

Jan. 17, 1950

A. G. ENOCK
MACHINE FOR CAPPING MILK AND OTHER
BOTTLES AND SIMILAR CONTAINERS

2,495,094

Filed May 14, 1946

5 Sheets-Sheet 1

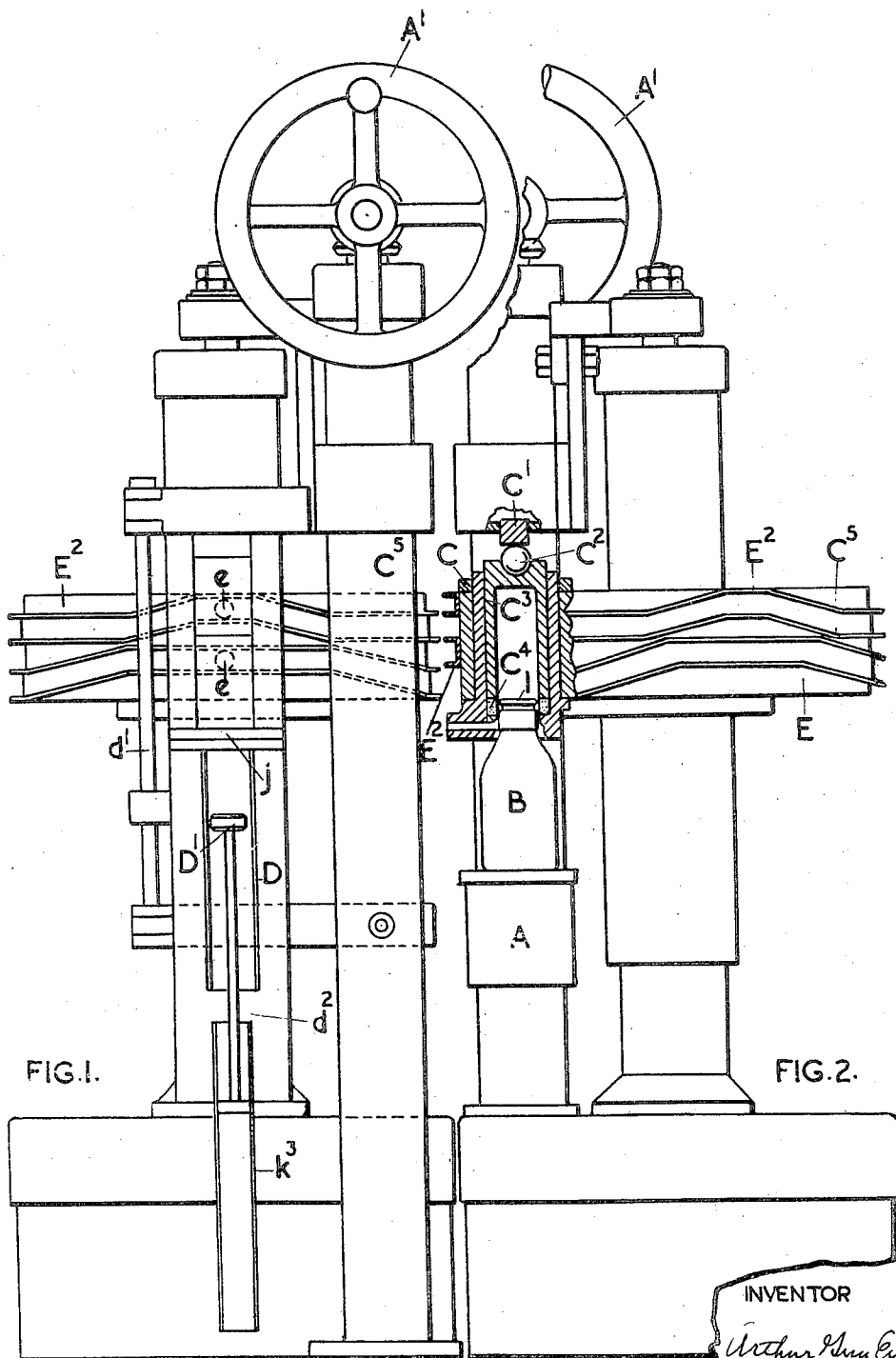


FIG. 1.

