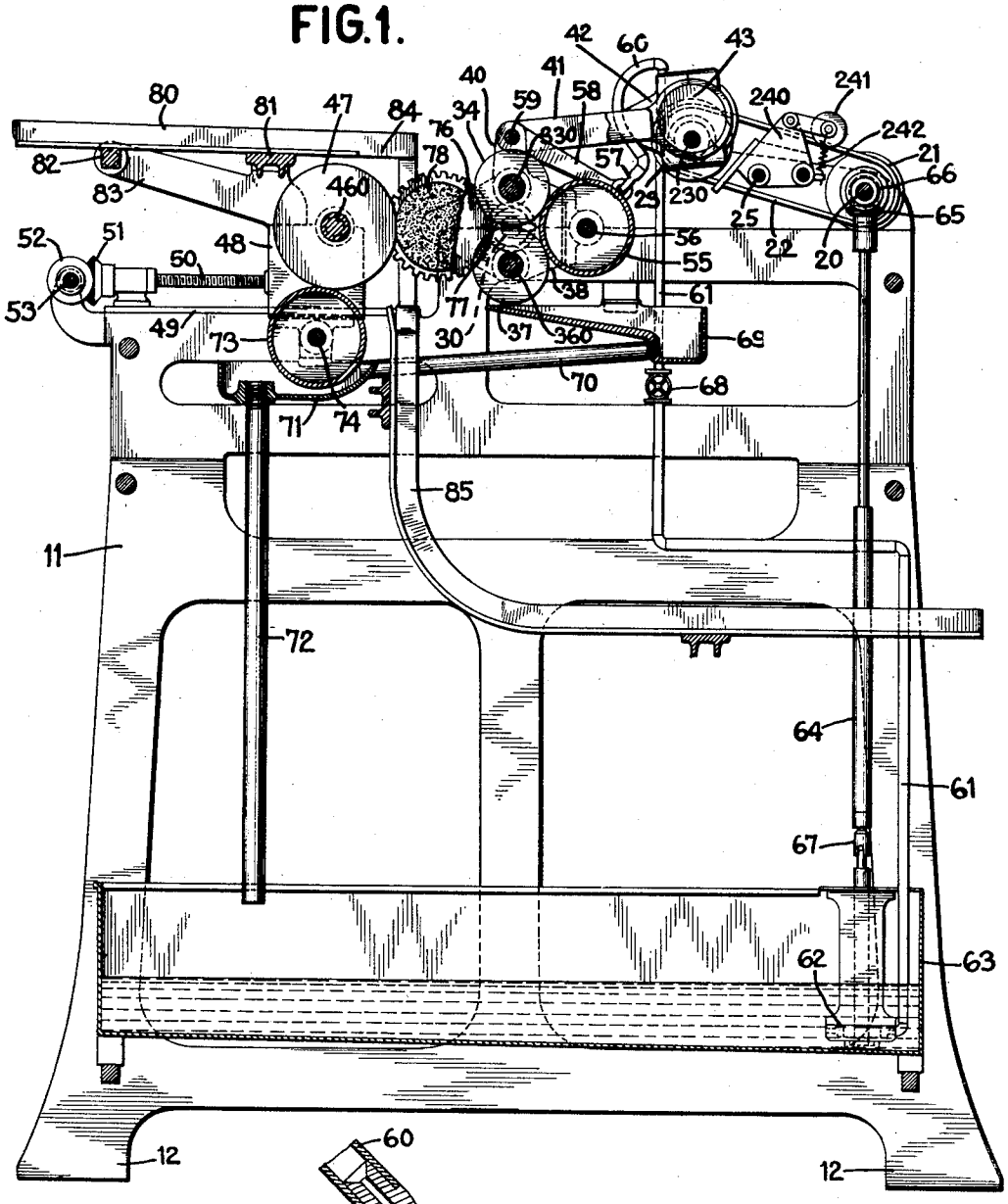
Oct. 17, 1933. G. C. COOKE ET AL 1,931,252

CAN VARNISHING MACHINE

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FIG.1.



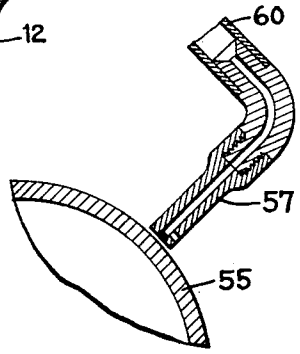




FIG.2.

