SEPARIATING APPARATUS FOR SPRINGS AND THE LIKE

Fig. 1.

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Fig. 2.
This invention relates to separating apparatus for entangled articles, such as springs, and more particularly to fluid pressure means for automatically separating various sizes and types of entangled coil springs, and to maintain the springs in their untangled state until ready for use.

Springs at present received from the manufacturer are invariably entangled; and it is necessary to use many man-hours to separate them and keep them in their separated state until ready for use or processing. One method of accomplishing this has been to place a large quantity of entangled springs on a table and employ operators to untangle them by hand. The operators would separate each spring and place it individually on a pin on specially formed boards. These boards containing the separated springs would be placed in storage until the springs were required for use in production.

Another object of the invention is to reduce the production costs of assembled articles containing springs by eliminating the pre-separating operation.

Another object of the invention is to maintain a steady flow of untangled springs ready for use under control of a single operator.

Another object of the invention is to insure a continuous supply of untangled springs by automatically returning unused springs to the receptacle to be disposed of. These objects are achieved by providing a receptacle having a wall provided with a plurality of apertures. Each of the apertures is of sufficient size for passage of the individual article being separated therethrough. In this embodiment, these articles are coil springs several of which, designated by the reference numeral 14, are shown disposed within the receptacle 10. The side walls 16 and top wall 20 of the receptacle 10 are closed to form a rectangular box for a purpose apparent hereinafter.

The receptacle 10 has a front wall 22 formed of glass or other transparent material and being otherwise closed. A container for the entangled springs is supported within the receptacle and has an open end adapted to be disposed adjacent a wall of the receptacle and remote from the apertured wall. Fluid pressure means are connected to the spring container and a valve or other control device serves under control of the operator to admit fluid pressure for ejecting the springs through the open end of the container into separating contact with the closed walls of the receptacle for exit individually through the apertures.

The springs so separated drop from the receptacle onto a conveyor belt which extends between a pair of rollers which are rotated by an electric motor or other suitable driving means. The surface of the conveyor belt is formed of felt or other frictional material which retains the separated articles in separated condition. The operator merely selects the separated springs as required for use. Those springs not so selected drop from the conveyor belt into a second receptacle disposed below one of the rollers. The second receptacle is preferably of funnel-shaped form having a discharge outlet connected to the first receptacle. Fluid-pressure means are employed for admitting fluid under pressure to the second receptacle for returning the springs received therein to the first receptacle. The admission of fluid under pressure to the second receptacle is also controlled by a valve or other control device which can be operated by the operator as desired.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a plan view of the separating apparatus; and
Fig. 2 is a cross-section taken on the line II—II of Fig. 1.
conical form with the open end 30 at the apex. The container 26 is adapted to be filled or partly filled with entangled springs 16 and placed within the receptacle 10 after which the lid 28 is secured thereon. The lid 28 is thus designed to be located within the receptacle 10 and conveniently carries a fluid pressure connection 32 in the form of a flexible conduit having a control valve 34 incorporated therein. The fluid pressure connection 32 extends through the top wall of the receptacle 10 with the control valve 34 located for easy operation by the operator, preferably by a foot pedal (not shown). The fluid may be compressed air from any suitable source of supply. It should be observed that the open end 30 of the container lid 28 is disposed adjacent the top wall 20 of the receptacle 10 so as to be purpose apparent hereinafter.

A conveyor in the form of a traveling belt 36 is supported on a pair of rollers 38 and extends under and beyond the bottom wall 12 of the receptacle 10. Thus, as shown more clearly in Fig. 1, a portion of the belt 36 extends forwardly of the sliding door 22 where its surface is accessible to the operator. The rollers 38 may be driven by an electric motor (not shown) or any other suitable driving means may be employed for moving the belt 36 under the bottom wall 12. Preferably, the belt 36 is surfaced with a frictional material, such as felt, on the exposed side thereof.

A second receptacle 40 is carried by the first receptacle 10 and extends below the front roller 38. The second receptacle 40 is of funnel-shaped form and is provided with a discharge outlet 42 connected by a conduit 44 to one of the side walls 18 of the first receptacle 10 adjacent the bottom wall 12. A fluid pressure connection 46 in the form of a flexible conduit extends through a wall of the second receptacle 40 for admitting fluid under pressure thereto. As in the case of the fluid pressure connection 32, a control valve 48 is provided in the fluid pressure connection 46 under control of the operator by a foot pedal (not shown) or other operating means. Compressed air from the same or another source of supply may be used as in the case of the supply for the container 26.

