall 17. As explained in the copending application hereinabove referred to, the shaft 14 operates the looping mechanism; thus every time the looping mechanism is operated another spring is moved into position for dropping into the machine.

The springs are cut to proper length before being fed into the tube 20 and the walls 15 and 16 of the hopper are spaced apart a distance only slightly greater than the length of the springs, so that as the springs leave the tube they will be guided by said walls to their proper lateral position with respect to the disks 11. The cutting of the springs sometimes results in burrs being formed at the point where the cut is made and if two adjacent springs in the tube have burrs, the springs will sometimes become entangled, so that when a spring passes out of the end of the tube it will not drop into the hopper but its free end will be pressed against the wall 15 while its other end is held suspended by the next spring, with which it is entangled. Such a condition is shown in Figure 1, and it will be apparent that as long as this condition exists no more springs can come out of the tube, the tube having an inside diameter substantially greater than the diameter of the springs to permit free passage of said springs therethrough but the inside diameter not being sufficiently great that two springs can lie side-by-side in the tube. As the plate 23 swings within the hopper it passes in front of the discharge end of the tube and will press sideways against any spring which may be suspended within the hopper to thereby cause the suspended spring to become disentangled and permit it to drop.

While the movement of the plate 23 would ordinarily be sufficient to break up any entanglement, the present invention also provides means operating periodically to lift and move backwards in the tube the spring which would be the next to be discharged. This upward and backward movement of the spring still in the tube will ordinarily be sufficient to break up any entanglement and when the spring in the tube is subjected to this action at the same time that the spring which has moved out of the tube but failed to drop is subjected to the action of the swinging plate 23, even the most extreme entanglement will be broken.

For imparting this upward and backward movement to the spring still in the tube, the following provision has been made. A slot 32 is provided in the bottom of the tube at a point beneath the spring 19 which would be the next to leave the tube and a pawl 33 has a pointed end normally positioned within said slot but not extending into the tube to impede the free passage of springs therethrough. This condition of the pawl 33 is shown in Figure 1.

The pawl 33 is pivotally mounted on one arm of a two-armed lever 34, which lever in turn is pivotally mounted at 35 on a bracket 36 extending outwardly from the side plate 16 of the hopper. The lever 34 is provided with a shoulder 37 normally held in abutment with a stop 38 by a spring 39 anchored at one end to said stop and at the other end to said lever. A compression spring 40 extending between a socket in the lever 34 and a tab 41 on the pawl 33 urges said pawl in a counterclockwise direction. The springs 39 and 40 normally hold the lever 34 and pawl 33 in the positions shown in Figure 1, with the end of the pawl abutting the left hand end of the slot 32.

The lever 34 is provided with a rounded end 42, and every time the plunger carrying head 13 moves forward during the spring looping operation, said head strikes the rounded end of the lever and rocks said lever in a clockwise direction about its pivot 35. This rocking of the lever 34, together with the action of the compression spring 40 causes the pointed end of the pawl 33 to first move upwardly into the tube 20 and raise the spring 19 which is over the slot 32 and the pointed end of the pawl then digs in between a pair of adjacent coils of the spring, as indicated in Figure 2, and shoves said spring a short distance away from the discharge end of the tube. As the pawl 33 moves the spring in the tube away from the discharge end of said tube, any spring which may have been suspended in the hopper in position to block the tube, as hereinbefore explained, will be relieved of the force of the spring in the tube, and the rearward and upward movement of the spring in the tube will ordinarily be sufficient to break up any entanglement which may exist, whereupon the spring in the hopper drops down and no longer blocks the end of the tube.

Having thus described the invention, what is claimed is:

1. A device for dispensing springs of substantially equal length and uniform diameter one at a time comprising, a hopper, said hopper having a pair of opposed walls spaced apart a distance only slightly greater than the length of the springs to be dispensed, a spring delivery tube having a discharge end opening through one of said walls near the upper portion thereof, said tube extending outwardly from said wall for a short distance and then sloping upwardly to a point substantially above said hopper, said tube being adapted to be filled with springs in end-to-end relation, said springs moving by gravity down the sloping portion of said tube and being forced out of the discharge end thereof by the weight of the springs in the sloping portion, said tube having an internal diameter substantially greater than the diameter of the springs but not great enough that two springs can lie side-by-side therein, said springs normally dropping into said hopper when they leave the tube but sometimes becoming entangled with the oncoming spring in which case the spring which leaves the tube has its free end pressed against the opposing wall of said hopper and does not drop but prevents any

more springs from being moved out of the tube, periodically operating means to lift and move backwards in said tube the spring which would be the next to be discharged, said means serving to unloosen any entanglement which may have occurred and to relieve the spring which has left the tube of the force of the springs still in the tube, whereupon the spring which has left the tube will drop into said hopper, and means in the lower portion of said hopper forming a narrow passage in which said springs become horizontally positioned for being dispensed one at a time.

