

Feb. 6, 1962

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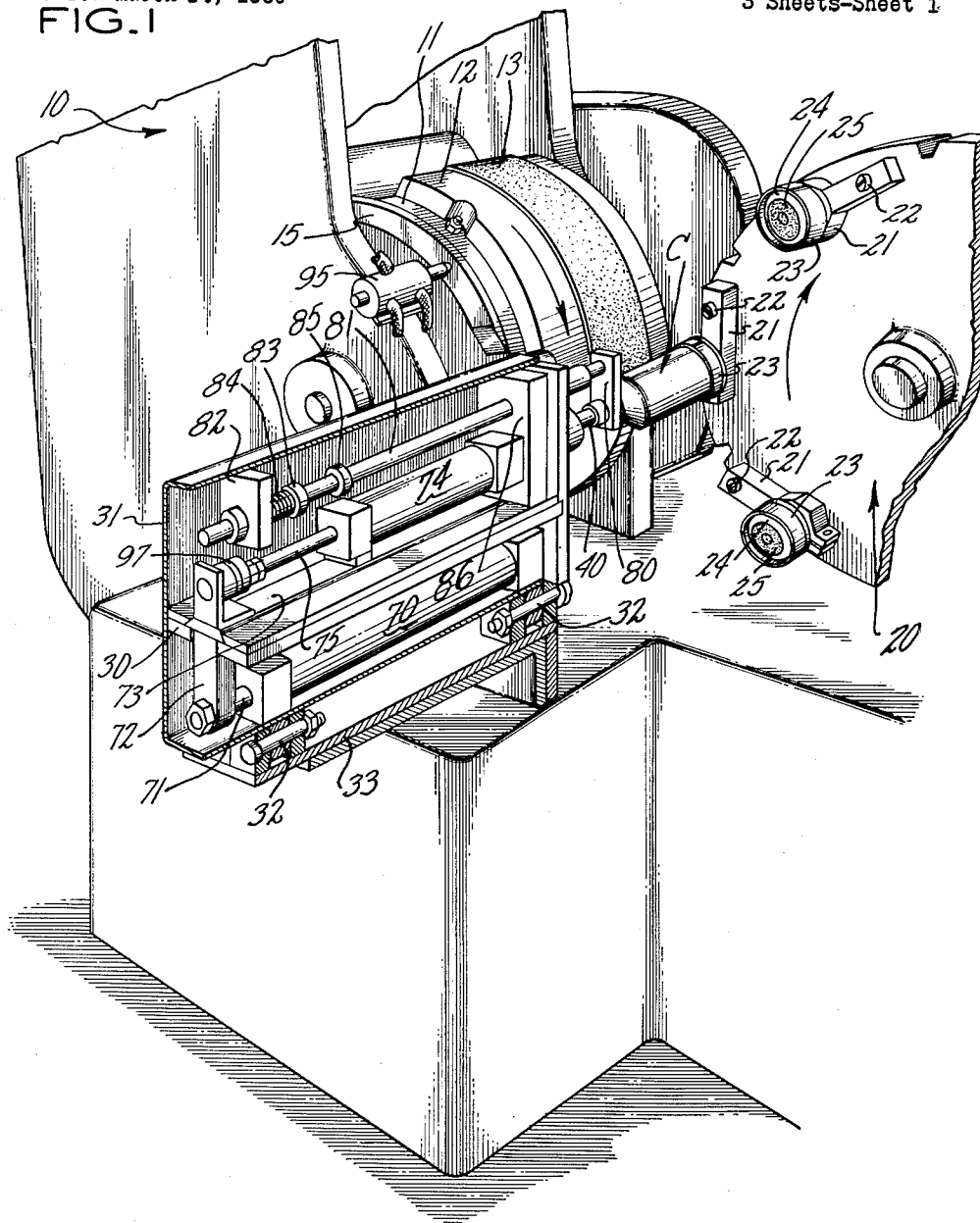
3,019,725

