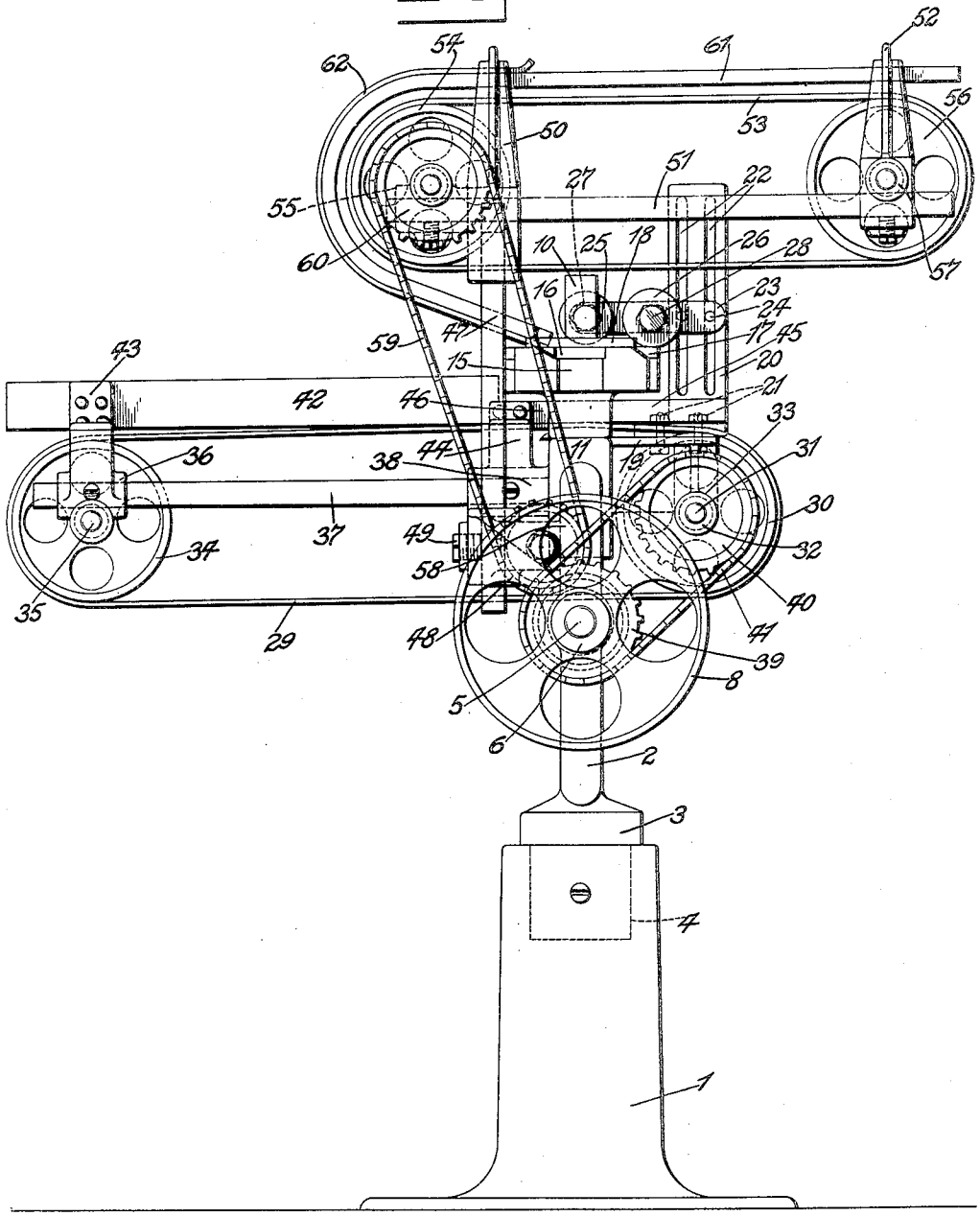
Aug. 26, 1924. 1,506,209

E. C. WEHNERT ET AL

CAPPING MACHINE

Filed Nov. 20, 1922 4 Sheets-Sheet 1

Fig. 1.