2. A device for dispensing springs of substantially equal length and uniform diameter one at a time comprising, a hopper, said hopper having a pair of opposed walls spaced apart a distance only slightly greater than the length of the springs to be dispensed, a spring delivery tube having a discharge end opening through one of said walls near the upper portion thereof, said tube extending outwardly from said wall for a short distance and then sloping upwardly to a point substantially above said hopper, said tube being adapted to be filled with springs in end-to-end relation, said springs moving by gravity down the sloping portion of said tube and being forced out of the discharge end thereof by the weight of the springs in the sloping portion, said tube having an internal diameter substantially greater than the diameter of the springs but not great enough that two springs can lie side-by-side therein, said springs normally dropping into said hopper when they leave the tube but sometimes becoming entangled with the oncoming spring in which case the spring which leaves the tube has its free end pressed against the opposing wall of said hopper and does not drop but prevents any more springs from being moved out of the tube, a pivotally mounted plate periodically swingable in said hopper across the discharge end of said tube to thereby dislodge any spring which has left the tube but has not dropped because of being entangled with the oncoming spring, and means in the lower portion of said hopper forming a narrow passage into which said pivotally mounted plate moves said springs after they have dropped from the end of the tube.

3. A device for dispensing springs of substantially equal length and uniform diameter one at a time comprising, a hopper, said hopper having a pair of opposed walls spaced apart a distance only slightly greater than the length of the springs to be dispensed, a spring delivery tube having a discharge end opening through one of said walls near the upper portion thereof, said tube extending outwardly from said wall for a short distance and then sloping upwardly to a point substantially above said hopper, said tube being adapted to be filled with springs in end-to-end relation, said springs moving by gravity down the sloping portion of said tube and being forced out of the discharge end thereof by the weight of the springs in the sloping portion, said tube having an internal diameter substantially greater than the diameter of the springs but not great enough that two springs can line side-by-side therein, said springs normally dropping into said hopper when they leave the tube but sometimes becoming entangled with the oncoming spring in which case the spring which leaves the tube has its free end pressed against the opposing wall of said hopper and does not drop but prevents any more springs from being moved out of the tube, periodically operating means to lift and move backwards in said tube the spring which would be the next to be discharged, means in said hopper movable across the discharge end of said tube simultaneously with the operation of said periodically operating means and cooperating therewith to dislodge any spring which may have left said tube but has not dropped because entangled with the oncoming spring, and means in the lower portion of said hopper forming a narrow passage in which said springs become horizontally positioned for being dispensed one at a time.

4. In a spring looping machine having reciprocating and rotating elements operating in timed relation to one another and so constructed and arranged as to cooperate in looping the ends of springs, a hopper for containing unlooped springs and having means forming a slot in the bottom thereof through which unlooped springs drop one by one into the looping mechanism, a tube extending from a point above said hopper and opening at its lower end into said hopper, said tube having an inside diameter substantially greater than the diameter of the springs which are to be looped but not great enough that two springs can lie side-by-side therein and adapted to conduct springs therethrough in end-to-end relation and discharge them into said hopper, means forming a slot in said tube near the lower end thereof, a pawl having an end extending into said slot but said end not normally extending far enough into said tube to impede the free passage of springs through said tube, means operated by a reciprocating element of the spring looping machine to move the end of said pawl into said tube and in the direction away from the lower end of said tube, whereby said pawl will move any spring which may be positioned adjacent the slot in said tube away from the lower end thereof.

5. In a spring looping machine having reciprocating and rotating elements operating in timed relation to one another and so constructed and arranged as to cooperate in looping the ends of springs, a hopper for containing unlooped springs and having means forming a slot in the bottom thereof through which unlooped springs drop one-by-one into the looping mechanism, a tube extending from a point above said hopper and having a discharge end opening into said hopper, said tube being adapted to conduct springs therethrough in end-to-end relation whereby they will normally drop one-by-one into said hopper but said springs sometimes becoming entangled so that even though a spring passes out of said tube it will not drop into the hopper, a device operated periodically by a reciprocating element of said machine to move backwards in said tube the spring which would be the next to be discharged, a member movable by a rotating element of said machine across the discharge end of said tube, said device and said member being simultaneously operated to thereby release the spring which may have become entangled and failed to drop into the hopper after passing out of the tube.

No references cited.