Operation

The operation of the apparatus will be clear from the foregoing description. Upon placing a spring-filled container 26 within the receptacle 10 and attaching the lid 28, the sliding door 22 is closed and air under pressure admitted by operation of the valve 34 through the fluid pressure connection 32. It will be apparent that the number of springs 16 to be placed in the container 26 is dependent on the size and the air pressure to be supplied. Upon admission of air to the container 26 a rotary action of the springs 16 within the container will be observed. The glass door 5 of the receptacle 10 and the glass container 26 facilitate such visual observation. The springs 16 will rotate from top to bottom and a number will be ejected through the opening 30 by control of the operator manipulating the foot pedal attached to the valve 34, ejection closing when the valve 34 is closed.

The springs so ejected are deflected from the top wall 20 of the receptacle 10 and drop upon the bottom wall 12 which contains the apertures 14. Since these apertures 14 are larger than the overall length of the springs 16 little or no impediment is presented to passage of the springs 16 onto the traveling belt 36. Since the belt has a frictional surface, the springs 16 are maintained in separated condition and are moved from under the bottom wall 12 and up through the apertures 14 in the face of the belt 36 as it moves from under the receptacle 10 as will be apparent. Those springs 16 which are caught and those which are not are yet completely untangled will move to the end of the belt 36 passing over the front roller 38 and will drop into the second receptacle 40. Since the second receptacle 40 is funnel-shaped, the springs 16 will drop toward the discharge outlet 42. By operation of the valve 48, air under pressure is admitted to convey the springs 16 through the conduit 44 back to the first receptacle 10.

The returned springs 16 are deflected from the side walls 18 of the receptacle 10 and pass through the apertures 14 in the bottom wall 12 which serve to disperse these springs upon the belt 36 as previously described. Consequently, some of the entangled springs 16 which were not separated in the preceding cycle will be separated in this succeeding operation. The cycle is continuous as long as the conveyor belt 36 is moving and fluid under pressure is being admitted to the second receptacle 40 through the fluid pressure connection 46. It will be apparent that the fluid pressure to be admitted to the second receptacle 40 is dependent on the action needed in the conduit 44 to untangle the springs 16 which drop off the end of the conveyor belt 36.

When the conveyor belt 36 contains sufficient springs 16 for use by the operator, then valve 34 can be operated to closed position to that-off flow of air to the container 26. Thereafter, valve 34 may be opened whenever additional springs 16 are required to be disposed on the conveyor belt 36. Consequently, with the conveyor belt 36 moving, air valve 48 properly adjusted and air valve 14 used for loading the conveyor belt 36, the system will continuously separate and disperse springs at whatever rate desired by the operator. It will furthermore be apparent that many changes may be made in the details of construction and arrangement of parts without departing from the scope of this invention as defined in the appended claims.

I claim:

1. Separating apparatus for connected articles comprising a receptacle having a wall provided with a plurality of apertures and being otherwise closed, a container for the connected articles supported within said receptacle and having an open end adapted to be disposed adjacent a closed wall thereof and remote from said apertured wall, and means for admitting fluid under pressure to said container for ejecting the articles of the receptacle into separating contact with the closed walls of said receptacle for exit individually through said apertures.

2. Apparatus as claimed in claim 1 wherein said apertured wall overlies movable means for conveying the separated articles beyond said receptacle and exposed for use.

3. Apparatus as claimed in claim 2 wherein a second receptacle is positioned adjacent said movable means for receiving articles therefrom, and fluid pressure means connecting said first and second receptacles for returning articles received from said movable means.

4. Separating apparatus for connected articles
5. Separating apparatus as claimed in claim 4 wherein said conveyor means includes a traveling belt having a frictional surface for retaining the separated articles in separated condition.

6. Separating apparatus as claimed in claim 5 wherein said belt extends between a pair of roller means, and a second receptacle disposed below one of said roller means beyond said bottom wall for receiving articles from said belt.

7. Separating apparatus as claimed in claim 6 wherein said second receptacle is of funnel-shaped form having a discharge outlet connected to said first receptacle, and means for admitting fluid under pressure to said second receptacle for returning articles received therein to said first receptacle.

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