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CAN VARNISHING MACHINE

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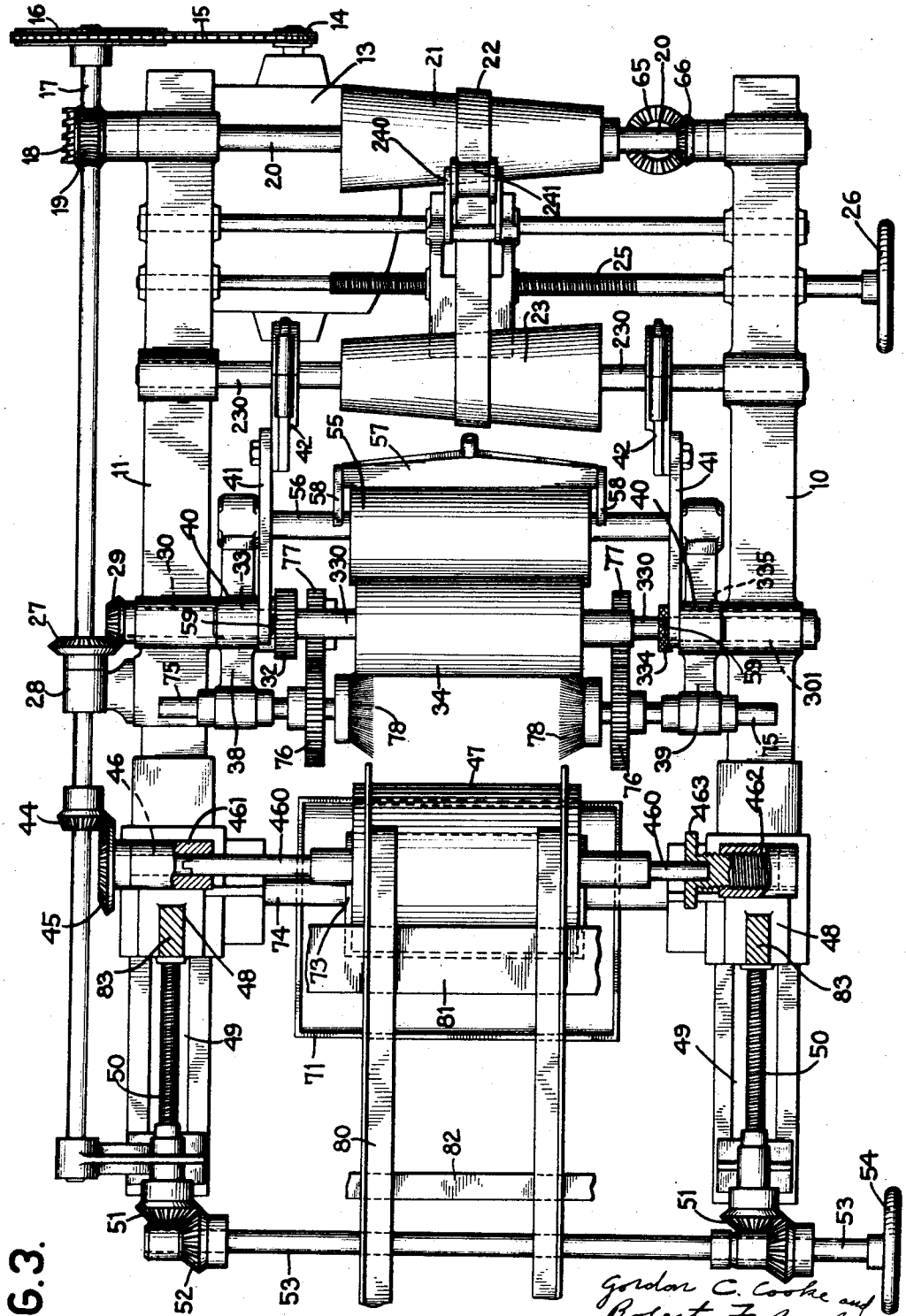


FIG. 3.

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CAN VARNISHING MACHINE

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FIG.4.

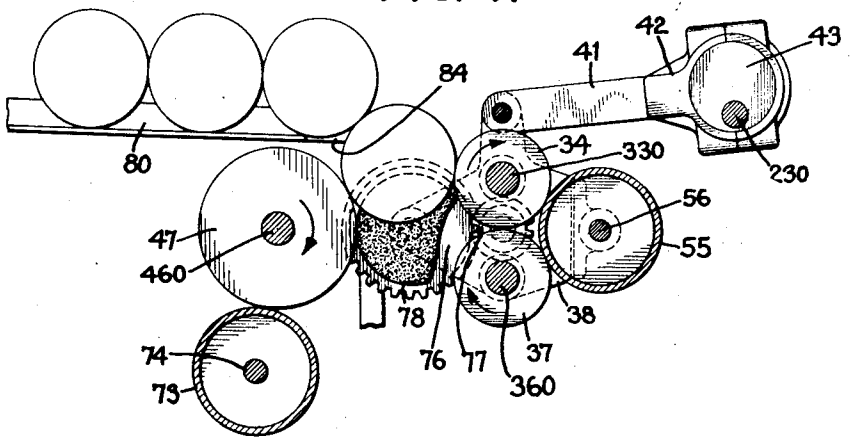



FIG.5.

