

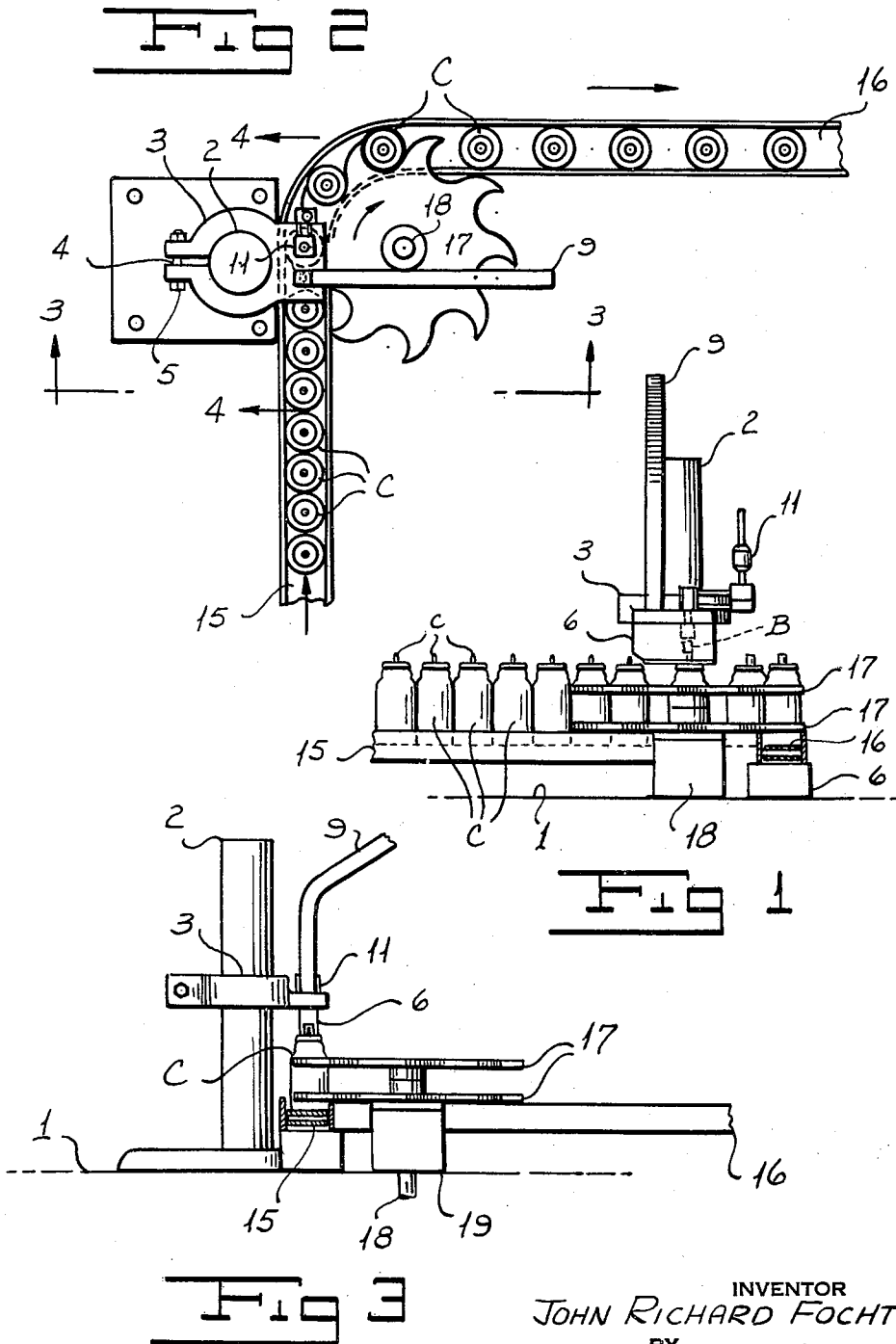
June 6, 1961

J. R. FOCHT
MACHINE FOR APPLYING VALVE OPERATING
BUTTONS TO AEROSOL CONTAINERS

2,986,809

Filed Oct. 14, 1959