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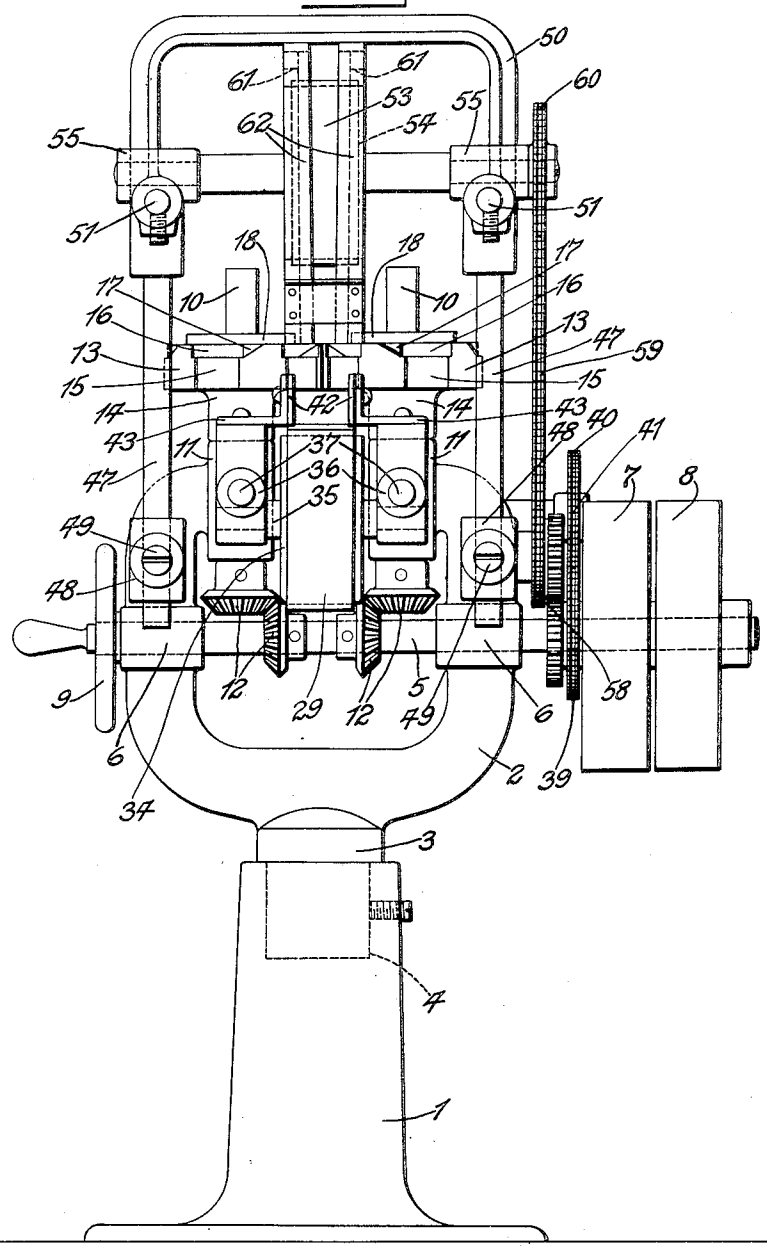
Aug. 26, 1924. 1,506,209

E. C. WEHNERT ET AL

CAPPING MACHINE

Filed Nov. 20, 1922 4 Sheets-Sheet 2

Fig. 2.



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Aug. 26, 1924. 1,506,209

E. C. WEHNERT ET AL

CAPPING MACHINE

Filed Nov. 20, 1922 4 Sheets-Sheet 3

Fig. 3.

