Mar. 13, 1923.

1,448,026

B. K. FORD

CAPPING MACHINE

Filed Mar. 26, 1921

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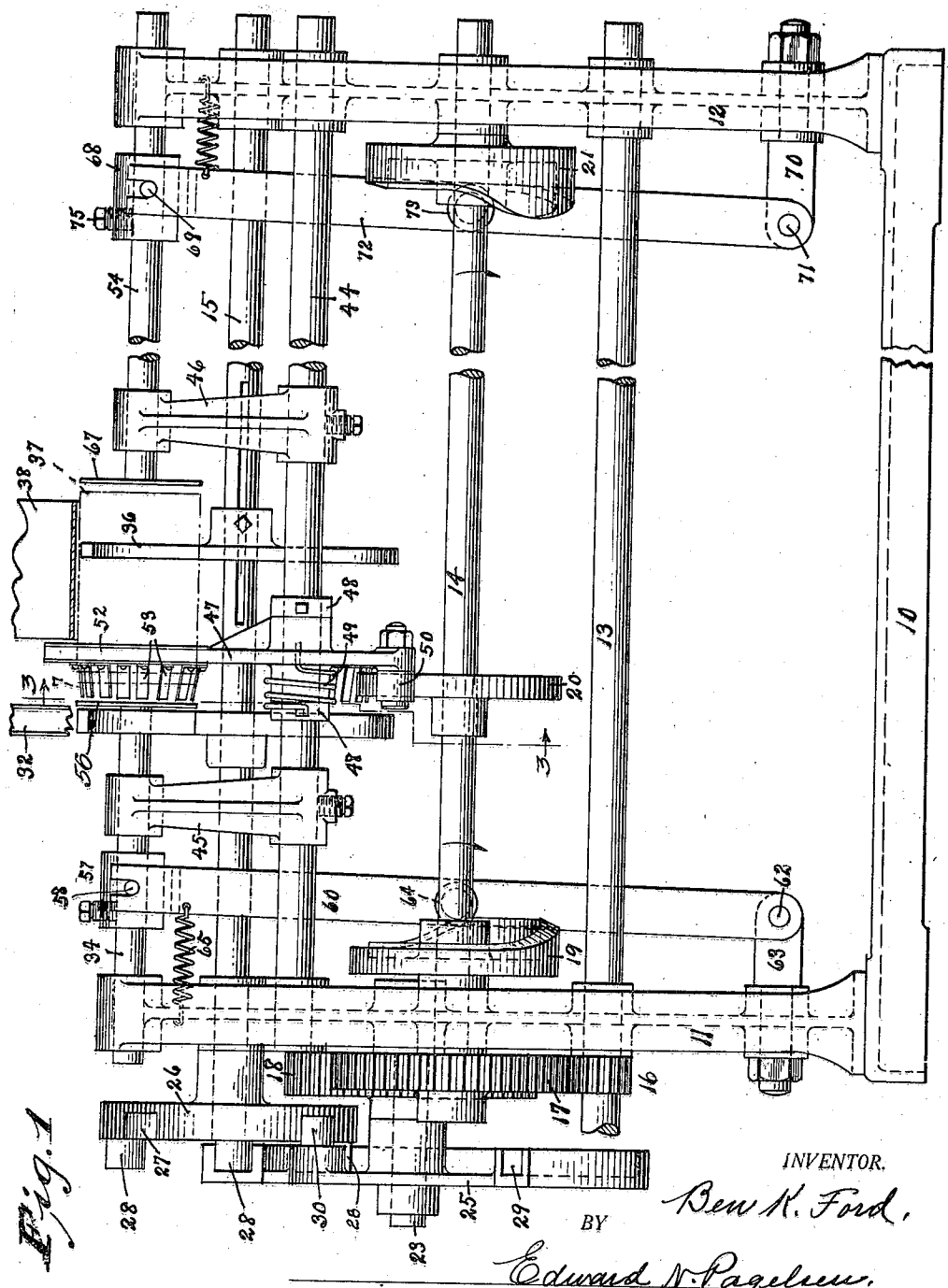