4 Sheets-Sheet 1



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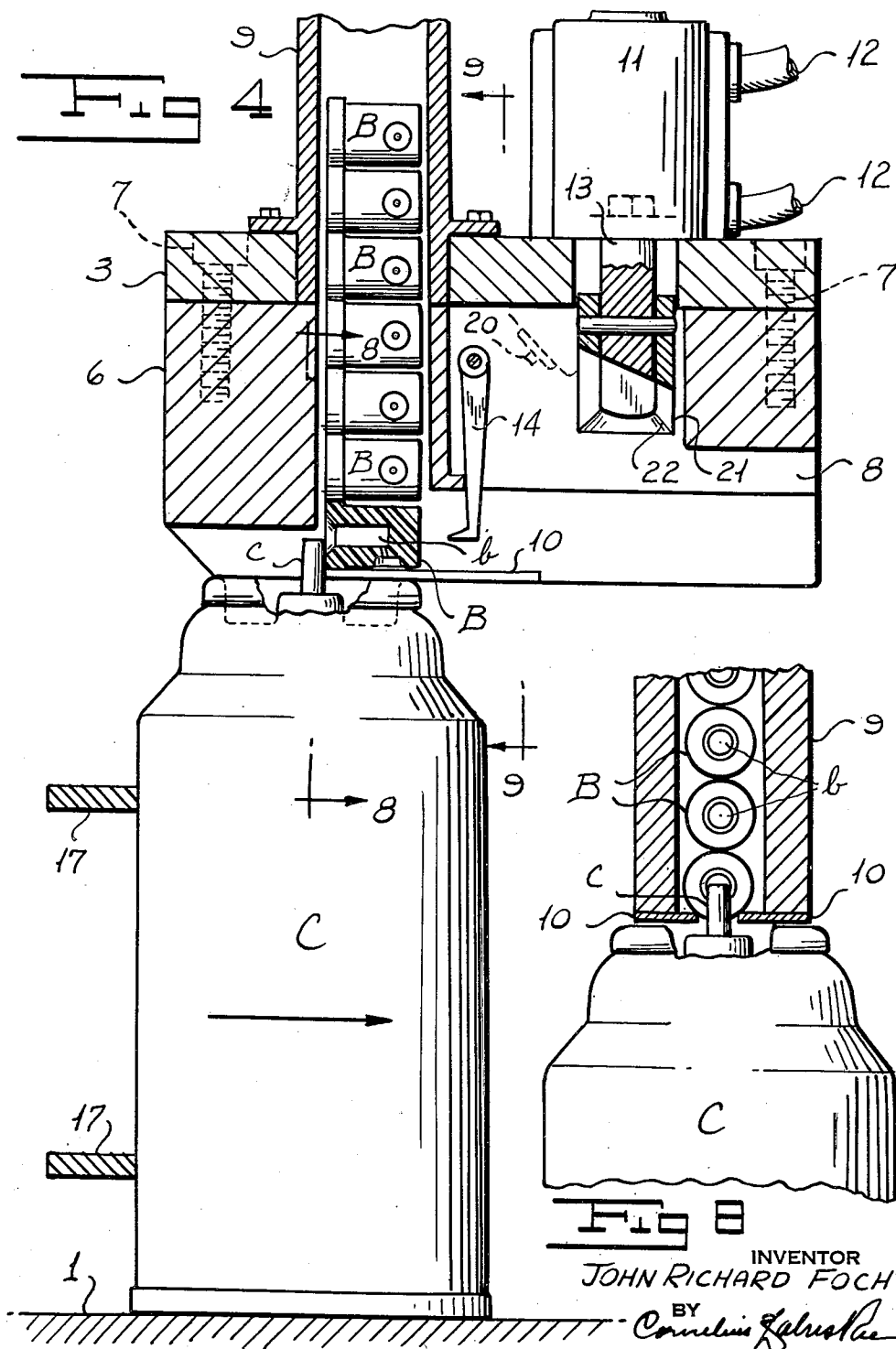
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4 Sheets-Sheet 2