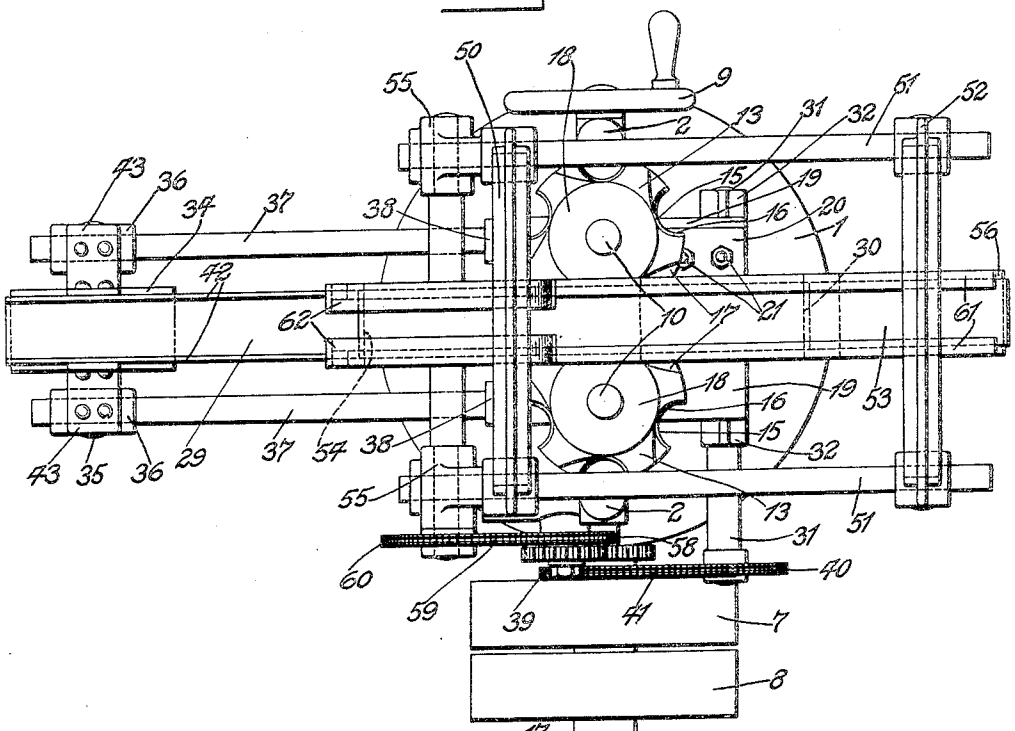
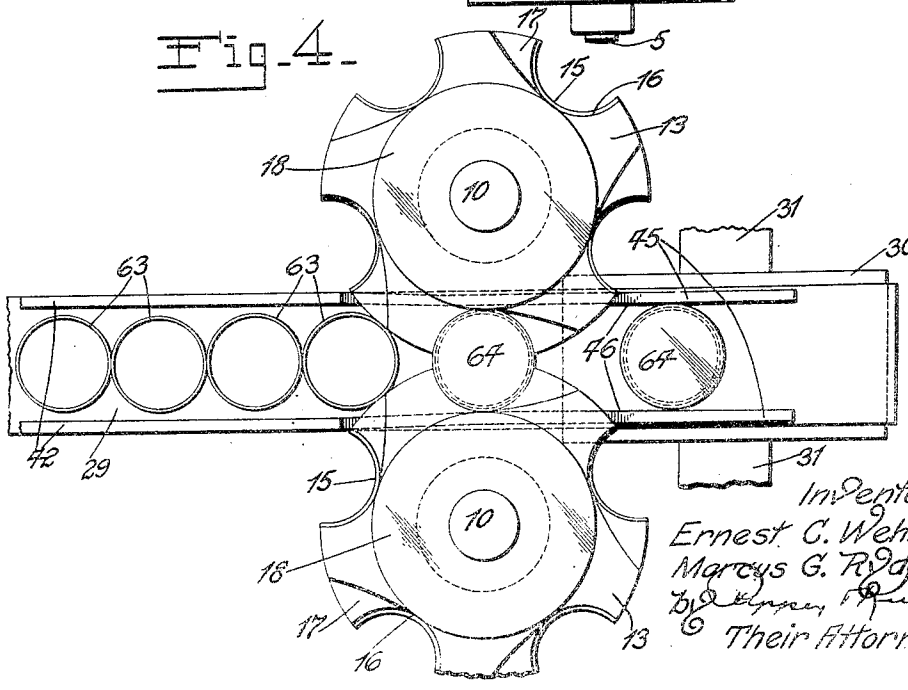


Fig. 4.