FIG. 2.

INVENTOR

Arthur G. Enock

By *Harold L. Patton*
ATTORNEYS

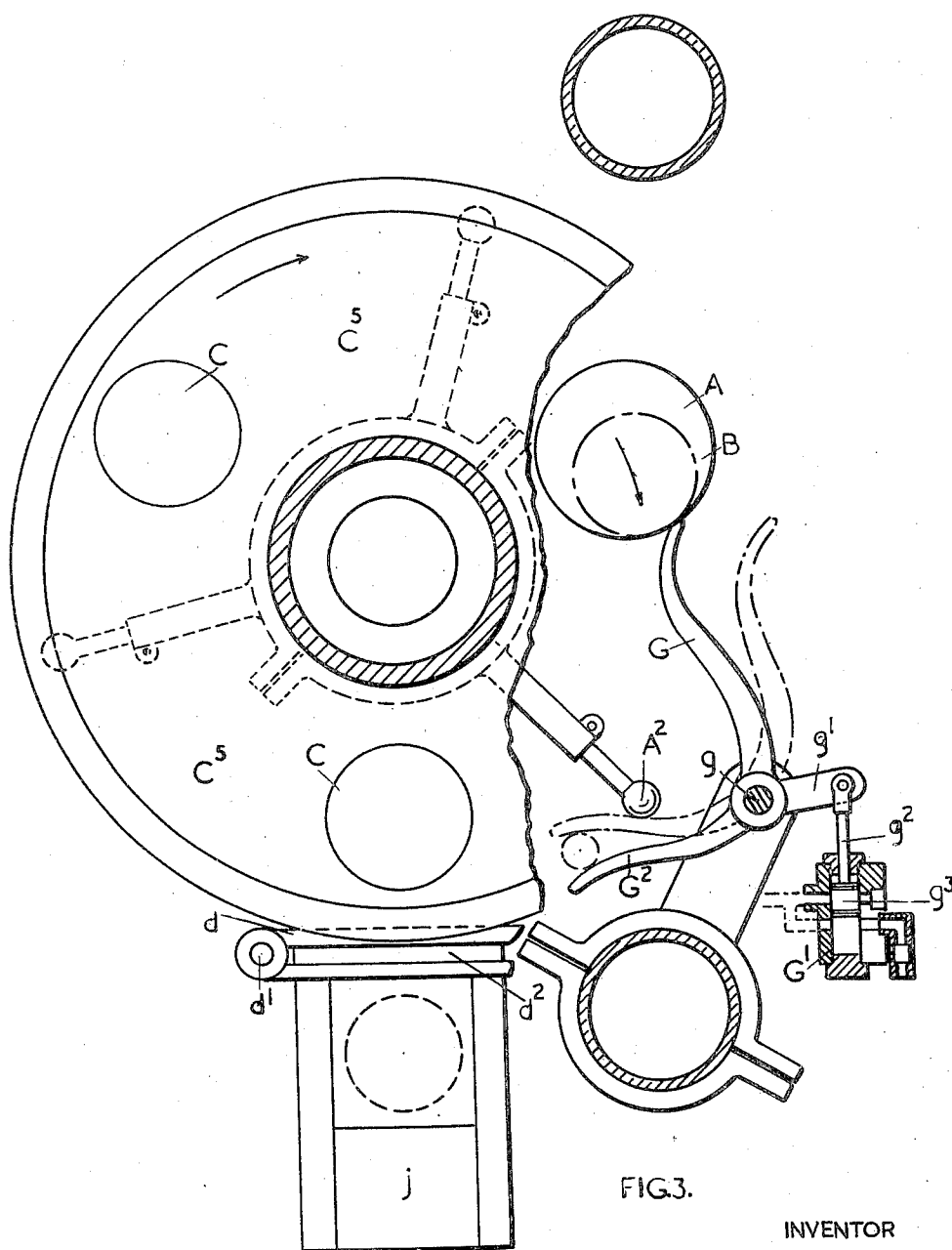
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5 Sheets-Sheet 2