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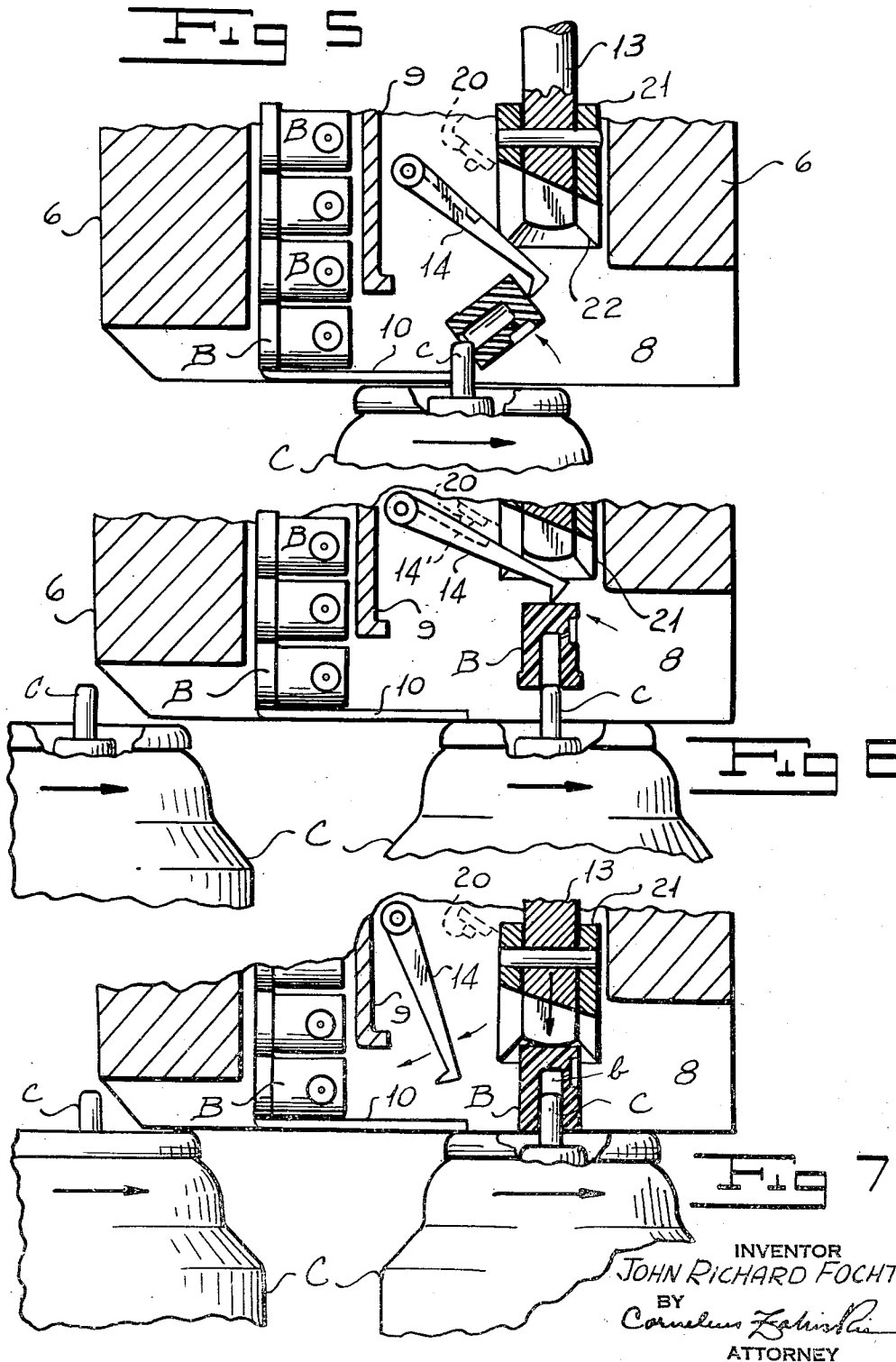
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2,986,809

MACHINE FOR APPLYING VALVE OPERATING BUTTONS TO AEROSOL CONTAINERS

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5 Claims. (Cl. 29—211)

This invention is a machine for applying valve operat-
ing buttons to the valve stems of aerosol and other pres-
sure package containers.

In the preparation of aerosols for the market, the aero-
sol material, generally consisting of an active ingredient
charged with a propellant, is introduced into the desired
container, usually a can, provided with a discharge valve
having a valve stem which, when depressed, will permit
the delivery of the active ingredient from the container.
It is common in practice for so-called "fillers" to package
aerosols as stated through the employment of appropriate
apparatus, and to thereafter manually apply the valve
operating cap to the free end of the valve stem. The ap-
paratus employed for the filling and charging of the con-
tainers operates at speeds which commonly range be-
tween 100–200 cans per minute and, as these cans are dis-
charged from said apparatus, women are usually employed
to manually apply the push button. In order to keep up
with the speed of such apparatus, many hands are required
for this purpose, otherwise a serious bottleneck results
in the production line.

The object of the present invention is to provide a ma-
chine for automatically placing the buttons on the valve
stems at speeds corresponding to the speed of operation
of the filling and charging apparatus. Through the em-
ployment of this machine, the filled containers, with the
buttons applied, pass from the filling and charging ap-
paratus through the button applying machine of this in-
vention and they may then be passed directly to appro-
priate shipping containers which may be immediately
sealed and labeled for shipment.