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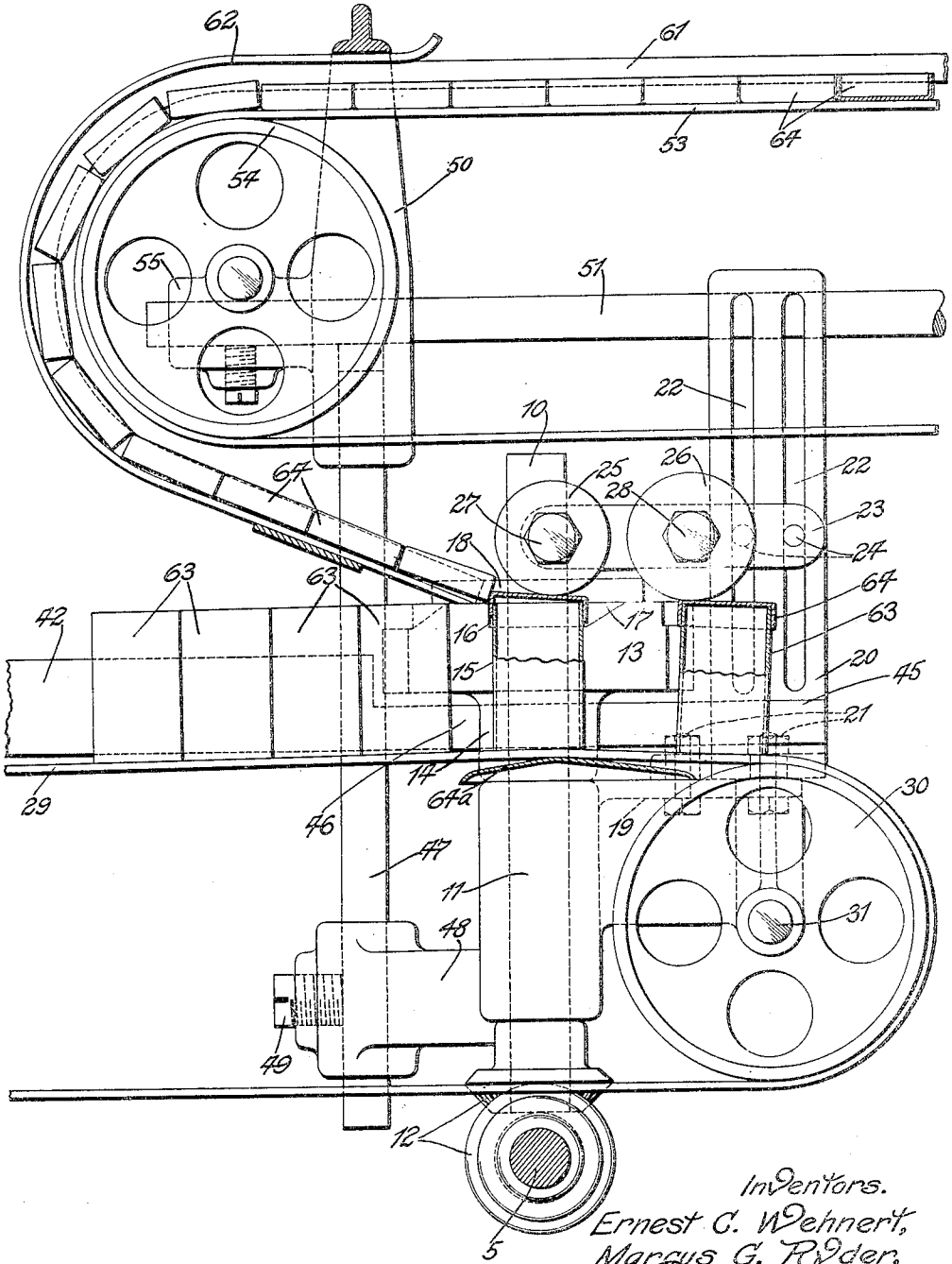
Aug. 26, 1924. 1,506,209

E. C. WEHNERT ET AL

CAPPING MACHINE

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Fig. 5.



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Patented Aug. 26, 1924. 1,506,209

UNITED STATES PATENT OFFICE.

ERNEST C. WEHNERT, OF ST. LOUIS, AND MARCUS G. RYDER, OF OVERLAND, MISSOURI.

CAPPING MACHINE.

Application filed November 20, 1922. Serial No. 602,046.

To all whom it may concern:

Be it known that we, ERNEST C. WEHNERT, a resident of St. Louis County, Missouri, and MARCUS G. RYDER, a resident of Overland, St. Louis County, Missouri, citizens of the United States, have invented a new and useful Capping Machine, of which the following is a specification.