INVENTOR

Arthur Guy Enock

By *Harold P. Peterson*

ATTORNEYS

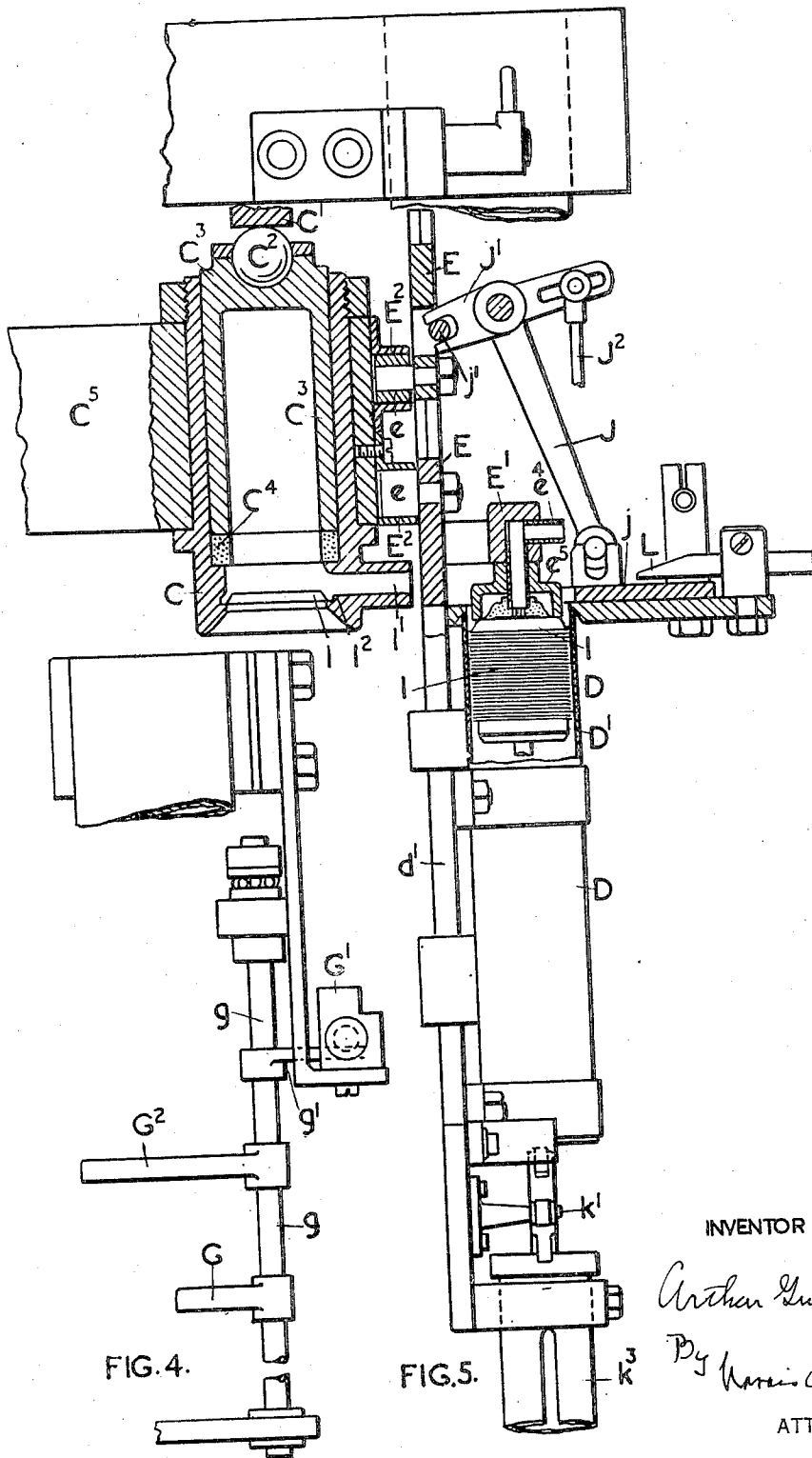
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INVENTOR

