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3,537,137

MACHINE FOR HOT-CRIMPING SKIRTS OF PLASTIC CAPSULES AND THE LIKE

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2 Sheets-Sheet 1

Fig. 1.

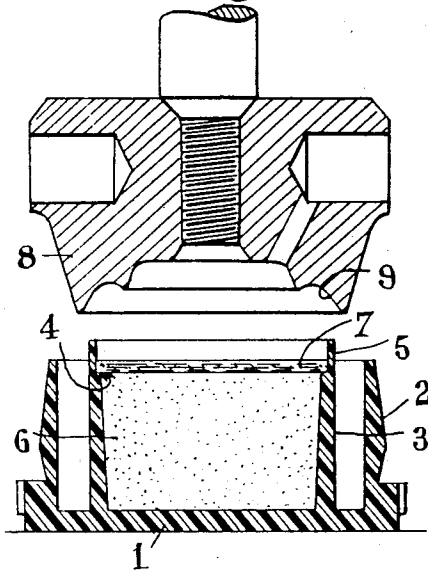
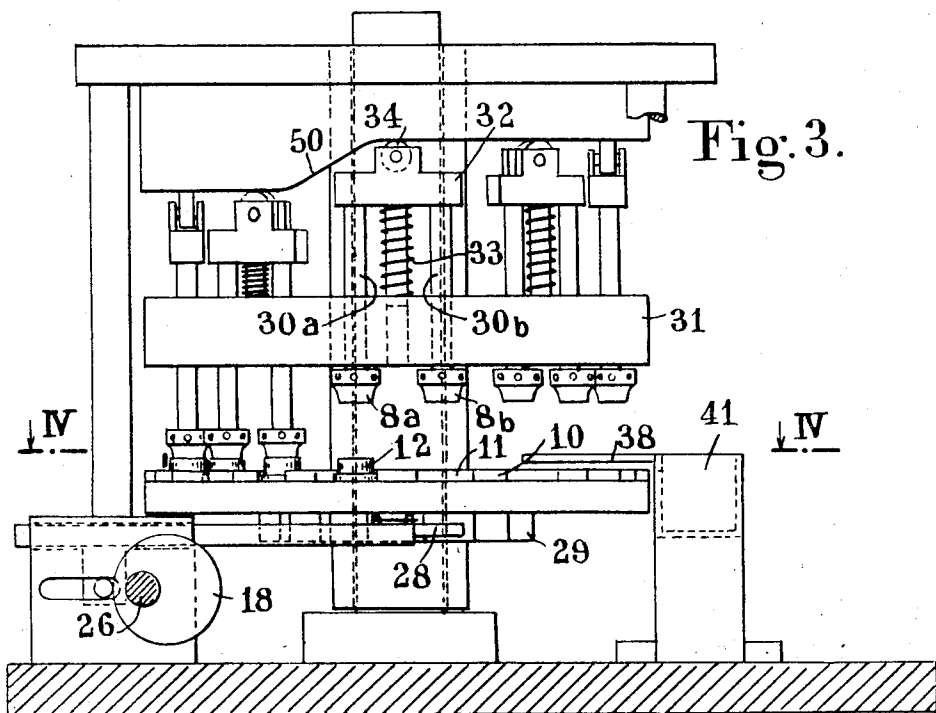
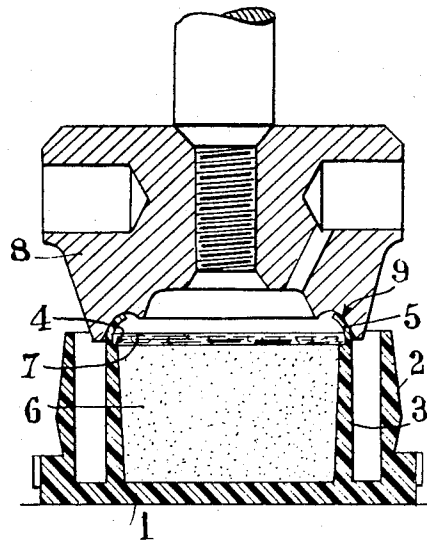


Fig. 2.