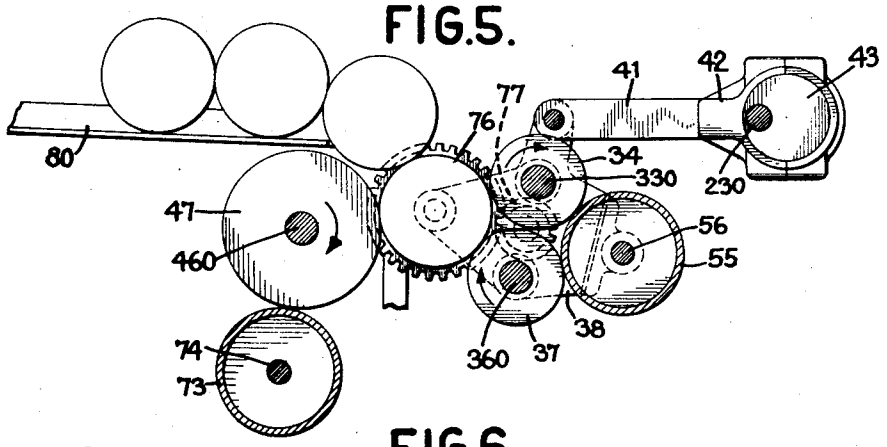
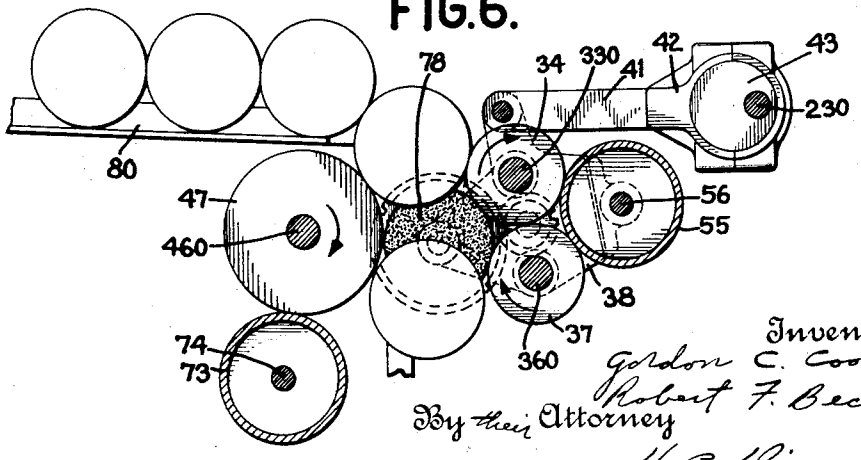



FIG.6.




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CAN VARNISHING MACHINE

Filed Oct. 24, 1930 4 Sheets-Sheet 4

FIG.7.

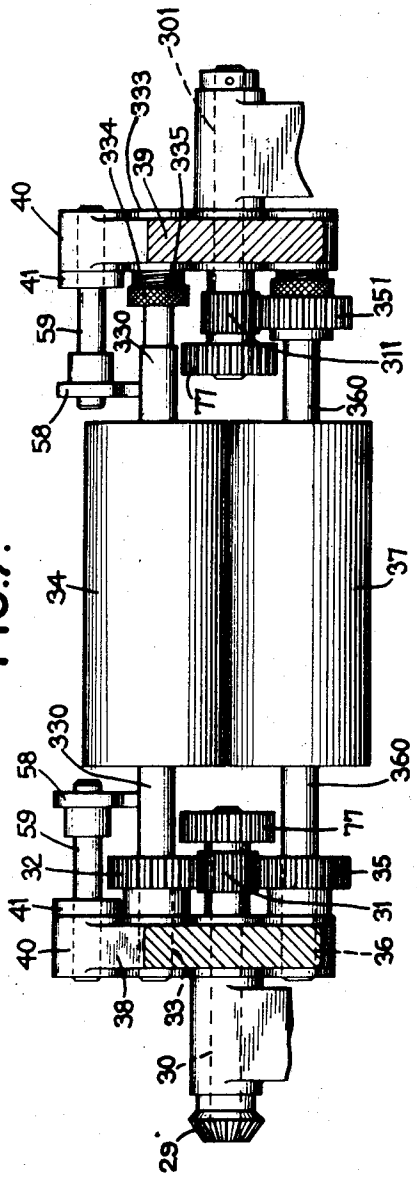
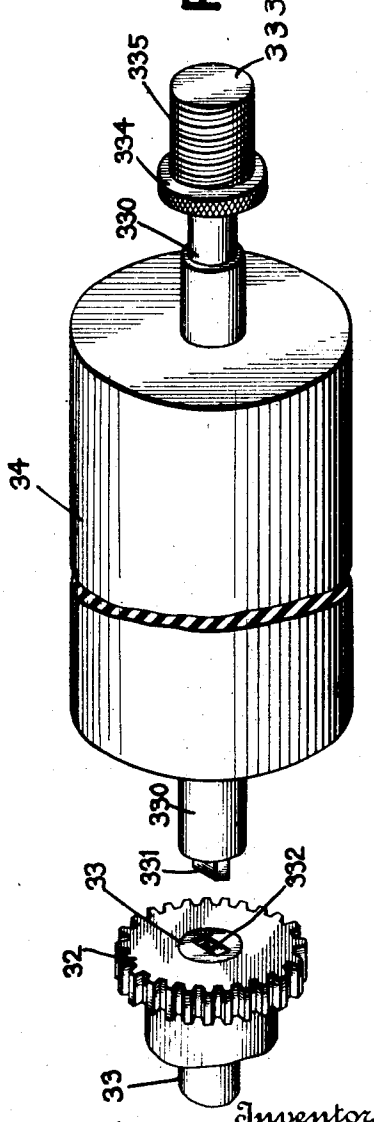