Arthur Guy Enock

By Morris C. Peterson

ATTORNEYS

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5 Sheets-Sheet 4

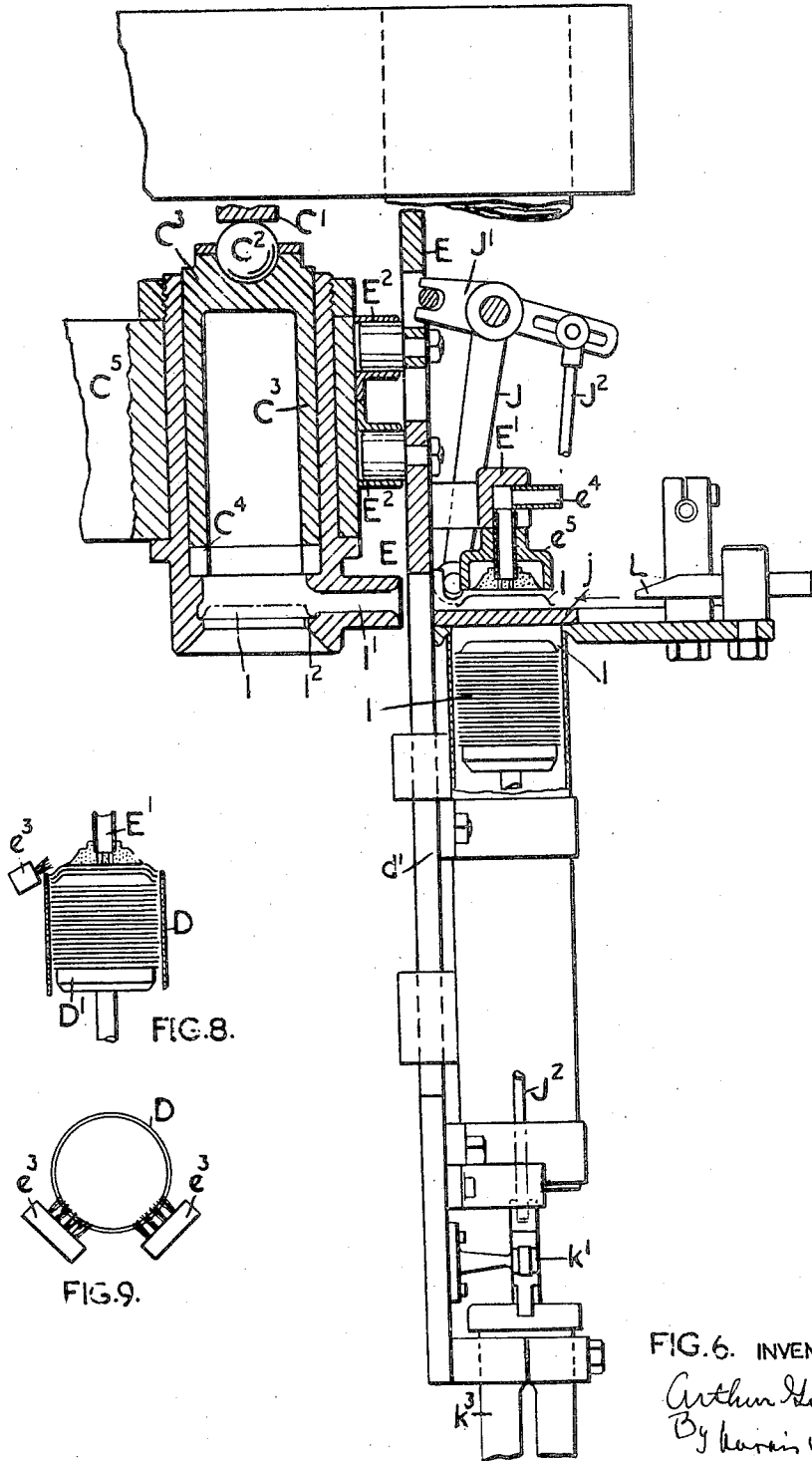


FIG. 6. INVENTOR

Arthur Guy Enock
By Harris & Attman
ATTORNEYS

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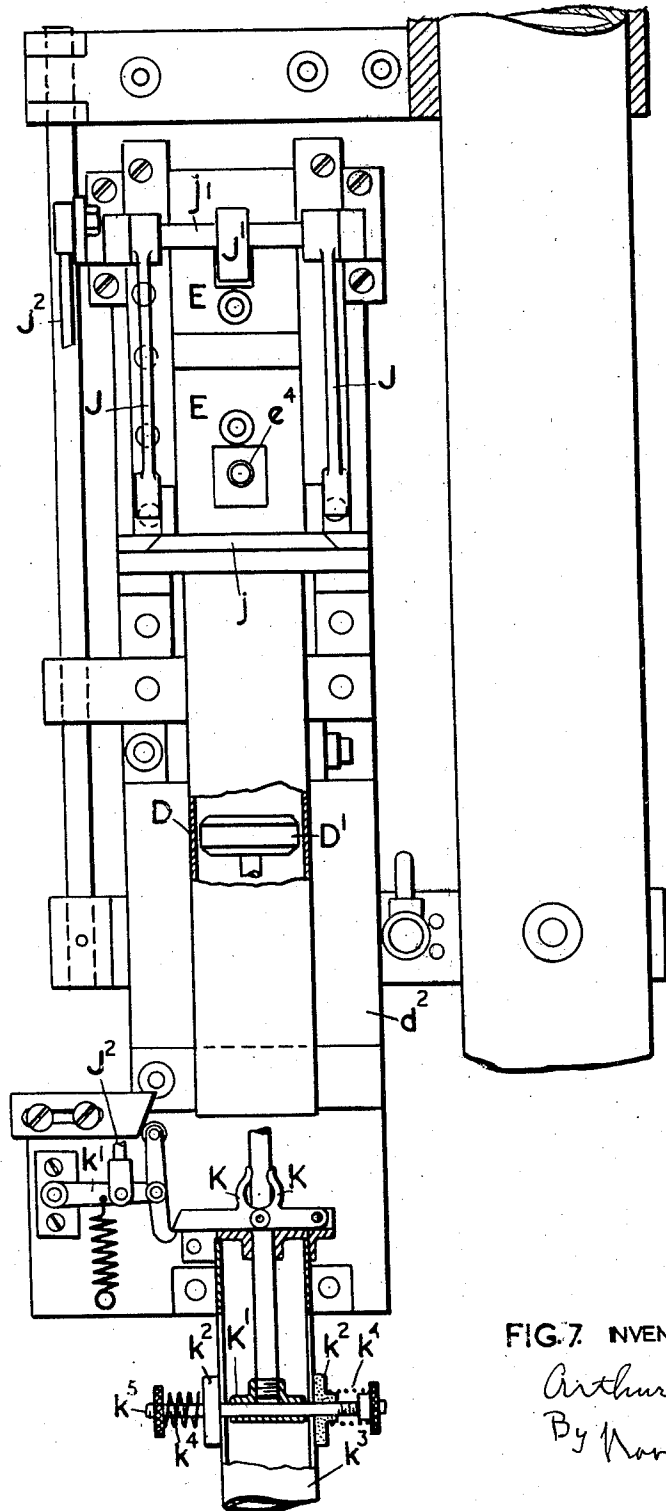


FIG. 7. INVENTOR

Arthur Guy Enock

By Norman L. Peterson

ATTORNEYS

UNITED STATES PATENT OFFICE

2,495,094

MACHINE FOR CAPPING MILK AND OTHER
BOTTLES AND SIMILAR CONTAINERS

Arthur Guy Enock, Thame, England

Application May 14, 1946, Serial No. 669,715
In Great Britain May 20, 1945

6 Claims. (Cl. 226—83)

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This invention relates to improvements in capping machines for capping milk or other bottles or like containers with caps of metal foil, plastics, cardboard or other material having a skirt which is pressed over the rim of the bottle or container.