Fig. 1

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3 sheets-sheet 2

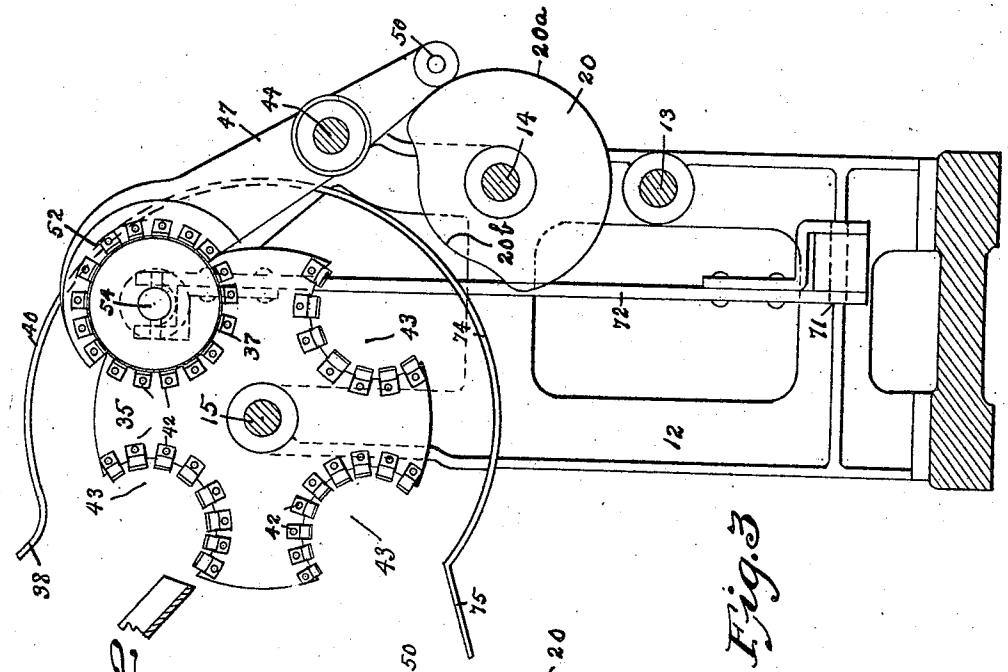


Fig. 2

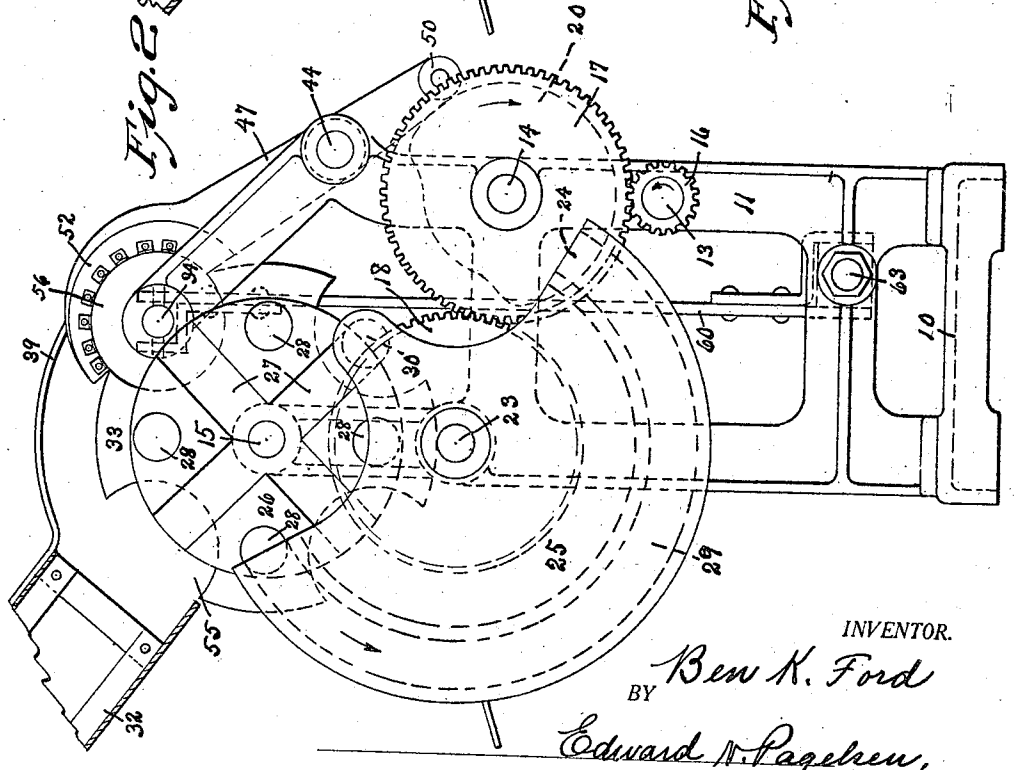


Fig. 3

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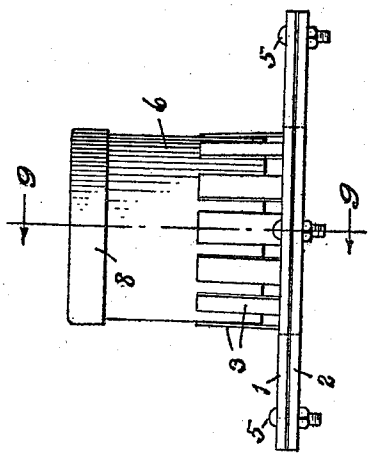