FIG.8.




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Patented Oct. 17, 1933 1,931,252

# UNITED STATES PATENT OFFICE

1,931,252

## CAN VARNISHING MACHINE

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Application October 24, 1930. Serial No. 490,890

9 Claims. (Cl. 91—27)

This invention relates to a machine for applying a protective coating to the outer surfaces of cans so as to prevent rusting of the cans at points where moisture might otherwise accumulate in direct contact with the metal. It has been found, particularly in the shipment of canned goods overseas, that moisture has a tendency to accumulate at the joints of the cans and at various points beneath the label where it may happen to be slightly loosened from the metal. Corrosion sets in at these points and the can is made unsightly. In some instances the goods may be spoiled as a result of the rusting of the can.

For the foregoing reason it has been found desirable in the shipment of canned goods overseas, and even in the handling of such goods in damper climates, when they are apt to be kept on the shelf for a long period, to apply a thin coating of varnish, or similar protective agent, to the entire surface of the cans. This coating may be applied either directly to the body of the can or may be applied over the label which is ordinarily pasted to the can. The latter practice is deemed preferable inasmuch as it affords a somewhat better protection for the can and presents a more attractive appearance even through a cheaper form of label may be employed. where the can is coated after the label has been applied, it is possible to employ a dull type of label, which is considerably less expensive than the glossy or pre-varnished type normally employed on unvarnished cans. A dull label which has been varnished presents just as good an appearance if not a better one than an ordinary pre-glossed label. The use of dull labels, furthermore, serves to overcome a difficulty which has been encountered in the handling of glossy labels; as is well known they require the omission of the glazing along a small strip at the end of the label to permit the overlapping portion of the opposite end of the label to properly adhere to it. The expense involved in the coating of the cans when efficiently carried out is less than the saving permitted in the cost of the labels that may be employed.

It has been an object of the present invention to produce a can-varnishing machine which may be operated continuously and rapidly to feed an endless series of cans past suitable varnishing devices capable of completely coating each can in a minimum of time. In the attainment of this object the cans are fed at a more rapid rate than has heretofore been possible in machines of this character and in passing through the machine the cans are continuously advanced in the same direction; that is to say the introduction and withdrawal of the cans are by way of movement of them in the same direction rather than by movements in opposite directions.

Another feature of the machine is the provision of cooperating varnish-applying rollers which are operated at the same peripheral speeds. Suitable provisions are made, furthermore, for the adjustment of the rollers to adapt the machine to the reception of cans of variable diameter and also for the adjustment of the speed of operation of the devices which control the introduction and removal of cans from the machine. This latter mechanism enables operation of the machine at the maximum speed permissible for each size of can consistent with a complete and thorough coating of the same.

While the machine disclosed as embodying the invention is particularly suited to the coating of metal cans it is also adapted for the application of a coating to containers of other types as for example to fibre containers, or paper or cardboard containers, or bottles or jars of various sorts. The coating may be applied primarily as a protective agent or it may be used entirely for the purpose of improving the appearance of the container.

Other features and advantages will appear from the detailed description of one illustrative form of the invention which will now be given in conjunction with the accompanying drawings, in which:

Figure 1 is a vertical sectional view taken longitudinally through the machine;

Figure 2 is a detail disclosing means for applying varnish to one of the coating rollers;

Figure 3 is a plan view of the machine;

Figures 4, 5 and 6 are sectional views taken through the can-feeding and coating mechanism showing the parts in various positions assumed during an operation;

Figure 7 is a detail view showing in elevation the supporting and driving means for certain of the coating rollers; and

Figure 8 is a perspective view of the supporting and driving means for one of the coating rollers with certain of the parts spread apart.

