

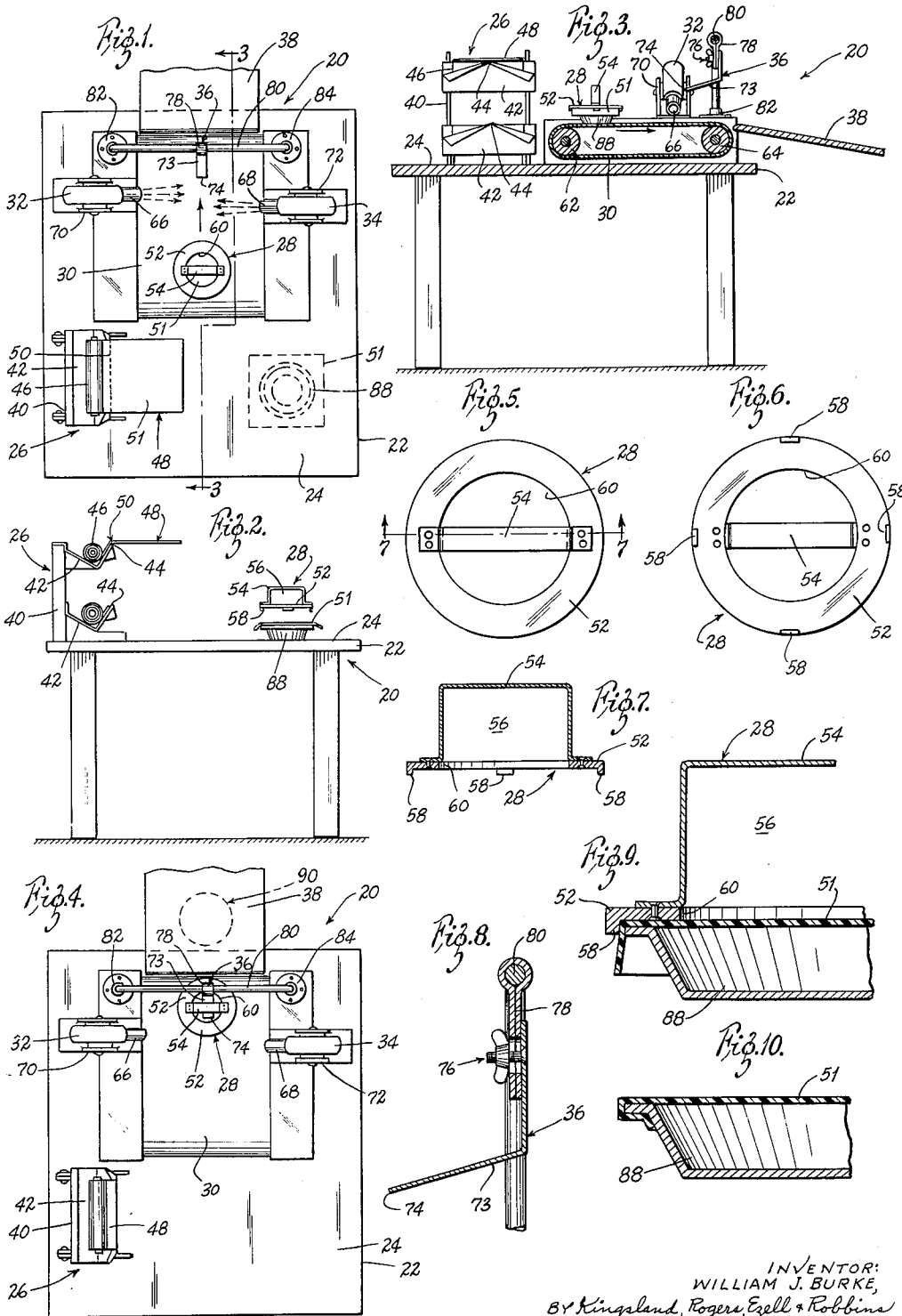
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SEMI-AUTOMATIC CAPPING MACHINE

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SEMI-AUTOMATIC CAPPING MACHINE

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This invention relates to improvements in capping machines and methods and in particular relates to a semi-automatic capping machine for capping open top receptacles and the like with a heat shrinkable plastic film, which is used to cap the top of the receptacle with the marginal edges of the film being shrunk around the top of the receptacle for firm engagement. This application is a continuation-in-part of my copending application for Capping Apparatus and Method, Serial No. 190,734, filed April 27, 1962, now abandoned.