An important feature of this invention is that it saves
a great amount of manual labor and the expense and
uncertainty of the labor and uniformly applies the but-
tons without any noticeable loss of the contents of the
container.

Features of the invention, other than those adverted
to, will be apparent from the hereinafter detailed descrip-
tion and appended claims when read in conjunction with
the accompanying drawings.

The accompanying drawings illustrate different em-
bodiments of the invention, but the constructions therein
shown are to be understood as illustrative, only, and not
as defining the limits of the invention.

FIG. 1 is a front elevation of a machine embodying this
invention.

FIG. 2 is a plan view thereof, this view being turned at
90 degrees from the showing of FIG. 1.

FIG. 3 is an elevation looking in the direction indi-
cated by the arrows 3—3 in FIG. 2.

FIG. 4 is a vertical section on the line 4—4 of FIG. 2.

FIGS. 5, 6, and 7 are fragmental views of the parts
shown in FIG. 4, but illustrating different operative po-
sitions of these parts appropriate to different steps in the
application of a button to the valve stem of a container.

FIG. 8 is a section on the line 8—8 of FIG. 4 showing
the container in elevation except for a small broken away
portion at the top thereof.

FIG. 9 is a fragmental section on the line 9—9 of
FIG. 4.

FIG. 10 is a section on the line 10—10 of FIG. 9.

FIG. 11 is a fragmentary section corresponding in

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location to the showing of FIG. 4, but illustrating a
modified form of the invention.

The machine shown in the drawings has an appropriate
base or table 1 on which is rigidly mounted a post 2.
Supported on this post for vertical adjustment is a bracket
3 having therein a slot 4 with an adjusting bolt 5 by means
of which the bracket may be locked in any desired po-
sition vertically of the post, in accordance with the par-
ticular height of the container to be passed through the
machine.

To the under side of the bracket 3 is attached a block
6 by means of screws 7 shown in FIG. 4. The greater
portion of this block is shown as slotted at 8 in FIG. 4
and extending downwardly through this slot from a con-
siderable elevation above the same is a feed chute 9.
Buttons B to be applied to the valve stems of the con-
tainers are fed into the open upper end of this chute and
descend by gravity to the lower end of the latter where
they successively come to rest upon flanges 10 (FIG. 8)
extending toward one another, across the slot 8, at the
lower edge of the block 6.

Also mounted on the bracket 3 (FIG. 4) is an air
cylinder having compressed air connections 12 through
which pressure may be applied alternately to the op-
posite ends of the piston therein, so as to cause the piston
stem 13 of said cylinder to be lowered and raised in ac-
cordance with the operations of a switch operating arm
14 mounted in the slot of the block 6 and serving to
control a micro switch 20 (Fig. 4). The switch operating
arm acts upon a switch actuating finger 14' (FIG. 9).

Filled and charged cans C having valve stems c are
moved into substantial proximity with the lower end of
the chute 9 by a conveyor 15 and are adapted to be dis-
charged, after the buttons have been applied, by means
of a conveyor 16 shown best in FIGS. 2 and 3. While they
are in proximity with the lower end of the chute, the
cans are adapted to be positively moved successively be-
neath the piston stem 13 of the air cylinder by a pair of
star wheels 17 spaced one above the other and mounted
on a shaft 18, driven by any appropriate mechanism at
such speed that cans, delivered from the filling machine
by the conveyor 15, may be handled by this apparatus
without producing a production bottleneck. The shaft
18 is provided with a suitable support 19 from the table 1.

It will be noted from Fig. 2 that the peripheries of
the star wheels 17 are shaped to partially embrace cans fed
from the conveyor 15 and to pass these cans continuous-
ly beneath the lower end of the chute 9 and the lower
end of the piston stem 13 of the air cylinder in succession.
Star wheels appropriate to different can diameters are
applied as required. In practice, the cans fed by the con-
veyor 15 are engaged in succession by the pockets of the
star wheels and moved through the slot 8 of the block
6 between the flanges 10.

The buttons B are fed to the flanges 10 so that they will
rest on their sides upon the flanges 10 with the socket b
of each button facing toward the valve stem c of the on-
coming can, as shown in FIG. 4, so that the movement
of the can between the flanges 10 causes the valve stem c
thereof to carry said button with it away from the lower
end of the chute and in a direction to the right as viewed
in FIG. 4. As the button and can thus move in unison,
the button engages the lower end of a micro switch op-
erating arm 14 and all of these parts move together from
the position shown in FIG. 4 successively through the
positions shown in FIGS. 5, 6 and 7.