This invention relates to improvements in capping machines, and consists in the novel construction hereinafter disclosed.

An object of the invention is to provide a machine for automatically applying metal or paper covers, either tops or bottoms, to cylindrical or polygonal containers.

Another object of the invention is to provide conveying mechanism for containers, in combination with co-ordinated conveying mechanism for tops or covers for said containers, and automatic mechanism for applying the tops or covers to the containers after which the capped containers are moved forward and discharged from the machine.

Another object of the invention is to provide in a machine of the class described certain adjustable features that will be more particularly pointed out hereinafter, whereby the machine may be adjusted for operating upon containers of different dimensions and contours.

Another object of the invention is to equip a machine of the class described wherein the cover conveyor is so arranged as to receive the covers fed thereto in a reverse position and to deliver the covers in such a position that they may be readily moved in place upon containers fed to the machine by a separate conveyor.

Another object of the invention is to equip a machine of the class described with coordinated driving mechanism whereby the movements of the machine will be synchronized by the delivery of the container and the covers to the capping mechanism, and to move the capped containers for discharge from the machine.

Other advantages will be apparent from the following detailed description of the invention taken in connection with the accompanying drawings, in which—

Fig. 1 is a side elevation of the machine embodying the invention.

Fig. 2 is a front elevation of the machine.

Fig. 3 is a plan view of the machine.

Fig. 4 is a detailed view further illustrating the capping mechanism.

Fig. 5 is an enlarged vertical section through a section of the machine to illustrate the essential operations of the machine.

In the embodiment of the invention illustrated in the drawing the machine is shown as including a base or pedestal 1 which adjustably supports a frame member 2, the body of which is substantially U-shaped and which has an extension 3 fitting in a socket 4 in the top of the pedestal. This construction permits the frame of the machine to be raised and lowered in respect of the pedestal for adjusting the height of the machine.

The main operating shaft 5 of the machine is supported in bearings 6 formed in the arms of the frame 2. The operating shaft extends a considerable distance beyond the side of the frame at one side, said extending portion of the shaft carrying a fast and loose pulley 7 and 8 for driving the shaft. The other arm of the shaft 5 terminates close to the frame of the machine and has attached thereto a hand wheel 9 for manual operation of the shaft.

A pair of vertical shafts 10 are mounted in bearings 11 supported at the ends of the arms of the frame member 2. The shafts 10 are driven in opposite directions at the same rate of speed from the power shaft 5 by means of a pair of oppositely disposed bevel gears 12 carried by the shaft 5 and the shafts 10 respectively. The shafts 10 extend for a considerable distance above the frame of the machine and each carries a head member. Each of the head members comprises a circular body 13 formed with a hub 14 on its under face, there being an opening extending through the axis of the body member and of the hub so that the heads may be removably supported upon the shafts 10 to which they are affixed in any convenient manner, preferably by keying them on the shafts. The periphery of the body member 13 of each head is provided with a series of notches 15, the upper wall of which is counter-bored forming a recess 16 at the top of the notches 15. The face of the body 13 is beveled to form an annular recess 17 at the forward edge of each of the notches 15, the purpose of said recesses 16 and 17 being more fully described hereafter.

Upon the top face of each of the bodies

13 is a boss 18, the diameter of the boss 18 being such that the vertical plane of the periphery thereof intersects the vertical plane of the base of the recesses 16. The wall formed by the edge of the boss 18 constitutes a guide for the covers as will be hereinafter more clearly described.

Projecting rearwardly from each of the members 11 of the machine is a bracket 19 and supported by one of said brackets is an upright support 20 adjustably secured to the bracket by bolts 21. The support 20 is provided with a pair of parallel elongated slots 22 for adjustably supporting a forwardly extending arm 23. The arm 23 is capable of being adjusted at various elevations and to be fixed in position in respect of the support 22 by set screws 24. The purpose of the arm 23 is to support a pair of rollers 25 and 26 which rotate on studs 27 and 28 extending outwardly from the arm 23. The rollers operate to seat the covers upon the containers as will more clearly appear in a description of the operation of the machine. It will be noted that the rollers 25 and 26 operate on parallel axes and that the roller 26 is of a slightly greater diameter than the roller 25.

