To all whom it may concern:

Be it known that I, ROLLAND J. CANTON, a citizen of the United States, and resident of Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Bottle-Capping and Wire-Removing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My present invention relates to bottle capping machines, and more particularly to a combined bottle capping and wire removing machine adapted for use on milk bottles and the like. My present invention is an improvement on the machine described and claimed in my Patent No. 1,381,278 of June 14, 1921.

In bottling high grade milk at the present day, it is customary to not only cap the bottle with the usual wax paper cap or disk, but also to further protect the contents of the bottle by placing a paper cup over the top of the bottle and hold such cup in place by a crimped metal ring.

With new bottles, the above method of procedure is comparatively simple and easily carried out. The main difficulty is in carrying out the method on bottles that have been previously capped and which therefore, after washing, must be refilled with milk and then recapped and recupped. When the milk is to be used, the outer cup and inner cap are removed, the crimped wire however, being left on the neck of the bottle. It is, of course, necessary that this wire ring be removed before the bottle can be recapped, and herefore this has been done by an operator grasping a bottle in both hands and snapping the wire ring apart over a hook fastened to a bench or other convenient support. This operation is expensive as it not only occupies the time of a man, but results in considerable breakage, the breakage averaging about twenty per cent. Also, this operation is dangerous as due to the large breakage, the operator is frequently injured by fragments of glass.

In my patent, above referred to, I have obviated the defects of prior apparatus by devising automatic wire removing means that operates in conjunction with a bottle capping, such for example, as the capping machine known as the Milwaukee capper, and described and claimed in Patent No. 1,040,453 and dated October 8, 1912.

The mechanism described and claimed in my patent, while efficient and capable of performing the functions for which it was designed, is apt, in unskilled or careless hands, to slight derangements of adjustment that necessitate frequent readjustment, due primarily to the pivotal mounting of the wire cutting mechanism. In my present invention which, as stated, is designed to be an improvement over that shown and described in my Patent 1,381,278, I have obviated the objectionable features of the structure shown in said patent, and also the objectionable features of all, prior apparatus of this character. In overcoming the objections above noted, I have mounted the cutters on a cross head movable in synchronism with the capping head, thus eliminating the necessity of pivotally mounting such cutters. My invention is capable of being used as a separate machine, in which event the removal of the wire from the necks of the bottles is a separate operation, or it may be used in combination with the capping machine, as above described, and as this use speeds up the work of preparing the filled bottles for shipment and is more economical, I prefer to use it in this manner.

The principal object of my invention therefore, is an improved device for removing wire rings from milk bottles and the like.

Another object is the provision of an improved combined bottle capping and wire removing machine.

In the accompanying drawings illustrating the preferred embodiment of my invention,

Fig. 1 is a sectional side elevation, showing a bottle in position to be operated on;
Fig. 2 is a sectional side elevation showing the bottle after the capping operation and with the wire ring removed;
Fig. 3 is a plan view partly in section;
Fig. 4 is a section on the line 4—4 of Fig. 2;
Fig. 5 is a front elevation showing the cutter cross head in position;
Fig. 6 is a rear elevation of Fig. 5, and
Fig. 7 is a section on the line 7—7 of Fig. 5.

Referring to the drawings, 10 and 11 designate supporting posts, extending upwardly...
from a suitable platform (not shown) and
adjustably mounted on said posts 10 and 11 is a bracket 12, clamping screws 13, at either
side thereof providing means for clamping
such bracket in adjusted position.

Slidably mounted in a vertical centrally
located bearing 14 in the bracket 12 is a
shaft 15, which extends upwardly from the
bracket 12 a suitable distance, and down-
wardly to an operating treadle (not shown).

Fastened to the top of the shaft 15 by a pin 16 is a holding bracket 17, an additional fas-
tening means 18 engaging in a transverse
slot in the shaft and held in position by
bolt 19 and screw 20. Laterally extending
arms 21 on the bracket 17 carry depending
rods 23 slidably therein and prevented from
falling out of said arms 21 by collars 24
pinned to the rods. Intermediate the ends
of each rod 23 is a bracket 25 with laterally
extending arms 26, these brackets being
pinned to the rods 23, as shown in Figs. 1
and 2. On each rod 23, between the upper
face of the bracket 25 and the lower face
of the bracket 21 is a coiled spring 27, the
purpose of which will be hereinafter de-
scribed. Slidably mounted on each of the
rods 23 is a frame 28 provided at its lower
end with a circular chamber 29, a capping
head 30, attached to the lower end of the
rod 23 by screw 31, fitting loosely in said
chamber, and predetermined the lower
limit of movement of the frame 28 on such
rod. At one side of the frame 28, or to the
right as viewed in Figs. 1 and 2, is a cap
receptacle or magazine 32, which is parallel
to the rod 23, and is adapted to hold a plu-
rality of caps 53.

Attached to the lower face of the frame
28, but spaced apart therefrom a distance
slightly greater than the thickness of a bot-
tle cap 53, is a member having a cotical re-
cess 33 in alignment with the chamber 29 and
of such size and shape as to readily engage
with and center the top of a mill bottle, and
a tapered extension or cap supporting plat-
form 34 which extends beneath and beyond
the cap receptacle, above referred to. This
chamber is attached to the frame 28 in any
convenient manner, as by screws 35. On
each side of the frame 28 are guides 36
which engage in guideways 37 in the ad-
justable bracket 12.