Fig. 8

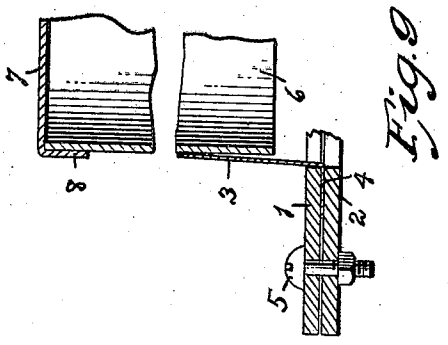


Fig. 9

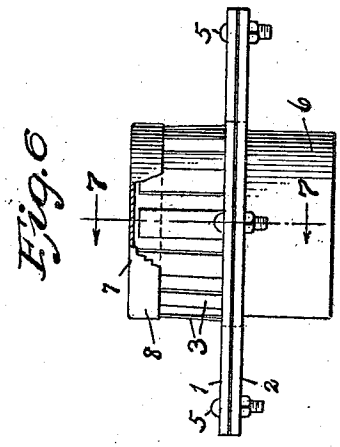


Fig. 6

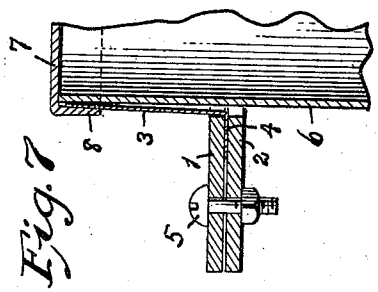


Fig. 7

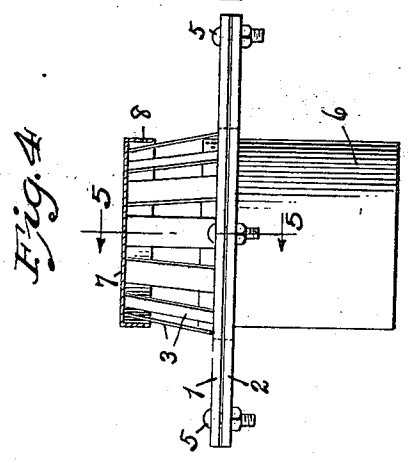


Fig. 4

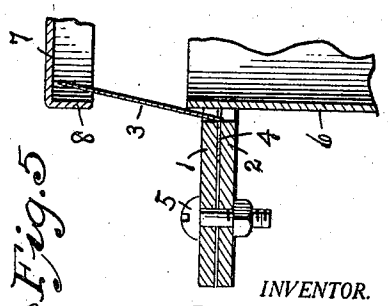


Fig. 5

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Patented Mar. 13, 1923. 1,448,026

UNITED STATES PATENT OFFICE.

BEN K. FORD, OF OAK PARK, ILLINOIS.

CAPPING MACHINE.

Application filed March 26, 1921. Serial No. 455,826.

To all whom it may concern:

Be it known that I, BEN K. FORD, a citizen of the United States, and residing at Oak Park, in the county of Cook and State of Illinois, have invented a new and Improved Capping Machine, of which the following is a specification.

This invention relates to means for assembling container bodies and caps, and while the device is adapted to apply caps of sheet metal, it is especially useful in connection with caps of paper, which so often get out of shape and which often shrink to scant size so that it becomes very difficult to apply the caps to the containers.

This invention consists of a ring of inwardly inclined blades, the caps of the containers being placed over the ends of the blades and the bodies of the containers being moved relatively longitudinally within the ring of blades into the caps until the caps are pulled off the ends of the blades by the containers.

It further consists in a blade support made in two parts which may be swung apart to release the capped container.

It also consists in means for feeding the container bodies and caps to the point where they are to be united, one of the carrying devices consisting of groups of blades which, together with a stationary group, will in turn constitute complete rings, and means for moving the containers relative to the caps.

It also consists in the details of construction illustrated in the accompanying drawing and particularly pointed out in the claims. While I have shown round rings of blades in the drawings, it will be understood that this invention is not limited thereto, as containers of any desired cross section may be supplied with caps by devices embodying this invention.