The conveyor mechanism for the containers includes an endless belt 29 supported at one end by a pulley 30, said pulley being mounted on a shaft 31 journaled in bearings 32, which bearings are supported by rollers 33 depending from the brackets 19. The opposite end of the belt 29 is supported by a pulley 34, said pulley being mounted on a shaft 35 carried by bearings 36, said bearings being adjustably supported at either side of the machine by a pair of arms 37, the inner ends of which arms are removably carried in bosses 38 formed on the forward face of the arms of the frame 2 of the machine.

By providing for the longitudinal adjustment of the bearing members 36 on the arms 37 the tension of the conveyor belt 29 may be adjusted. The belt is driven from the main drive shaft by means of a sprocket 39 carried by the shaft 5 and a sprocket 40 carried by the shaft 31, over which sprockets 39 and 40 a sprocket chain 41 operates.

At either side of the belt and above the same is a side rail 42, said side rails 42 being supported by brackets 43 carried by the bearing brackets 36 and by brackets 44 extending upwardly from the bosses 38. The inner end of each of the side rails 42 is of a decreased width forming a narrow extension 45 to clear the heads of the machine. The extensions 45 are bent inwardly as indicated at 46 to form a narrowed path for the containers, as best illustrated in Fig. 4. The purpose of narrowing the space between the side rails at the capping point is to center the containers for the reception of the covers, permitting them to move freely between the side rails as they approach the capping point. It will be noted that after the containers have passed beyond the capping point the rails again expand, which tends to extract the containers from the notches and permits them to move onwardly through the machine by movement of the conveyor.

The cover conveyor is supported by standards 47 adjustably mounted in bosses 48 extending from the frame of the machine. The standards 47 are preferably in the form of round bars that pass through openings in the bosses 48 and are held at selected elevations by set screws 49. The standards 47 support a U-shaped bracket 50 in which are mounted, at either side, arms 51, the arms 51 extending across the top of the machine and rearwardly of the frame of the machine. At the rearward end of the arms 51 is another U-shaped bracket 52.

An endless belt 53 is supported at its forward end by a pulley 54 mounted in bearings 55 extending from the bracket 50 and supported by the arms 51. The rearward end of the belt is supported by a pulley 56 mounted in bearings 57 carried on the rearward end of the arms 51. The bearings 57 are adjustable longitudinally of the arms 51 so as to tension the conveyor belt. The pulley 54 is driven from the main shaft 5 by a chain and sprocket connection comprising a sprocket 58 on the shaft 5, a chain 59 operating over a sprocket 60 on the shaft of the pulley 54. Side rails 61 are supported at each side of the belt 53 by the brackets 50 and 52. The side rails 61 are curved at their forward ends and extend downwardly to a point adjacent to the capping mechanism of the machine. A guide chute in the form of a pair of curved plates 62 is mounted at the forward end of the belt 53, being supported by the bracket 50. This chute overlies the end of the belt 53 in such a way as to receive the cover members fed thereto by the conveyor belt 53 and to reverse the covers, presenting them to the capping mechanism in proper position for mounting upon the containers. That is to say, the cover members are received by the upper section of the conveyor belt 53 in reverse position, carried forward to the end of the belt and deposited upon the chute 62, being held from lateral displacement by the curved section of the side rail 61 and passing down the lower section of the chute by gravity to the capping point.

The side rails 61 converge as they reach the capping point, so that the covers, in the same manner as the containers, have free movement on the conveyor without contact with the side rails, except for supporting them in upright position until the covers approach the capping point when they are centralized by the converging side rails so as to bring the covers and containers into

proper registration for seating the covers on the containers without damaging the walls either of the container or of the caps.

The construction of the mechanism and the operation thereof may be better understood by particular reference to Fig. 5, in which the cycle of operation of the machine is clearly illustrated. The containers 63 are fed to the upper face of the conveyor belt 29, said containers being placed on said belt in upright position in longitudinal series with the end to be capped uppermost.