Referring now to the drawings, the framework of the machine consists of a pair of side members 10 and 11 (Figures 1 and 3) which rise substantially vertically from the floor on which the machine stands on feet 12, formed as extensions of the frame members. These side

frames are held in spaced relation by suitable cross rods, shafts and bars, some of which serve further to support various portions of the operating mechanism of the machine, as will appear hereinafter.

A motor 13, suitably mounted on the framework, is adapted to drive all of the operating parts through a sprocket wheel 14 secured to its armature shaft and adapted to drive a chain 15 cooperating with another sprocket wheel 16 secured to a shaft 17 extending longitudinally along one side of the machine. The shaft 17 may be suitably supported by brackets extending from the side frame 11.

A worm 18, carried by the shaft 17, cooperates with a worm-wheel 19 secured to a shaft 20 which is journalled between the side frames 10 and 11. On the shaft 20 there is secured a pulley cone 21 which converges gradually from a larger to a smaller diameter and is adapted to cooperate with a belt 22 which at its opposite end surrounds a corresponding, conical pulley 23, having a slight taper in the opposite direction from that of the pulley 21. The pulley 23 is secured to a shaft 230 which is journalled in the side frames 10 and 11. It will be apparent that the speed of rotation of the pulley 23 and its shaft 230 may be varied by shifting the belt 22 along the conical surfaces of the pulleys 21 and 23. Movement of the belt toward the bottom of Figure 3 will cause a reduction in the speed of rotation of the shaft 230 in a manner well known. For the purpose of shifting the belt to vary the angular speed of the shaft 230, a belt guiding structure 240, having mounted thereon a spring-tensioned roller 241 for applying a desired tension to the belt, may be shifted in a direction parallel to the axes of the pulleys by rotation of a feed-screw 25. A hand-wheel 26 is provided for turning the feed screw.

At about the midpoint of the shaft 17 there is secured a bevel gear 27 adjacent a supporting bracket 28 for the shaft. This bevel gear meshes with a bevel pinion 29 secured to a shaft 30 which extends through a bearing provided in the frame 11. At its inner end the shaft 30 carries a pinion 31 adapted to mesh with a pinion 32 secured to a shaft 33 directly above and parallel to the shaft 30. Upon the shaft 33 there is mounted a soft, flexible roller 34 formed of rubber or gum, or any other suitable material such as commonly employed in the production of inking rollers for printing presses and the like. In a similar way the pinion 31 may cooperate with another pinion 35 secured to a shaft 36 which serves to support a roller 37 similar to the roller 34. The shafts 33 and 36 may be formed as single continuous elements, if desired, carried at their opposite ends by a pair of intermediate frame elements 38 and 39 which are pivotally supported respectively by the shaft 30 and by a stud 301 extending from the opposite side frame 10 in line with the shaft 30. Preferably, however, the shafts 33 and 36 are formed in several sections so as to facilitate the removal of the flexible rollers for cleaning and whenever the machine is idle. Due to the necessity of providing a substantial amount of pressure between the flexible rollers and another roller, as will presently appear, it is desirable to remove the flexible rollers from the machine whenever the latter is left out of operation for any length of time since otherwise permanent indentations may be left in the surfaces of the soft rollers. That part of shaft 33 which carries the pinion 32 is accordingly in the form of a short stub journaled in the rockable frame 38 and terminating at a point within the pinion 32. The roller 34 is then mounted on a separate portion 330 of the shaft which extends into the pinion 32 and is provided with one or more lugs 331 adapted to interengage with one or more recesses 332 in the end of the stub shaft within the pinion. In this way the rotation of the pinion 32 is transmitted to the roller 34. At its opposite end the shaft 330 may be journaled within a sleeve 333 which extends through the rockable frame 39 and has a threaded engagement with the same. At its inner end the sleeve may be provided with a knurled wheel 334 by means of which the sleeve may be turned to feed it toward or away from the roller 34 by the action of the screw threads 335 on the sleeve. When the machine is placed in condition for operation the sleeve 333 will be shifted toward the roller 34 as far as possible to lend proper support to the shaft 330. However, when it is desired to remove the flexible roller 34 from the machine the sleeve is shifted in the opposite direction until it clears the end of the shaft 330 at which time the roller may be removed. In a similar way the roller 37 is preferably carried by a separate shaft section 360 which is adapted to be inserted into the pinion 35 and engaged with the short stub shaft 36 to be turned by the latter. At its opposite end the shaft 360 may be supported by a sleeve similar to the sleeve 333 and adapted to be shifted, by a screw motion, relative to the frame 39. Each of the frame elements 38 and 39 is provided with an upward extension 40 having pivotally connected thereto a link or pitman 41 having an eccentric strap 42 bolted or otherwise secured to its opposite end adapted to cooperate with an eccentric 43 secured to the shaft 230. It will be apparent that upon rotation of the shaft 230 in the manner previously explained the eccentrics will produce a longitudinal movement of the pitmen 41 and will rock the frame elements 38 and 39 to rock the rollers 34 and 37 through a suitable arc about the axis of the shaft 30 and stud 301.