In the accompanying drawing, Fig. 1 is a side elevation of a power machine for applying caps to cylindrical containers. Fig. 2 is an end elevation thereof and Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is an elevation of a capping device adapted to be operated by hand, the cap being in position and the body being pushed up. Fig. 5 is a section on the line 5—5 of Fig. 4. Fig. 6 is another elevation showing the body pushed up into the cap. Fig. 7 is a section on the line 7—7 of Fig. 6. Fig. 8 is a third elevation showing the cap on the container and the container ready to be removed from the capper. Fig. 9 is a section on the line 9—9 of Fig. 8.

Similar reference characters refer to like parts throughout the several views.

I have shown the simplest embodiment of my invention in Figs. 4 to 9 inclusive. Two plates 1 and 2 are provided with openings somewhat larger than the outer diameter of the container which is to be capped. A series of thin narrow blades are formed with feet 4 which are gripped between the plates when pressed together by the bolts 5. These blades normally slope toward each other as indicated in Figs. 4 and 5 and while they are preferably of spring steel, they may even be of tough paper to do the work.

When it is desired to cap a container 6, the cap 7 is placed on the ends of the blades 3, as indicated in Figs. 4 and 5, and the body 6 is pushed up, as indicated in Figs. 6 and 7, the thin blades preventing the container touching the flange 8 of the cap while moving up into the cap. This is true even when the internal diameter of a paper cap is less than the external diameter of the body and the forcing of the body up into the cap temporarily stretches this flange 8. Further movement of the body 6 causes it to lift the cap 7 entirely free from the blades as indicated in Figs. 8 and 9.

The simple device thus far described functions very satisfactorily where but few containers are to be capped. Where a large number of containers are to be taken care of, the power driven machine shown in Figs. 1, 2 and 3 may be employed.

A base 10 carries the frames 11 and 12 in which are mounted a countershaft 13, rotated in any desired manner, a main shaft 14 which makes one rotation for each cap applied, and a carrier shaft 15 which rotates intermittently. On the countershaft 13 is secured a pinion 16 which meshes with the gear 17 attached to the main shaft 14, on which main shaft are the cams 19, 20 and 21. A stud shaft 23 extends from the frame 11 and rotatable together thereon are the gear 18 and the mutilated disk 25 of a Geneva movement. On the carrier shaft 15 is a disk 26 which has the crossed grooves 27 and carries the pins 28. The mutilated disk 25 has a circular groove 29 to receive the pins 28 and carries a pin 30 adapted to slide in the crossed grooves 27.

The disk 25 rotates constantly, and while

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a pin 28 is in the groove 29, the shaft 15 is prevented from turning. The end of this rest is shown in Fig. 2. At this point the pin 30 enters a groove 27 and causes the disk 26 and shaft 15 to turn one fourth rotation. At the end of this movement the forward end 24 of the groove 29 reaches the next pin 28 (that at the right in Fig. 2) and thus again prevents this disk from turning, which rest continues for three fourths of the rotation of the disk 25. The advantage of this mechanism is that the parts may be machined in ordinary lathes, drill presses and milling machines.

A chute 32 conveys caps to the notched disk or carrier 33, which moves each cap in turn into alinement with the rod 34. At the same time the pair of carriers 35 and 36 receive a container 37 from the chute 38, the guards 39 and 40 preventing the cap and body from leaving the pockets in the carriers. Any proper means may be used to supply the caps and bodies to the carriers and for guiding them until they reach the capping devices.

A series of blades 42, similar to the blades 3 shown in Figs. 4 to 9, are attached to the carrier 35 adjacent each semi-circular pocket 43 therein. A shaft 44 extending between the frames 11 and 12 carries guide arms 45 and 46, and a lever 47. The collars 48 position this lever longitudinally of the shaft 44 and a spring 49 holds the roller 50 on the lower end of the lever against the cam 20. The lever has a semi-circular upper end 52 to which are attached another series of spring blades 53, which form a complete set of these plates with each group of blades 42 adjacent each pocket 43.

The cam 20 is so positioned and formed that the roller 50 will run on the outer portion 20^a during nearly all the time the shaft 15 is at rest, but the roller 50 reaches the inner portion 20^b just before the shaft 15 begins to turn, so that while a container body is being carried into alinement with the rod 54, the upper end of the lever 47 together with its blades 53 are out of the path of this container. But as soon as the container body comes to a rest, the upper end 52 of the lever swings down so that the blades 53 thereon will complete the ring which receives the cap.

As stated before, the cap is carried into alinement with this ring of blades in a pocket 55 in the carrier 33. To move this cap onto these blades the rod 34 is provided with a circular plate 56 on its inner end to engage the cap, and a collar 57 is attached to this rod and provided with a pin 58 extending into a notch in the upper end of the lever 60. This lever is mounted on a pin 62 carried by a post 63 secured to the lower part of the frame 11, and carries a conical roller 64 which engages the cam 19, being held against it by the spring 65. The operation of these parts is timed to move the cap inwardly onto the ends of the plates 42 and 53 and hold it there until these blades are sprung out by the container body. The rod 34 is slidable in the upper end of the arm 45 and in the frame 11.