The operation of the conveyor belt advances the containers toward the capping point. The space between the side rails 42 is sufficient to permit the containers to clear the side rails so that they will move forward without friction, but will be prevented from tilting sidewise until they reach the capping point. At the same time the containers 63 are being fed to the capping point the covers 64 are likewise being advanced to the capping point in synchronism with the movement of the containers. The caps are fed to the upper face of the conveyor belt 53 in up-turned position and in longitudinal series. This arrangement permits the caps to be dropped directly from a punch press or to be fed from bins or by hand as preferred. The covers move along the upper face of the conveyor belt 53, as clearly illustrated in Fig. 5, ride over the end of the belt, reversing the position of the covers and are delivered to the chute 62 down which the covers move by gravity. The side rails 62 have an interval therebetween sufficient to permit the free movement of the covers on the belt. When the covers are deposited on the lower section of the chute, the side rails converge so as to narrow the path of movement of the covers therebetween, thereby centralizing the covers for delivery to the capping point.

The containers reach the interval between the peripheries of the bodies 13 of the heads in the manner clearly illustrated in Fig. 4, that is to say while a capping operation is being performed the next container of the series is held in contact with the plain surface of the body of the heads, the movement of the containers being slightly retarded so as to properly space the containers for reception in the notches in the body of the heads. As soon as the heads have moved sufficiently to bring each pair of notches together, the container moves into the seat formed by the side walls of the converging notches of the heads. The containers are carried forward on a true axis to a centralizing point, where the capping operation occurs. As the containers are moving to the capping point the covers, in an inclined position, are delivered to the face of the capping heads, the forward edge of the cover resting upon the surface between the upper edge of the notched sections of the heads. The vertical edge of the container impinges against the boss 18 and against the roller 25.

The mechanism is so coordinated that while the containers are retarded, as above explained, the covers will also be retarded from movement while the heads are revolving through an arc represented by the distance between the edge of adjacent notches in the bodies of the heads. As soon as the edge of the recesses 17 of each notch begins to come into registration with the corresponding edge of the notch in the other head, the cover slides down into position so that when the container moves forward the lower edge of the cover will be seated over the forward edge of the top wall of the container. The space formed by the recesses 16 leaves an interval between the vertical wall of the recesses and the outer wall of the upper part of the container, sufficient for the depending flange of the cover to seat over the container and drop within the recess.

In order that this seating operation may be effectively performed an arched plate 64^a is mounted below the belt upon the frame of the machine in such a way that the container is tilted and elevated just at the moment of the capping operation. In other words, the covers may be seated with greater facility by slightly tilting the container to receive the forward edge of the depending flange of the cover, then raised to the high point, and tilted in the opposite direction. After the initial seating of the forward edge of the flange of the cover over the edge of the container has been accomplished, the container moves forward under the roller 25 which exerts pressure upon the upper face of the cover to carry the cover forwardly to its seat. The container and cover then move forward under the roller 26 which roller, as has been explained is of greater diameter than the roller 25, therefore exerts greater downward movement against the upper face of the cover. As it passes under this second roller 26 the cover is moved downwardly upon the container sufficiently to bring it to its seat.

It is obvious that by changing the shape of the notches 15 irregularly shaped containers may be capped in the machine of this invention. It is also obvious that containers of different heights may be capped by slight adjustment of the mechanism, that is to say by raising or lowering the rollers 25 and 26, and by adjusting the height of the plate 64.

We are aware that the invention may be modified in certain particulars without departing from the spirit and scope thereof. We do not limit ourselves unessentially, but

what we claim and desire to secure by Letters Patent is:—

1. In a machine of the character described, a chute for guiding caps to an inclined position for engagement with containers, a conveyor for moving the containers to engage the caps in inclined position, means for tilting the containers to an angle of inclination opposite from the angle of inclination of the caps when the containers engage the caps, and a device above said tilting means for pressing the caps upon the containers.

2. In a machine of the class described, a conveyor device for moving the containers in a horizontal direction, a conveyor adapted to receive the covers in reverse position and to deliver the same to the capping point in position to be seated on the containers, a pair of revoluble heads adapted to engage the containers, said heads being provided with means for guiding the caps to their seats on the containers, and pressure means for seating the caps on the containers after they have been positioned by said heads.

3. In a machine of the class described, a conveyor device for moving the containers in a horizontal direction, a conveyor adapted to receive the covers in reverse position and to deliver the same to the capping point in position to be seated on the containers, a pair of revoluble heads adapted to engage the containers, said heads being provided with means for guiding the caps to their seats on the containers, and pressure means including a pair of rollers for moving the caps to their seats.