At another point along the shaft 17 there is secured a bevel pinion 44 which is adapted to mesh with a gear 45 secured to a shaft 46. This shaft may extend from one side frame to the other but preferably is formed in sections similar to the shaft 33. A short stub section attached to the bevel gear 45 extends partly through a bearing 461 and has a recess in its end adapted to receive a rectangular projection, or the like at the end of another section 460 of the shaft. The opposite end of the shaft 460 is journaled in a bushing 462 which has screw threaded engagement with a supporting block and may be fed axially of the shaft by turning of a thumb wheel 463. On the shaft 460 there is mounted a soft, flexible roller 47 formed preferably of the same material as the rollers 34 and 37; it may be of substantially larger diameter but by proper selection of gearing the roller 47 is preferably driven at the same peripheral speed as the smaller rollers. This is not absolutely necessary and a difference of peripheral speed is permissible but uniformity of speed is regarded as preferable since the label is then less likely to be torn. The shaft sections 46 and 460 are supported by bearings carried by blocks 48 slidably mounted on guides 49 formed on the upper surfaces of the side frames 10 and 11. A

feed-screw 50 is adapted to cooperate with each of the blocks 48 so that turning of the feed-screws will shift the blocks toward or away from the rollers 34 and 37. A bevel pinion 51 mounted at the ends of each of the feed-screws 50 is adapted to mesh with a corresponding bevel pinion 52 carried by a cross shaft 53 supported by brackets extending from the side frames 10 and 11. Rotation of the shaft 53 by means of a hand-wheel 54 will serve to move the blocks 48 and hence the roller 47 toward or away from the rollers 34 and 37 to accommodate the machine to the reception of cans of different diameters.

Means are provided for supplying the various varnishing rollers 34, 37 and 47 with a suitable quantity of varnish to be applied to the cylindrical surfaces of the cans fed through the machine. The varnish supplying means, furthermore, is so constructed as to provide the rollers with only sufficient varnish to coat the cans at the rate they are being fed. For this purpose a distributing roller 55 cooperating with the rollers 34 and 37 is rotatably mounted in the frames 38 and 39 by means of a shaft 56 journalled in extensions of the frames 38 and 39. This distributing roller is preferably formed of metal, such as steel or brass or the like, but it may be formed of any material suitable for the purpose. Varnish is supplied to its surface by means of a nozzle 57 which extends substantially across the width of the roller and is suitably supported above it, as shown in Figure 1, by means of a pair of arms 58 swung from a pair of studs 59 carried by the extensions 40 of the intermediate frames. A flexible tube 60 will serve to connect the inlet of the nozzle with the upper end of a vertically extending pipe 61 which, at its lower end, is connected to the discharge outlet of a suitable, small gear pump 62. The latter is mounted within a large vat or vessel 63 adapted to contain a supply of varnish, from which it may be pumped through the lines indicated and discharged along the surface of the roller 55. For driving the pump, a rod or shaft 64 carrying at its upper end a bevel pinion 65 adapted to mesh with a bevel pinion 66 secured to the shaft 20, may be provided. A vertically movable coupling member 67 may be provided on the shaft 64 for connecting or disconnecting the same with relation to the pump.

No separate means is provided for rotating the roller 55. The latter is merely maintained in contact with the rollers 34 and 37 so that it will be frictionally driven by these rollers whenever required. It has been found that so long as both of the rollers 34 and 37 are provided with sufficient varnish to properly coat the cans with which they come in contact, these rollers will merely slip idly over the surface of the roller 55 and the latter will not be rotated to transfer any additional varnish. However, as soon as one or the other of the rollers 34 and 37 should become too dry to properly apply varnish to the surface of cans, the friction between such roller and the surface of the roller 55 will become sufficiently great to rotate the latter so that more varnish will be transferred to the soft rollers. This automatic control of the distribution of varnish is extremely useful since it effects a saving in the amount of varnish consumed by the machine for coating a given number of cans and it reduces the amount of time required for drying the varnish. If the coating rollers were permitted to receive an excess quantity of varnish this would be transferred to the cans and if inadequate time for drying were allowed the cans or the labels thereon would stick together when packed. While a single roller 55 may be satisfactorily employed to supply varnish to both of the rollers 34 and 37 a separate supply roller might be provided for each soft roller if desired. In that event the excess varnish supplied to the upper steel roller could trickle over a shield and flow onto the lower supply roller.