Mounted for sliding movement longitudi-

dally of the cap supporting platform 34 are
cross-heads 38 provided with top plates 39
of dimensions that permit them to move
between the upper face of the member com-
prising the recess 33 and the cap supporting
platform 34, and the lower face of the frame
28, the end of such plate 39 being rounded,
as shown at 40, to more readily engage with
and feed a cap 53 from the cap receptacle
32 to the chamber 28. Links 41 are pivotally
mounted at one end on each side of the cross-
heads 38, the other end of said links being
pivotally attached to one end of one of the
arms of the bell crank levers 42, which levers
are pivotally mounted on opposite sides of
the cap receptacles 32. The other arm of
each of the bell crank levers 42 is provided
with an elongated slot 43 in which works a
stud 44 on one end of links 45, the other ends
of which are pivotally mounted on the ex-
tremities of the laterally extending arms 26
of the bracket 25.

Slidably mounted on the posts 10 and 11,
and on the shaft 15 beneath the bearing 14,
is a cutter holding cross-head 46, the portion
47 surrounding the shaft 15 being elongated
and slotted at 48 to engage with a screw
49 attached to the shaft 15, as clearly shown
in Figs. 4 and 5. On the shaft 15 between
the lower end of the portion 47 of the cross-
head 46 and the top of the platform (not
shown) is a coil spring 50, which tends to
"float" the cross-head 46 in its normal, or
inoperative, position, which is the position
shown in Fig. 1. In the cross-head 46, on
either side of the shaft 15, and in alignment
with each of the rods or plungers 23, as
viewed in Fig. 7, is a counterbored hole 51
in which is slidably mounted a wire cutter
or knife 52, a shank 53 on the rear end there-
of extending through the hole 51 and pro-
vided on its outer ends with threads 54 to
receive nuts 55, these nuts limiting the out-
ward movement of the cutters 52. In the
counterbored hole 51 and at the rear of the
cutter 52, is a spring 56 that tends to force
the cutter 52 outwardly. One side of the cut-
ters 52 is flattened throughout the major
portion of its length, as shown in Fig. 7, and
a headless screw 57 in the cross-head 46 en-
gages with such flattened portion to pre-
vent rotation of the cutter while yet permit-
ing sliding movement thereof into and out
of the counterbored hole. The normal posi-
tion of the cutter 52 is shown in Fig. 1, with
the point thereof in engagement with the
upper rim of a milk bottle and with the
spring 56 slightly compressed, so that, as the
cross-head moves downward, the cutter 52
will follow the contour of the bottle and
positively engage with the wire ring 55 and
the bottle head, as shown in Fig. 2.

The operation of my invention is as fol-
lows, assuming that the mechanism is in the
position shown in Fig. 2, a bottle having
not been capped and the wire ring 55 re-
moved. The treadle (not shown), is oper-
ated to move the boxing bracket 17 up-
wardly, carrying the frame 28 and associ-
ated parts, including the cross-head 46 with
cutters 52, therewith, until the parts assume
the position shown in Fig. 1. As the rods
23 move upwardly, the frame 28 remains sta-
tionary until the capping head 30 engages
with the top of the chamber 29, and during
this period the cross-head 38, through the
linkage 42, 43, 45, moves the plate 39 longitudinally of the cap supporting platform 34, forcing the lower cap of the pile of caps in the receptacle or magazine 32 into the chamber 29, the spring 27 being compressed during this operation. Continued upward movement of the operating post 15 moves the conical recess 33 upward a sufficient distance to allow the capped bottle to be removed.

Ordinarily in practice, the bottles are supported on a rotatable table, and are supplied to the machine in pairs, but as this feature of the machine does not concern the present invention, it has not been described or illustrated. It is sufficient for the present purpose to know that at this stage of the proceedings an additional bottle or bottles are supplied to the machine and occupy the position with respect thereto shown in Fig. 1.

The treadle (not shown) is now operated to lower the holding bracket 17 and parts carried thereby, the cutter 52 engaging with the upper edge of the bottle, the pressure of the spring 56 maintaining the cutter in engagement with the bottle, as before described. As the frame 28 is lowered simultaneously with the cutter 52, the conical recess 33 engages with and holds the bottle in position, and further downward movement of the shaft 15 brings the screw 49 into engagement with the lower end of the slot 48, thus causing a downward movement of the cross-head 46 and cutters 52, which cutters, following the contour of the bottles, as above described, engage with the ring 55, cutting and breaking said ring and throwing it off the bottle. Simultaneously the rod 23 forces the capping head 30 against the cap 53 in the chamber 29 and into the top of the bottle, as shown in Fig. 2. During the first part of the downward movement of the bracket 17, the spring 27 operates to return the cross-head 38 and plate 39 to the position shown in Fig. 2.

While I have shown and described the preferred embodiment of my invention somewhat necessarily in detail, it is to be understood that I may vary the size, shape, and arrangement of parts making up the device within considerably wide limits without departing from the spirit of the invention.

Having thus described my invention, what I claim as new is:

1. In a machine of the class described, the combination of bottle holding means, a cross-head movable toward and from said bottle and provided with a recess, a cutter slidably mounted in said recess, and means for forcing said cutter outwardly with respect to said recess to maintain said cutter in engagement with the bottle during its movement to cut and remove used cup holding rings from the neck of the bottle.

2. In a machine of the class described, the combination of bottle holding means, a cross-head movable toward and from said bottle and provided with a recess, a cutter slidably mounted in said recess, a spring in said recess for forcing said cutter outwardly with respect to said recess to maintain said cutter in engagement with the bottle during its movement to cut and remove used cup holding rings from the neck of the bottle, and means for limiting the outward movement of the cutter.

3. In a machine of the class described, the combination of a bottle holding means, a crosshead movable toward and from said bottle on a line parallel to the axis thereof, a cutter slidably mounted in said crosshead in a direction transverse to the line of movement of the crosshead, and means for forcing said cutter outwardly with respect to said crosshead to maintain said cutter in engagement with the bottle to cut and remove used cap holding rings from the neck of the bottle.

In testimony whereof, I have signed my name to this specification.

ROLLAND J. CANTON.