In the past, various apparatus and methods have been employed for shrinking plastic films over receptacles using various types of shrinkable plastic films. Heat shrinkable films have been employed and the Dreyfus Patent No. 2,976,655 shows a method and apparatus illustrating a number of such heat shrinkable films that can be employed to cap open top receptacles. Such apparatus has in the past required a rather complicated structure and operation.

By means of this invention there has been provided a semi-automatic machine and method that can be very simply employed to cap open top receptacles with a plastic heat shrinkable film. Essentially, the invention employs a dispenser for simply dispensing plastic film in sheets, which are placed over the top of a receptacle to be capped. A capping member is then placed on top of the sheet and the conventional rimmed mouth of the receptacle with the protruding and marginal edges of the film sheet hanging limply down over the top of the receptacle. The capping member is formed to mate with the top of the receptacle and seat upon it so that the film sheet protruding edges are draped over the top edge of the receptacle. The receptacle with the sheet and the overlying cap member is then placed upon a moving belt conveyor in such fashion that the handle of the cap member, which has an open space beneath it, is open in the direction of movement of the belt conveyor. The belt conveyor then moves the receptacle past a blowing means where both sides of the receptacle are contacted with hot gas, such as hot air. The excess marginal edges are caused to shrink into a firm bead or folded area against the top sides of the receptacle in firm engagement therewith. After moving past the blowing means, a catching member, or arm, hooks into the open area underneath the handle member and the movement of the receptacle causes the capping member to be lifted from it. The capped receptacle then moves down a ramp to a collection point while the capping member remains suspended upon the catching member so that it may be easily grasped and used again in a repeat of the aforementioned operation.

The semi-automatic machine and method of this invention are very simple to operate and can be employed by relatively unskilled workmen with a greatly increased efficiency in the capping operation. Yet at the same time the operation is relatively simple and the semi-automatic machine is uncomplicated and can be simply employed. Any type of conventional heat shrinkable plastic film may be employed, such as the conventional heat shrinkable films sold under the names Cryovac, Vitafilm, Reynolon, Polystyrene, Polypropylene and Saran-Wrap. Some of these will provide an elastic bead when shrunk, while others will be of a non-elastic nature when shrunk,

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but both types may be employed in the method and semi-automatic machine of the invention.

The above features are objects of this invention and further objects will appear in the detailed description which follows and will be otherwise apparent to those skilled in the art.

For the purpose of illustration of this invention, there is shown in the accompanying drawings a preferred embodiment thereof. It is to be understood that these drawings are for the purpose of example only and that the invention is not limited thereto.

In the drawings:

FIGURE 1 is a top plan view of the semi-automatic machine of the invention;

FIGURE 2 is a view in front elevation of the semi-automatic machine;

FIGURE 3 is a view in section taken on line 3—3 of FIGURE 1;

FIGURE 4 is a top plan view similar to FIGURE 1 but showing the engagement of the cap member by the catching member as the receptacle is moved upon the conveyor belt;

FIGURE 5 is a top plan view of the capping member;

FIGURE 6 is a bottom plan view of the capping member;

FIGURE 7 is a view in section taken on line 7—7 of FIGURE 5;

FIGURE 8 is an enlarged view in vertical section taken through the center of the catching member;

FIGURE 9 is a vertical view in section taken through the center of the receptacle showing the overlying position of the capping member placed upon the film sheet; and

FIGURE 10 is a view in section taken similarly to FIGURE 9 but showing the film shrunk upon the open top receptacle after the use of this invention.

The semi-automatic machine of this invention is generally referred to by the reference numeral 20 in FIGURES 1 through 4. As there shown, the main components of the machine comprise a work table 22, having a work surface 24, a film dispenser 26, a capping member 28, a belt conveyor 30, a pair of blowers 32 and 34, a cap catching member 36, and a ramp 38, which feeds the capped receptacles to a collecting point.

The film dispenser 26 may be of the type shown in my Patent No. 3,045,883, issued July 24, 1962, for Roll Dispenser, comprising a standard 40, roll supporting troughs 42, and pointed piercing members 44. The roll of plastic film 46 is supported within the trough and a web 48 may be extended thereover and pierced along perforations 50 in order to dispense sheets 51 of uniform size. It will be understood that one or more troughs may be supported upon the standard, such that sheets of varying sizes of different color, texture, and the like, may be employed.