The object of the invention is a capping machine which is entirely separate from the cap forming machine so that the latter may be located in the case of a milk bottle filling plant in a separate room or building from the bottling plant and which receives the pre-formed caps stacked in a magazine which is preferably cylindrical.

According to the invention caps are lifted from a magazine by a suction head and transferred to the capping position means being provided for raising succeeding caps in the magazine for subsequent transfer by the suction head.

The invention will be described with reference to the accompanying drawings:

Fig. 1 is a side elevation of the capping machine;

Fig. 2 is an elevation partly in section of the machine from the opposite end to that shown in Fig. 1;

Fig. 3 is a diagrammatic plan of Fig. 1;

Fig. 4 is an elevation of vertical shaft carrying the operating cams for the vacuum valve;

Fig. 5 is a vertical section through the capping machine and cap magazine;

Fig. 6 is a similar view showing a cap in position for transferring to the capping position;

Fig. 7 is a part elevation of Fig. 5;

Fig. 8 is a detail view of suction head and magazine showing means for preventing more than one cap being lifted at a time;

Fig. 9 is a plan of Fig. 8.

The invention will be described with reference to a rotary capping machine provided with three bottle receiving pedestals A and having a single capping position into which each pedestal A is rotated in turn.

A cap 1 is transferred as described hereafter into position in the capping head C in which it is pressed over the bottle mouth in known manner by a skate C¹ acting upon a roller C² to depress a capping member C³ which deforms a resilient ring C⁴ to mould the skirt of the cap 1 around the mouth of the bottle. The capping head is carried by a carrier C⁵.

The pedestal A with bottle B thereon is raised to the cap squeezing level and lowered therefrom in known manner by rollers at the lower ends of the pedestals running upon a ramp in the base of the machine. A hand wheel A¹ acting

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through a bevel wheel shaft a is provided for varying the height above the pedestals A of a cap magazine D, cap feeding mechanism and the carrier C⁵ and its capping heads, C to accommodate bottles of varying heights.

The caps 1 stacked one on top of another are stored in a removable magazine D with the lowermost cap resting on a plunger D¹ capable of being moved upwards through the magazine as the supply of caps diminishes.

The caps 1 are transferred from the magazine D to the capping head C by a suction head E¹ controlled by a slide E carrying rollers e engaging cam tracks E² mounted on the carrier of the three capping heads C. The magazine D is carried by brackets d pivoted on a vertical rod d¹ carrying a sole plate d² to be capable of being swung outward for attention when required.

As a bottle B approaches the capping position the rollers e engage a rise in the cam tracks E² to raise the slide E and suction head E¹ and simultaneously the bottle also contacts a lever G keyed on a vertical shaft g to cause this shaft to rotate through a predetermined arc. The shaft g carries a further arm g¹ connected to a connecting rod g² controlling a piston valve g³ sliding in a vacuum cylinder G¹ to apply a vacuum to the head E¹. As the suction is applied to the head E¹ it raises a cap 1 from the magazine D. A brush or brushes e³ (Figs. 8 and 9) may engage the skirt of the cap as it leaves the magazine to prevent more than one cap being lifted at a time.

The suction is applied to the head E¹, Fig. 6, through a pipe e⁴, Fig. 5, therein communicating with the cylinder G¹, Fig. 3.