Any excess quantity of varnish forced through the nozzle 57 against the roller 55 will be carried around with the roller or be permitted to trickle downwardly along the rear side of the roller and will be discharged into a collecting pan 69. From this collection pan the excess varnish is discharged through a pipe 70 into a second pan 71, from which a portion of it is subsequently discharged by a pipe 72 and returned to the original storage vessel 63. The inlet of the pipe 72 is maintained at such a height within the pan 71 as to provide for the retention of a quantity of varnish in the pan at a suitable level. If desired varnish could be fed directly from the pipe 61 to the pan 71 and the overflow from both of the pans 69 and 71 could be returned directly to the vessel 63. This would insure a slightly greater consistency of the varnish applied by the several rollers since the evaporation of the solvent would be approximately the same for each. Normally, however the extent of evaporation during the course of circulation is so slight that it may be ignored. Additional alcohol or other solvent may be introduced into the varnish at any suitable point, preferably in the vessel 63.

A roller 73, similar to the roller 55, is suitably journalled by means of a shaft 74 beneath the roller 47. The shaft 74 is carried by downward projections formed integrally with the shiftable blocks 48 so that the roller 73 will be moved with the roller 47 in the course of adjusting the machine for the reception of cans of different sizes. The roller 73 will have its surface in contact with the soft roller 47 at all times and it will be frictionally driven by this soft roller whenever an additional supply of varnish is required by the roller 47. When no cans are being fed through the machine, and at other times when the roller 47 is provided with an ample coating of varnish, the surface of this roller will merely slip on the surface of the roller 73 and will not rotate the latter to cause an additional transfer of varnish.

Suitable means are also provided for supplying varnish to the ends of the cans as they are passed through the machine. For this purpose a pair of stub shafts 75 are mounted, each in an extension of one of the rocking frames 38 and 39. These stub shafts are provided with pinions 76 adapted to mesh with pinions 77 carried by the shaft 30 which, as will be recalled, receives power from the shaft 17 and by the stud 301 which is driven from the shaft 360 by means of pinions 351 and 311 (Fig. 7). In this way the shafts 75 will be rotated continuously so long as the machine is in operation. A rotary brush 78 is carried at the inner end of each of the stub shafts and is adapted to come in contact with the periphery of one, or both of the rollers 34 and 37. Through this contact the brushes are continuously provided with varnish, which is then transferred by the brushes to the ends of the cans.

A runway or track 80, carried by suitable cross members 81 and 82 integral with or otherwise

secured to arms or extensions 83 of the slidable blocks 48, is adapted to feed cans continuously into varnishing position. As the roller 47 is shifted to accommodate cans of different diameters, the runway 80 will also be shifted so that an opening 84 therein will serve to drop the cans at the appropriate point between the rollers 37 and 44.

A résumé of the operation of the machine may now be briefly given:

The hand-wheel 54 is first rotated to adjust the blocks 48 to proper position for the coating of cans of the desired diameter. The hand-wheel 26 is also turned to shift the belt 22 into proper position along the cones 21 and 23 to insure operation of the feeding devices of the machine at the speed at which the cans are properly and completely coated. The machine is then set into operation and the cans are fed either by hand or by an automatic conveyor system to the runway 80. They are permitted to descend by gravity until the first can is dropped into the space between the rollers 34 and 47. At the initial stage of a coating operation, these rollers will be too close together to permit the can to drop through. The frames 38 will at this time assume the position shown in Figure 6. Subsequently upon rotation of the shaft 230 in the direction indicated by the arrow the rollers will assume the position shown in Figure 4, at which time the can will be permitted to drop between the rollers to a further extent and as the frames continue to rock into the position shown in Figure 5, the can will be dropped into contact with the roller 37 in the manner shown. Throughout this rocking of the pair of rollers 34 and 37 and the dropping of the can, the latter will have been rotated by the action of the soft rollers in contact with it and a coating will have been applied to its outer surface after the manner of a printing transfer. Incidentally it should be observed that the action is not a rubbing one which might result in the tearing of the labels. As the cans are permitted to drop between the rollers 34, 37 and 47 in the manner indicated, the brushes 78 will be rotated as previously explained to pick up varnish from the ends of the smaller rollers and apply it to the end portions of the cans so that the latter, prior to discharge from the machine, will be completely coated.

As rotation of the shaft 230 continues, the frames 38 and 39 will be restored to the position shown in Figure 6 and as they reach this position the coated can will be dropped into a chute or runway 85 beneath the coating rollers and will be discharged from the machine. The cans may be subsequently removed by hand or by a suitable conveyor system to any suitable drying chamber or apparatus, after which they may be packed in cases for shipment. If desired the drying may be permitted to take place on the table onto which the cans are discharged by the chute 85.