During the movement from the position shown in FIG.
4 through the position of FIG. 5, the arm 14 engaging
the end of the button, retards the movement of the for-
ward end of the button, so that the button is tilted up-
wardly as shown in FIG. 5 into a position wherein the
valve stem c of the can starts to enter the socket b of the

button. As the parts continue to travel, this retarding action continues until the button is moved to the upright position shown in FIG. 6 wherein the socket thereof is coaxial with the valve stem c.

When this stage of the operation has been reached, the arm 14 has been raised sufficiently to engage the micro switch 20 and, as a result thereof, compressed air is admitted through the upper connection 12 of the air cylinder. The piston of said cylinder immediately descends carrying with it its piston stem 13, so that said stem engages the button and forces it downwardly over the valve stem c into the position shown in FIG. 7 to complete the operation of applying the button to the valve stem.

In the interim, however, the button has been depressed sufficiently to release the switch operating arm 14 which returns immediately to its normal inactive position shown in FIG. 4 with the result that compressed air is cut off from the upper connection 12 and admitted through the lower connection 12 to the air cylinder, whereupon the piston stem 13 is immediately elevated to permit the container to continue its travel under the impulse of the star wheels to the conveyor 16 which moves it out of the machine.

In order to insure proper alinement between the piston stem 13 and the button, as the former moves into cooperative relation with the latter, said stem is provided with a sleeve 21 as shown in FIGS. 4-7. This sleeve is pinned to the stem 13 and its lower end is internally tapered as shown at 22 to form an alining guide. It is also to be noted that the lower ends of the stem 13, as well as the sleeve 21, are slotted to make way for and permit of the operations of the switch operating arm 14 as described. In lieu of the pneumatic cylinder and piston stem shown and described, a solenoid, controlled by the micro switch, may be employed in which case the part 13 would be an extension of the core of the solenoid.

The machine hereinbefore described is operable at extremely high speeds. In practice the button may be engaged by the valve stem and applied thereto in about $\frac{1}{200}$ of a minute which is approximately $\frac{1}{3}$ of a second. Inasmuch as the actual seating of the button on the valve stem requires but a small fraction of this time, it will be apparent that even though the button is pressed down hard enough to unseat the valve of the can, this interval is too short to allow of the discharge from the can of any appreciable amount of the material contained therein. This is in pronounced contradistinction to the prior manual application of buttons to valve stems where the discharge of appreciable amounts of such material results, creating a situation where discharged material must be cleaned up by the operator from time to time and also soiling the exterior of the can so that the can too must be wiped off before packing.

The foregoing description sets forth the preferred embodiment of this invention, but it is susceptible to various modifications. For example the star wheel feed of cans through the button applying zone may be dispensed with by alining the discharge conveyor 16 with the conveyor 15 and feeding the cans through the applying zone in any appropriate manner.

Furthermore, it is possible to apply the buttons without using an air cylinder or solenoid. Such a structure is shown in FIG. 11, wherein a constantly rotating wheel 23 with a roughened surface engages the button as the latter travels with the container, retards the upper end of the button and progressively forces it downwardly over the valve stem as illustrated in this figure. The wheel is peripherally grooved at 24 to permit of operation of the switch operating arm 14.

The foregoing detailed description sets forth different embodiments of the present invention, but the invention is to be understood as not limited to these specific embodiments, but is rather to be construed as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine for applying a socketed valve operating button to the valve stem of an aerosol container comprising: means for moving an aerosol container along a predetermined path, means for positioning a button in the path of the valve stem of the container with the button resting on its side and the socket of the button substantially in the path of the free end of the valve stem of said container said button to be engaged by the valve stem and thereby caused to move therewith, means engageable with the forward end of the button to retard the movement of that end of the button while the other end of said button continues to move with the container to thereby tilt the button into upright position, and additional means to thereafter force the button in the direction of the container to force the socket of the button onto the valve stem.

2. Machine according to claim 1, wherein the means for retarding the forward end of the button comprises a switch operating arm for controlling the operations of the means for forcing the socket of the button onto the valve stem.

3. Machine according to claim 1, wherein the means for retarding the forward end of the button and applying said button to the valve stem of the containers comprises a rotating wheel.

4. Machine according to claim 1, wherein the means for moving the container along a predetermined path comprises conveyors leading to and from the zone wherein the button is engaged by the valve stem and applied thereto, with interposed means for positively moving the container through said zone at a predetermined speed.

5. Machine according to claim 4, wherein the interposed means for positively moving the container through said zone comprises at least one mechanically driven star wheel.

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