As the capping head carrier rotates so as to bring the capping head C into the position to receive a cap a bottle comes in contact with the arm G and operates the vacuum valve g³ so as to admit vacuum to the suction head E¹ and when the capping head C has reached this position the vacuum is broken by the arm A² coming into contact with arm G² and thus closing the vacuum valve g³ and allowing the cap to drop on to the slide j, Fig. 5, when it is blown into the capping head C.

If there is no bottle on the pedestal it is necessary to prevent the pick-up of a cap and this is effected by the arm G remaining stationary thus causing the vacuum valve g³ to remain closed and preventing the sucker from picking up a cap.

During the raising of the suction head E¹ into the position shown in Fig. 6 an arm J carried by a lever J¹ moves a plate j over the mouth

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of the magazine D. The lever J^1 is forked at one end to engage a transverse shaft j^1 , Fig. 5, mounted on the slide E and at its other end is adjustably connected to the upper end of a rod J^2 the lower end of which is connected to a link k , Fig. 7. The column of caps l is raised by the plunger D^1 , Fig. 5, which is moved upwards by friction grips K mounted on a crosshead K^1 through the lever k^1 connected to one end of the link k carrying the lower end of the rod J^2 . If the uppermost cap is raised too high a hollow plunger e^6 , Figs. 5 and 6, in the suction head E^1 pushes it down again whilst the friction crosshead K^1 remains stationary due to friction grips k^2 travelling vertically on a cylinder k^3 . The pressure exerted by the friction grips k^2 is adjusted by springs k^4 on a spindle k^5 passing through the grips k^2 and cylinder k^3 .

When the suction to the suction head E^1 is cut off with the head in the position shown in Fig. 6 the cap carried thereby drops onto the plate j and is blown by a jet of compressed air from a nozzle L in known manner through a chute l into a recess l^1 in the capping head ready to be applied to the bottle B by the resilient ring C^4 .

After the cap has been applied to the bottle the slide E is lowered due to the rollers e traversing a descending portion of the cam track E^2 causing the plate j to be removed from the mouth of the magazine D and the suction head E^1 to re-enter this latter ready to engage a further cap l when a succeeding bottle moves towards the capping position and again applies suction to the sucker.

Although the invention has been described with reference to a rotary capping machine it is equally applicable to a capping machine with the bottles arranged to approach the capping position in line.

I claim:

1. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage a suction head actuated by the slide, a vacuum cylinder and piston valve by which the suction head is operated a plate controlled by the slide to move over the mouth of the magazine as the suction head rises to receive the cap when the vacuum is broken and a compressed air jet to transfer the cap from the plate to the capping position.

2. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage a vacuum cylinder and piston valve by which the suction head is operated a rocking shaft by which the vacuum is applied and broken and means for rocking the shaft.

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3. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage a suction head actuated by the slide, a plunger adapted to raise the caps into a position to be engaged by the suction head, friction grips operating on the plunger and by which it is raised after removal of a cap therefrom, and means for actuating the friction grips.

4. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage a vacuum cylinder and piston valve by which the suction head is operated a plate controlled by the slide to move over the mouth of the magazine as the suction head rises to receive the cap when the vacuum is broken a compressed air jet to transfer the cap from the plate to the capping position and a resilient ring to mould the edges of the cap around the mouth of the bottle.

5. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage, a suction head actuated by the slide, a plunger adapted to raise the caps into a position to be engaged by the suction head, a brush to prevent more than one cap rising at a time, and friction grips operating on the plunger and by which it is raised after removal of a cap therefrom.

6. A capping machine for capping milk or other bottles comprising pedestals for supporting the bottles, a capping head for applying a cap to the bottle, a magazine for storing the caps, a vertical slide, rollers on the slide and cam tracks mounted on the capping head in which the rollers engage, a suction head actuated by the slide for removing the caps from the magazine, a vacuum cylinder and piston valve by which the suction head is operated, a compressed air jet to transfer the cap from the suction head to the capping position, and a resilient ring to mould the edges of the cap around the mouth of the bottle.

ARTHUR GUY ENOCK.

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