4. In a machine of the class described, a conveyor device for moving the containers in a horizontal direction, a conveyor adapted to receive the covers in reverse position and to deliver the same to the capping point in position to be seated on the containers, a pair of revoluble heads adapted to engage the containers, said heads being provided with means for guiding the caps to their seats on the containers, pressure means including a pair of rollers for moving the caps to their seats, and means for adjusting the position of said rollers.

5. In a machine of the class described, a continuous straight line conveyor for feeding containers across the capping point of the machine, a conveyor for feeding the caps to the machine arranged above said first named conveyor, a pair of revoluble heads mounted on opposite sides of said first named conveyor and arranged on parallel axes and driven in opposite directions, said heads being provided with cooperating notches for receiving the containers and with recesses for guiding the caps to their seats on the containers, and pressure means for exerting pressure on the caps to seat the same.

6. In a machine of the class described, a conveyor device for containers arranged to convey the containers on a straight line through the machine, a device in connection with said conveyor adapted to rock the containers as they pass through the capping mechanism, a conveyor for the covers having a discharge chute feeding the covers by gravity at an angle to the containers, capping heads including guiding recesses for guiding the caps over the edge of the containers, and pressure means for seating the caps after they have been positioned on the containers.

7. In a machine of the class described, a pair of revoluble capping heads mounted on parallel shafts transversely of the machine, said heads being provided with container-receiving notches and recessed portions for receiving and guiding the covers to their seats upon the containers, a belt conveyor for receiving the caps in up-turned position, a chute adapted to receive the caps and to reverse the same whereby said caps are fed to the capping point in position for reception upon the containers, guide rails in connection with the conveyor for the containers, said guide rails being arranged to center the containers, guide rails in connection with the cap conveyor arranged to center the caps, and means for exerting pressure on the caps to seat the same after they have been positioned by the heads.

8. In a machine of the character described, the combination of a chute for guiding caps to position for engagement with containers, a conveyor for the containers, mechanism for operating the conveyor to convey the containers to engagement with the caps, a device engaging the conveyor to tilt the containers when the containers engage the caps, and a roller above said device for pressing the caps upon the containers as the containers are carried under said roller.

9. In a machine of the class described, a horizontal endless belt conveyor for feeding the containers to the machine, side rails in connection with the conveyor for guiding the containers in their movements through the machine, said side rails having a restricted path therebetween at the capping point, a beveled plate beneath the capping point of the machine arranged to present the containers in inclined position for the reception of the covers, an endless belt conveyor arranged above said first-named conveyor for moving the covers in a direction opposite from the containers, a chute arranged at the end of said conveyor for receiving and reversing the covers and delivering the same to the machine, mecha-

nism including revoluble heads having notches therein for receiving the containers, guiding surfaces in connection with said notches for positioning the covers over the ends of the containers, and mechanism for pressing the covers to their seats after they have been positioned upon the containers.

10. In a machine of the class described, a horizontal endless belt conveyor for feeding the containers to the machine, side rails in connection with the conveyor for guiding the containers in their movements through the machine, said side rails having a restricted path therebetween at the capping point, a beveled plate beneath the capping point of the machine arranged to present the containers in inclined position for the reception of the covers, an endless belt conveyor arranged above said first-named conveyor for moving the covers in a direction opposite from the containers, a chute arranged at the end of said conveyor for receiving and reversing the covers and delivering the same to the machine, mechanism including revoluble heads having notches therein for receiving the containers, guiding surfaces in connection with said notches for positioning the covers over the ends of the containers, and a pair of rollers arranged on parallel axes, one of said rollers imparting to the covers an initial seating movement and the other of said rollers completing the seating of said covers.

11. In a machine of the character described, a chute for guiding caps to position for engagement with containers, a conveyor for moving the containers to engage the caps, means for tilting the containers to an angle of inclination relative to the caps when the containers engage the caps, and a device above said tilting means for pressing the caps upon the containers.

12. In a machine of the character described, a chute for guiding cap elements to an inclined position for engagement with container elements, a conveyor for moving the container elements to engage the cap elements in inclined positions, means for changing the angle of inclination of one of said elements at the time said elements engage each other, and a device for pressing the cap elements upon the container elements.

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