SUPPORTING CONTAINERS FOR PRINTING THEREON

Filed March 14, 1960

3 Sheets-Sheet 1

FIG. 1



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Filed March 14, 1960

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FIG. 2

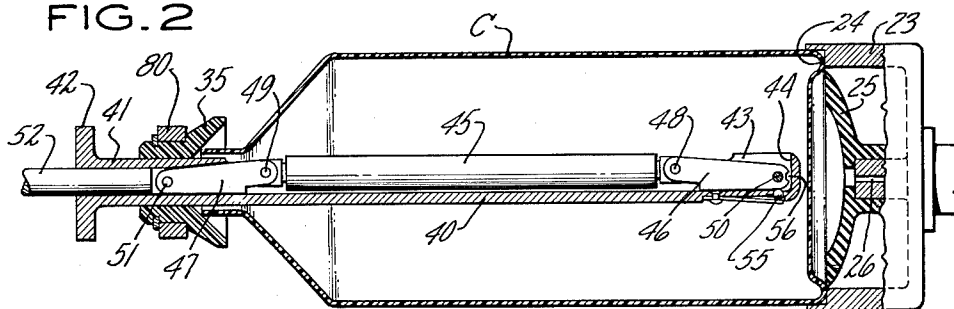


FIG. 3

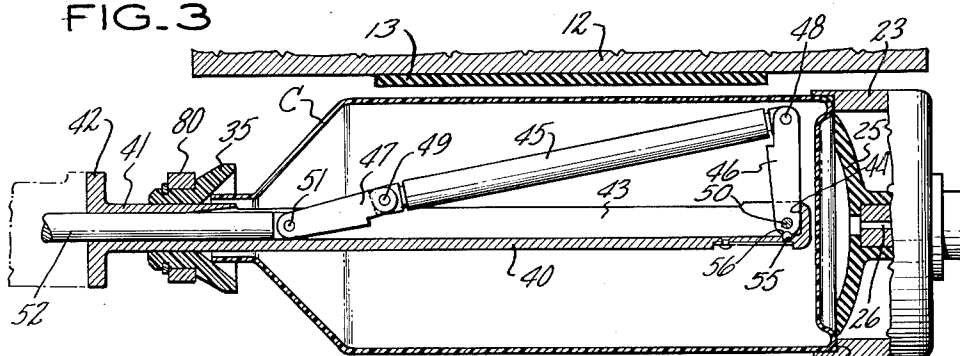


FIG. 4

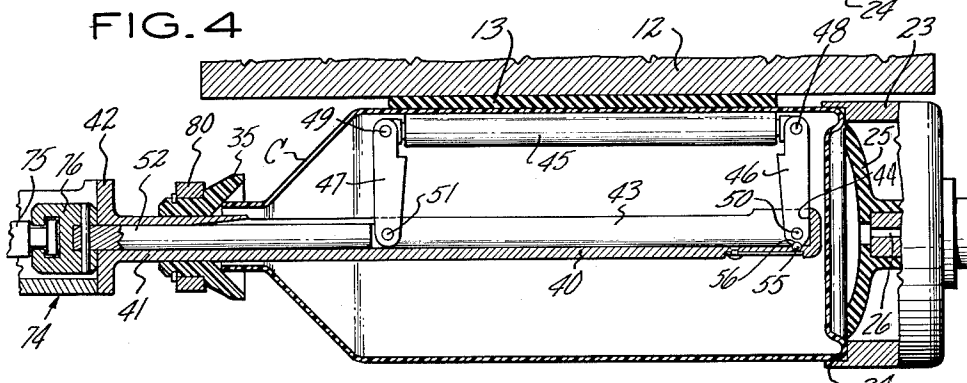


FIG. 5

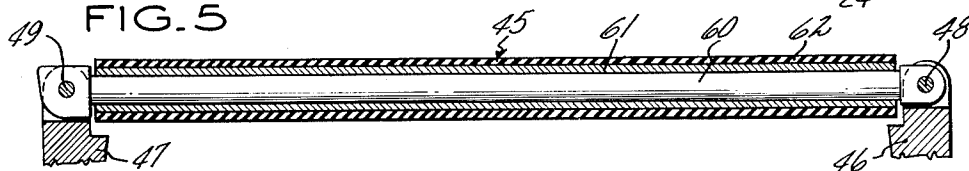


FIG. 6

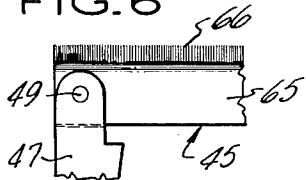
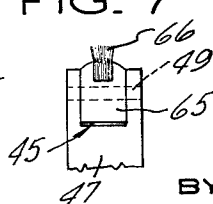