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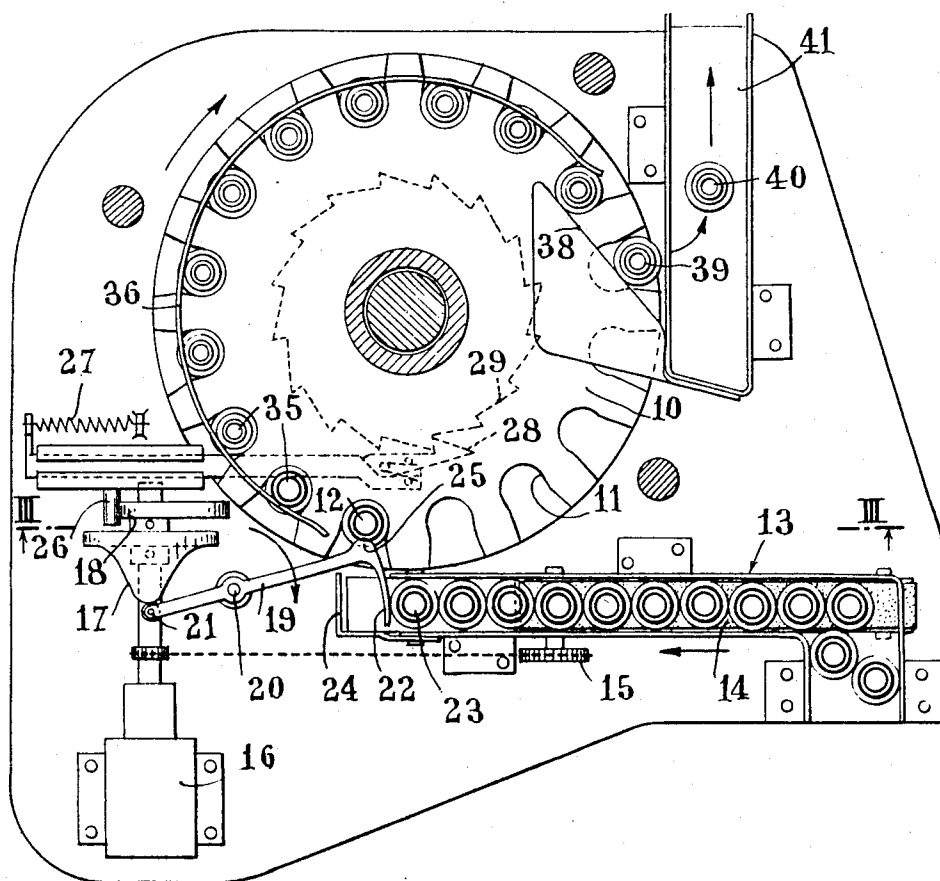
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Fig. 4.



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**MACHINE FOR HOT-CRIMPING SKIRTS OF
PLASTIC CAPSULES AND THE LIKE**
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125,242

Int. Cl. B29c 17/00, 3/00
U.S. Cl. 18—19 1 Claim

ABSTRACT OF THE DISCLOSURE

Machine for hot-crimping the skirts, plastic stoppers, capsules and gaskets, comprising a turret-platform, stations disposed at spaced intervals along the periphery of said turret-platform and adapted to receive the plastic stoppers to be crimped, crimping heads rotatably driven by said-turret platform, corresponding in number to, and overlying, said stations, said head being mounted for vertical sliding movement, spring means constantly urging said heads away from the underlying stations, a fixed cam concentric to said turret-platform and resiliently engaged by an upper extension of each crimping head, said cam being adapted to move each crimping head downwards toward the stopper to be crimped and thus cause said crimping operation to take place and subsequently allow said head to rise again under the control of said spring means upon completion of the crimping operation.

BACKGROUND OF THE INVENTION

Plastics stoppers, capsules and gaskets of round, square or other general configuration, comprising a skirt portion, are now frequently used in many applications requiring, in said skirt portion, the presence of a dehydrating product in the form of a tablet, powder or the like, which is retained in position by a cardboard disc; in all cases, to prevent the escape of the aforesaid dehydrating product the edge of the skirt is crimped onto the tablet or the cardboard disk; in certain cases, this skirt is provided internally and an external skirt is added for imparting a greater flexibility to the capsule or stopper.

Up to now the crimping operation was carried out mainly by using a conventional roller.

SUMMARY OF THE INVENTION

It is the essential object of the present invention to provide a machine for hot-crimping plastic stoppers, capsules or gaskets, which is characterized notably in that it comprises a crimping head proper, made of bronze, brass or the like, adapted to be heated to the desired temperature and shaped to produce the desired crimping step by simply exerting a pressure, without any movement of rotation, so as to produce a permanent distortion of the plastic material constituting the outer lip of the skirt.

Stoppers, capsules, gaskets or boxes of which the skirt has been crimped by the machine of this invention are easily distinguished from other similar articles by the quality of the crimping.

BRIEF DESCRIPTION OF THE DRAWING

The attached drawing illustrates by way of example a typical form of embodiment of a machine constructed according to the teachings of this invention. In the drawing:

FIG. 1 is an axial section showing in vertical axial alignment, before the beginning of the crimping operation proper, a stopper of which the skirt is to be crimped, and the corresponding crimping head;

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FIG. 2 is a similar view showing the same elements at the beginning of the crimping operation;

FIG. 3 is an elevational view of an automatic crimping machine with parts shown in section taken along the line III-III of FIGURE 4;

FIG. 4 is a horizontal section taken upon the line IV-IV of FIGURE 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The plastic stopper illustrated by way of example in the drawing comprises a bottom 1 and an external skirt 2; it further comprises an internal skirt 3 formed with an inner shoulder 4 and provided at its outer end with a thinner lip 5; a dehydrating product 6 in granular or powder form is adapted to be disposed within the inner skirt 3 and a cardboard disc or washer 7 bearing on the shoulder 4 is provided for retaining this product 6 in position.