A second rod 54 is slidable in the frame 12 in the arm 46, and has a disk 67 on its inner end. A collar 68 on this rod carries a pin 69 that extends into a notch in the upper end of the lever 72, pivoted at 71 on the post 70. The conical roller 73 on this lever engages the cam 21 whereby the rod 54 is moved inwardly to push the container body 37 entirely into the cap 7 until the cap is slipped off the ends of the blades, the action of the blades being the same as in the device shown in Figs. 4 to 9. The rod 34 recedes before the rod 54 completes its stroke so that the cap cannot be injured and the rod 54 recedes before the lever 46 rises and the carrier begins to turn.

The capped container is carried around by the carriers 35 and 36, being held in position by the guide strap 74 until the chute 75 directs the container out of the machine. The machine constructed for containers three inches in diameter can cap one hundred containers per minute. The rod 54 may be slid along in the collar 68 when the set screw 75 is released to accommodate the machine for containers of different lengths, the carrier 36 being similarly adjustable on the shaft 15.

The machine may be mounted with the shafts vertical when it is desired to cap filled containers.

The details of the several parts may all be changed by those skilled in the art without departing from the spirit of my invention as set forth in the following claims.

I claim:—

1. In a capping machine, a support formed of a plurality of parts movable toward and from each other, and blades attached to each part of the support and adapted when the parts of the support are united to receive a container cap on their free ends, said support having an opening to permit a container body to be moved longitudinally into the cap.

2. In a capping machine, a support formed of two parts movable toward and from each other, blades attached to each part of the support and having their free ends inclined toward each other when the two parts of the support are united, means to place a container cap on said free ends, said support having an opening, and means to move a container body longitudinally in said opening into said cap.

3. In a capping machine, a support formed of two parts movable toward and

from each other, blades attached to each part of the support and having their free ends inclined toward each other when the two parts of the support are united, means to place a container cap on said free ends, said support having an opening, means to move a container body longitudinally in said opening into said cap, and means to separate the two parts of the blade support to release the container.

4. In a capping machine, an intermittently rotating disk having semi-circular pockets in its periphery, a lever having a semi-circular pocket, means to swing the lever so its pocket will register with the pockets in the disk as the disk is rotated, a series of spring blades attached to the disk at the edge of each pocket in the disk and lever and inclining toward each other, means to conduct container bodies to the pockets in the disk, means to place caps over the ends of said blades, and means to push the container in the registering pockets into the cap.

5. In a capping machine, an intermittently rotating disk having semi-circular pockets in its periphery, a lever having a semi-circular pocket, means to swing the lever to its pocket will register with the pockets in the disk as the disk is rotated, a series of spring blades attached to the disk at the edge of each pocket in the disk and lever and inclining toward each other, means to conduct container bodies to the pockets in the disk, means to place caps over the ends of said blades, and means to push the container in the registering pockets into the cap, comprising a longitudinally slidable rod with a disk at its inner end, a lever and a cam to actuate the last named lever.

In a capping machine, a carrier shaft and means to rotate the shaft step by step, three disks secured on said shaft and provided with alined pockets, a lever mounted to swing in the plane of the middle disk and formed with a pocket adapted to register with the pockets of the middle disk as it rotates, blades attached to said lever and the middle disk around the pockets therein, means to move the caps out of said pockets of one of the end disks onto the ends of the blades, means to supply container bodies to the pockets of the middle and the other end disks, and means to push said bodies into the caps on the blades and the cap off the blades.

7. In a capping machine, a carrier shaft and means to rotate the shaft step by step, three disks secured on said shaft and provided with alined pockets, a lever mounted to swing in the plane of the middle disk and formed with a pocket adapted to register with the pockets of the middle disk, blades attached to said lever and the middle disk as it rotates around the pockets therein, means to move the caps out of said pockets of one of the end disks onto the ends of the blades, means to supply container bodies to the pockets of the middle and the other end disks, means to push said bodies into the caps on the blades and the cap off the blades, and means to swing the lever to carry the blades thereon out of engagement with the container in its pocket to permit the discharge of the capped container and the placing of another container.

8. In a capping machine, a support comprising two parts movable to register with each other, blades attached to said parts to form substantially a frustum of a cone when assembled and adapted to extend into a container cap, means to guide a container body and cap to said blades, means to move the body into the cap, and means to separate the two parts of the support to release the body.

BEN K. FORD.