The capping member 28 is best shown in FIGURES 5, 6, 7 and 9. As there shown, it is comprised of a flat base 52 in the form of a ring to which is supported a handle member 54, which has a medial or grasping portion positioned above the base to leave an opening 56 through which the catching member can be inserted to catch the handle, as will more fully appear hereinbelow. A plurality of detents 58 are provided at the bottom of the base to position the capping member properly upon the edges of the opened top receptacle in proper registry. The capping member through the ring-shaped configuration of the base, has an opening 60 in the interior, such that should the receptacle be filled with heaping portions extending somewhat over the top of the receptacle, the capping member can still be placed on the rim of the receptacle.

The belt conveyor 30 is of conventional construction and fits over a pair of rollers 62 and 64 as best shown

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in FIGURE 3. Conventional power means (not shown) is provided, as will be understood in the art, to provide for the movement of the belt conveyor in the direction of the arrow shown in FIGURE 3.

The blowers 32 and 34 are provided with nozzles 66 and 68, respectively, which are directed in the manner shown in FIGURE 1 to direct hot air upon the conveyor belt. The blowers are mounted upon supports 70 and 72 to provide for their horizontal and vertical adjustment and also to provide for their pivotal movement so that they may be directed at varying angles upon the conveyor belt. This provides for accommodation of different size receptacles.

The catching member 36 is best shown in FIGURES 1, 3, 4 and 8. As there shown, it comprises the catching member 35 in the form of an elongated element, generally in the nature of a tongue 73, having a free end 74. The catching member slopes upwardly in a generally diverging direction from the conveyor belt so that the capping members will tend to ride upwardly upon it and be lifted from engagement with the receptacle as the receptacles move along the conveyor belt. The catching member is provided with a screw adjustment 76 upon a bracket 78 suspended from a horizontal shaft 80. The horizontal shaft 80 is connected over the conveyor belt by a pair of supports 82 and 84.

A ramp 38 is positioned adjacent the end of the conveyor belt, as best shown in FIGURES 1, 3 and 4. The ramp is inclined downwardly so as to receive the capped receptacles as they discharge from the conveyor belt and the receptacles are then passed to a collection point not shown.

Method of operation

The semi-automatic capping machine of this invention is very simply operated to cap any type of open top receptacle with a plastic film. Such a use finds employment in capping dishes of the type shown by reference numeral 88 in the drawings. It will be understood, however, that other types may also be capped. For example, these dishes may be square or oblong in general plan configuration with it being understood that the capping member will be of a congruent size so that it may be placed over the top of the receptacle in mating relationship. The receptacles may be packed with foods of various type for hermetic sealing or with any type of goods, as will be readily understood.

In the capping operation, the operator will first of all withdraw the plastic film from the dispenser 26 to a position where the perforation 50 overlies the piercing member 44. A downward movement of the end of the film will cause the piercing member to pierce the web and tear the sheet along the perforation. The sheet 51 is then placed over the top of the receptacle 88 with the outer edges overlying the top edges of the receptacle, it being understood that the sheet is slightly larger than the top of the receptacle. The capping member 28 is then placed over the sheet upon the top of the receptacle as shown in FIGURES 2 and 9. In this operation, the outer marginal edges of the sheet extending beyond the receptacle, through the limp nature of the film, will drape downwardly to assume the position shown in FIGURE 9. After this operation has been performed upon the work surface area 24, the open top receptacle with any contents contained therein and the film sheet placed over it and the capping member on top will be transferred as a unit to the conveyor belt as shown in FIGURE 1. The receptacle then moves along the conveyor belt in the direction of the arrow shown in FIGURE 1 to a point between the two blowers 32 and 34. Hot air from the blowers is blown against the downwardly extending skirt marginal edge portions of the film which causes the film to shrink and a bead or shrunken band is formed along the underside of the receptacle as shown in FIGURE 10. This operation takes only a matter of seconds and as the receptacle with the cap still placed upon it moves down the con-

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veyor belt to the position shown in FIGURE 4, the catching member 74 moves inside the opening 56 and catches the cap member and lifts up and out of engagement with the open top receptacle. Due to the upwardly diverging positional relationship of the catching member as shown in FIGURE 8, the capping member tends to ride upwardly as it moves with some degree of speed and there is a camming action in effect which lifts the capping member off and away from the receptacle. The film capped receptacle with the capping member removed then rides over the end of the conveyor belt to the position shown in dotted lines in FIGURE 4, designated by the reference numeral 90, where the downwardly sloping nature of the ramp 38 discharges the receptacle to a collecting station.