As will be apparent from Figures 4, 5 and 6, no special means need be provided for arresting the cans on the runway 80. Each can as it passes through the coating rollers will hold back the preceding cans until they are arrested by the rollers 34 and 47, in the manner shown in Figure 6. If desired, special detents might be provided for retaining and releasing the cans on the runway, either under control of the shaft 230 or under the control of the movement of the cans. Thus the discharge of a coated can might be caused to release the detent for the introduction of a subsequent can. However, this type of mechanism is not considered to be necessary and would, in fact, tend to slow up the operation of the machine.

In the course of its travel between the rollers, each can will be rotated somewhat more than a complete revolution and preferably will be rotated several revolutions in order to insure adequate coating. The adjustment of the belt 22 by means of the hand-wheel 26 may be varied at the beginning of a run for the coating of a batch of cans until the frames 38 and 39 are rocked at sufficient frequency to insure complete coating of the cans without reducing the speed of operation too far. Variation of the speed of rotation of the shaft 230 and hence the frequency of the rocking movements of the rollers 34 and 37 will not affect the speed of rotation of the coating rollers since they are driven directly from the shaft 17. It has been found that the machine is readily capable of coating 120 cans per minute where the latter are of the usual 3" diameter.

While one admirable form of the invention has been set forth in detail in the foregoing, it is to be understood that many variations and modifications may be made in the construction and arrangement of the various features of the machine without departing from the general spirit and scope of the invention. Furthermore while the invention has been explained in connection with the varnishing of cans it will be readily appreciated that some other type of coating material such as enamel, lacquer and the like may be employed and that containers of various sorts, including bottles, jars, fibre or paper receptacles and the like, capable of being handled by the machine, may be coated in lieu of the cans. In some instances merely the wall of the container will need to be coated and the end coating devices may be eliminated.

What we claim is:

1. In a machine of the class described a flexible coating applying roller for applying a coating to the outer surfaces of containers, a plurality of flexible rollers spaced from said first mentioned roller, a rockable frame adapted to support said plurality of rollers, means for supplying a coating substance to said rollers, means for continuously rotating said rollers, and means for rocking said frame to permit containers to be fed between and withdraw from said rollers by gravity.

2. In a machine of the class described a flexible coating applying roller, a plurality of flexible rollers spaced from said first mentioned roller, means for varying the distance between said rollers to accommodate containers of different diameter, a rockable frame adapted to support said plurality of rollers, means for supplying a coating substance to said rollers, means for continuously rotating said rollers, and means for rocking said frame to permit containers to be fed between and withdraw from said rollers.

3. In a machine of the class described a flexible coating applying roller, a plurality of flexible rollers spaced from said first mentioned roller, a rockable frame adapted to support said plurality of rollers, means for supplying a coating substance to said rollers, means for continuously rotating said rollers, means for rocking said frame to permit containers to be fed between and withdrawn from said rollers, and means for varying the frequency of the rocking movements of said frame.

4. In a machine of the class described a plurality of coating rollers for applying a coating to the outer surface of containers, certain of said rollers being spaced from another of said rollers, operating means for rotating all of said rollers, and connections from said operating means for periodically shifting said certain rollers, said connections and rollers being so constructed and arranged as to permit introduction and withdrawal of containers from between said rollers by gravity.

5. In a machine of the class described a plurality of coating rollers, certain of said rollers being spaced from another of said rollers, operating means for rotating all of said rollers, connections from said operating means for periodically shifting said certain rollers to permit introduction and withdrawal of containers from between said rollers, and means for varying the relation between the speed of rotation of said rollers and the frequency of said shifting movements.

6. In a machine of the class described a plurality of flexible coating rollers, means for rotating said rollers, a rockable frame adapted to support certain of said rollers in spaced relation from one roller, and means for rocking said frame to carry a roller thereon toward said one roller and another roller thereon away from said one roller to permit feeding of containers between said one roller and those on the frame.

7. In a machine of the class described a flexible coating roller for applying a coating to the outer surfaces of containers, a rockable frame, a plurality of smaller flexible rollers mounted on said frame adjacent said first mentioned roller, means for rotating said rollers, and means for rocking said frame to control the feeding of containers by gravity between said first mentioned roller and said smaller rollers.

8. In a machine of the class described a flexible coating roller, a rockable frame, a plurality of smaller flexible rollers mounted on said frame adjacent said first mentioned roller, common means for rotating said rollers and for rocking said frame to control the feeding of containers between said first mentioned roller and said smaller rollers and means for varying the relative speeds of said rotating and rocking movements.

9. In a machine of the class described a flexible coating roller for applying a coating to the outer surfaces of containers, a rockable frame, a plurality of smaller flexible rollers mounted on said frame adjacent said first mentioned roller, means for varying the normal distance between said first mentioned roller and the smaller rollers, means for rotating said rollers, and means for rocking said frame to control the feeding of containers by gravity between said first mentioned roller and said smaller rollers.

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