To keep the assembly in position the lip 5 of inner skirt 3 must be crimped over the disc or washer 7.

To this end, a tool head 8 shown in FIGS. 1 and 2 is used; this head 8 is adapted to be heated by using electric current or any other suitable source of energy, and comprises at its lower portion a circular annular groove 9 of curved radial configuration; the contour of this groove 9 is such that if a pressure is exerted on the tool head 8 in a direction parallel to its axis and towards the stopper the heated circular groove 9 will soften the material constituting the thinner lip 5 of skirt 3 so as to crimp said lip over the washer or disc 7.

This operation may be carried out automatically by using the machine illustrated diagrammatically in FIGURES 3 and 4.

This machine comprises a turret-platform 10 formed with spaced peripheral notches 11 each adapted to receive an open-ended tubular plastic stopper 12 to be crimped; these stoppers are fed from a transverse chute 13 either by gravity alone, due to its inclination, or by being carried along by an endless belt conveyor 14 driven from a motor 16 by means of a transmission 15, the shaft of this motor 15 having secured thereon a pair of cams 17 and 18.

The first cam 17 controls the rocking motion of a two-armed lever 19 fulcrumed about a vertical pivot pin 20; the end of lever 19 which is opposite the follower end 21 engaging the contour of cam 17 carries an integral foot 22 adapted to stop the aligned stoppers 23 in their guide chute 13; thus, when the cam 17 causes the lever 19 to pivot about its pin 20 in the clockwise direction as shown by the arrow, this foot 22 releases the leading stopper 23 so that the latter can move forwards until it engages an abutment 24; during its movement in the opposite direction restoring said lever to the position illustrated, the heel 25 of foot 22 causes a stopper 12 to penetrate into the notch 11 then registering therewith.

Then, the other cam 18 moves the stud 26 to the left against the resistance of a return spring 27, thus moving the hook member 28 and causing the turret-platform 10 to be intermittently rotated due to engagement with one tooth 29; the number of teeth 29 corresponds to that of said peripheral notches 11; therefore, another notch is substituted for the one having just received a stopper 12 and is therefore ready to receive another stopper.

The crimping heads 8a, 8b are mounted by pairs on the lower end of rods 30a, 30b guided by a mounting ring 31 rotatably rigid with said turret platform 10, and carried by a strap 32 constantly biased upwardly by a return spring 33, so that the roller 34 carried by strap 32 rolls on a fixed cam 50 concentric to said turret-platform 10.

The assembly comprising said tool heads 8a, 8b and their supporting members 30a, 30b, 31, 32, 33 and 34 revolves bodily with the turret-platform 10.

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During this rotation, the stoppers 35 held in position by a curved guide strip 36 concentric with the turret-platform 10 are acted upon by the tool heads which, under the control of the cam 50 assume a working position operable to exert a certain pressure on the thin lips or open end portion 5 of the skirts 3 to be crimped by means of their curved grooves 9, this pressure being exerted during more than one-half of a revolution of said turret-platform 10; the heat is effective immediately so as to facilitate the crimping operation, as these heads are brought to the proper temperature to this end.

At the end of the travel, an inclined abutment member 38 is sufficient, when the heads 8a and 8b have been raised again to their upper, inoperative position, for gradually extracting the stoppers from their notches 11 and bring them in succession firstly to position 39 and then to position 40 on the discharge chute 41, as shown in FIG. 4.

Of course, the specific form of embodiment described hereinabove with reference to the accompanying drawing is given by way of example only and it will be readily understood that many modifications and variations may be brought thereto without departing from the spirit and scope of the invention as set forth in the appended claim.

What I claim is:

1. A machine for hot-crimping open-ended tubular plastic stoppers comprising a rotatably mounted turret; drive means for rotationally driving said turret; means defining a plurality of work stations on said turret for receiving and holding open-ended tubular plastic stoppers during a hot-crimping operation; supply means for sequentially supplying in an open-ended condition open-ended tubular plastic stoppers to individual ones of said work stations; a mounting ring spaced from said turret and fixed to rotate therewith; cam means defining a stationary cam track spaced from said mounting ring; a plurality of crimping elements slidably mounted in said mounting ring in a position opposed to respective ones of said work

stations; each of said crimping elements having a working position operable to effect a hot-crimping operation; each crimping element comprising a crimping head having an annular portion arcuate in cross section dimensioned to encircle and deform inwardly the open end portion of a tubular plastic stopper seated in one of said work stations, heating means for heating each crimping head, follower means cooperative with said stationary cam track in response to rotation of said turret to effect movement of each crimping head to said working position and maintain it therein throughout the hot-crimping operation, connecting means for connecting said crimping elements together in pairs; and wherein each said follower means comprises a cam follower rotatably mounted on said connecting means, and biasing means for continuously biasing said cam follower into contact with said stationary cam track.

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