It will be understood that after the operator has placed the receptacle with the sheet and the overlying capping member upon the front end of the conveyor belt, as shown in FIGURE 1, he is then free to repeat this operation while the conveyor belt automatically moves the receptacle along it past the blowers and underneath the catching member. In the repeat of this operation, the operator will grasp a previously removed capping member from the catching member in a repetition of the sequence of operations previously described, and it will be apparent that a fast, efficient, method of operation has been provided.

Various changes and modifications may be made in the machine and method of this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended hereto.

What is claimed is:

1. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises a conveyor belt means receiving the receptacle, a cap engageable with the top of the receptacle to position the film thereover, blower means adjacent the conveyor belt directing hot gas from opposed sides of the conveyor belt over the receptacle, and catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it is carried along on the conveyor belt.

2. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises a conveyor belt means receiving the receptacle, said means comprising a conveyor belt movable in a horizontal direction toward a blower means, a movable cap engageable with the top of the receptacle to position said film thereover, said blower means being positioned adjacent the belt conveyor to direct hot gas over marginal edges of the film to cause said edges to shrink against the sides of the receptacle, and catching means positioned further along the belt conveyor in the direction of its travel, said catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it is carried along on the conveyor belt.

3. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises a conveyor belt means receiving the receptacle, said means comprising a conveyor belt movable in a horizontal direction toward a blower means, a movable cap engageable with the top of the receptacle to position said film thereover, a handle member connected to the top of the cap and having a medial portion spaced above the cap to define an opening, said blower means being positioned adjacent the belt conveyor to direct hot gas over marginal edges of the film to cause said edges to shrink against the sides of the receptacle, and catching means positioned further along the belt conveyor in the direction of its travel, said catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it is carried along on the conveyor belt, said catching member extending substantially axially with the direction of travel of the conveyor belt and having

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a free end in registry with the opening of the handle member to engage the cap.

4. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises a conveyor belt means receiving the receptacle, said means comprising a conveyor belt movable in a horizontal direction toward a blower means, a movable cap engageable with the top of the receptacle to position said film thereover, a handle member connected to the top of the cap and having a medial portion spaced above the cap to define an opening, said blower means being positioned adjacent the belt conveyor to direct hot gas over marginal edges of the film to cause said edges to shrink against the sides of the receptacle, and catching means positioned further along the belt conveyor in the direction of its travel, said catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it is carried along on the conveyor belt, said catching member extending substantially axially with the direction of travel of the conveyor belt and having a free end in registry with the opening of the handle member to engage the cap, said catching member extending upwardly from its free end whereby the cap when it is engaged is caused to move upwardly from the receptacle.

5. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises means for dispensing sheets of plastic film, a conveyor belt means receiving the receptacle, a cap engageable with the top of the receptacle to position the film thereover, blower means adjacent the conveyor belt directing hot gas from opposed sides of the conveyor belt over the receptacle, and catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it is carried along on the conveyor belt.

6. Apparatus for capping receptacles with a heat shrinkable plastic film which comprises means for dispensing sheets of plastic film, said means comprising trough means

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supporting a roll of plastic film having transverse perforations and a cutting edge connected to said trough and having a perforation piercing member situated between the ends of the trough formed by a pair of wall members converging outwardly from the ends of the trough and acting as a support for the wall of film extended from the trough, a conveyor belt means receiving the receptacle, said means comprising a conveyor belt movable in a horizontal direction toward a blower means, a movable cap engageable with the top of the receptacle to position said film thereover, a handle member connected to the top of the cap and having a medial portion spaced above the cap to define an opening, said blower means being positioned adjacent the belt conveyor to direct hot gas over marginal edges of the film to cause said edges to shrink against the sides of the receptacle, and catching means positioned further along the belt conveyor in the direction of its travel, said catching means having a catching member positioned over the conveyor belt engageable with the cap to remove it from the receptacle as it carried along on the conveyor belt, said catching member extending substantially axially with the direction of travel of the conveyor belt and having a free end in registry with the opening of the handle member to engage the cap, said catching member extending upwardly from its free end whereby the cap when it is engaged is caused to move upwardly from the receptacle.

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