FIG. 7



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3 Sheets-Sheet 3

FIG. 8

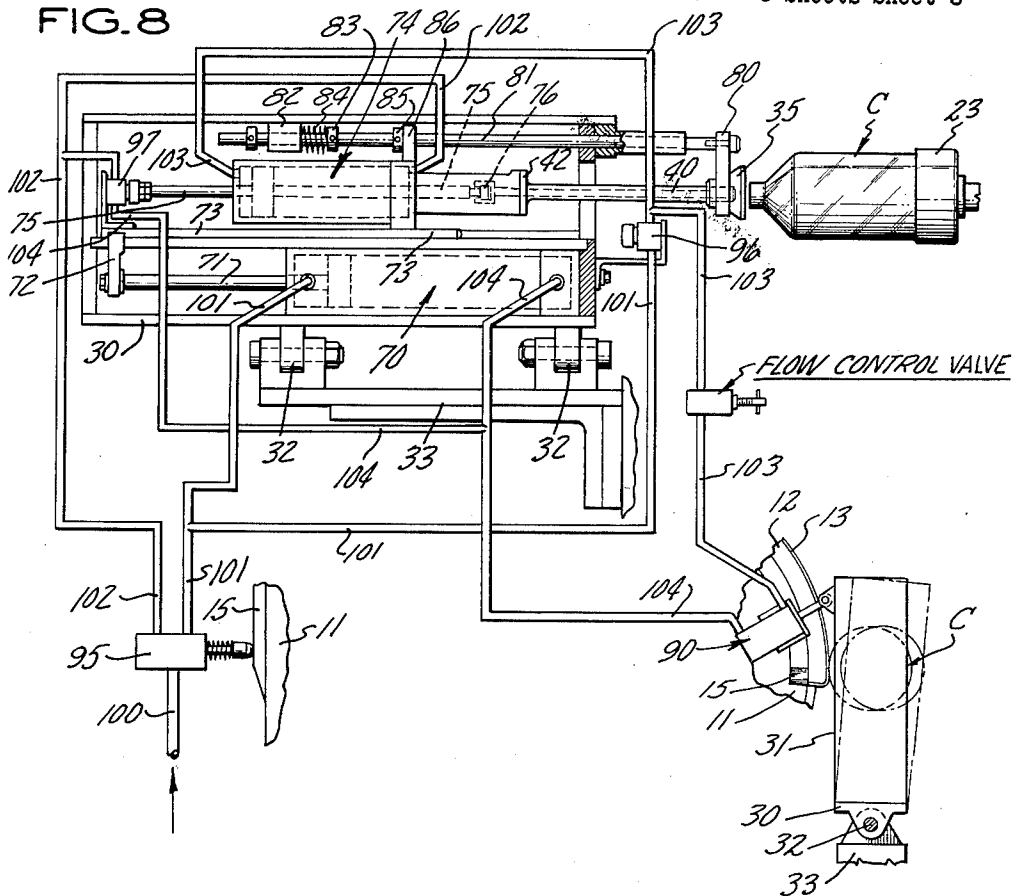


FIG. 9

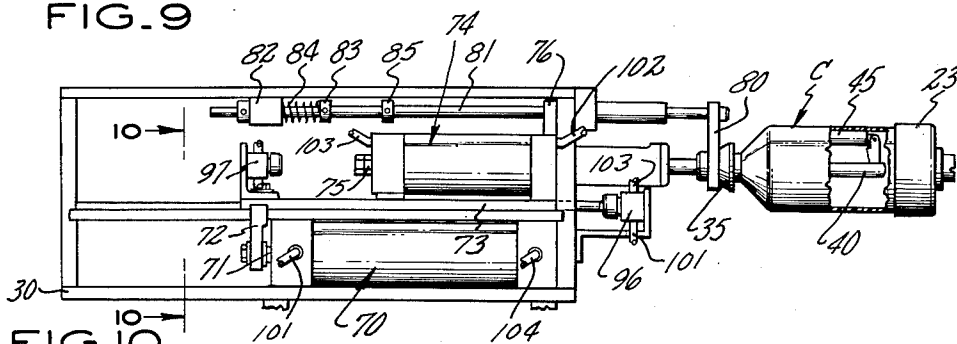
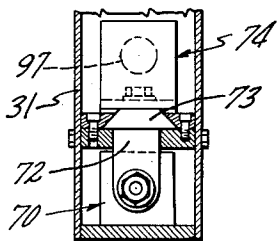


FIG. 10



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3,019,725

SUPPORTING CONTAINERS FOR  
PRINTING THEREON

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Filed Mar. 15, 1960, Ser. No. 14,901

15 Claims. (Cl. 101—38)

This invention relates generally to the art of printing 10  
containers to provide printed or design matter in the  
form of a label on the exterior surface thereof. More  
specifically, it is concerned with printing on the exterior  
cylindrical surfaces of containers having flexible walls  
such as found in blown plastic bottles. The invention,  
as hereinafter described and claimed, is directed to the  
supporting and manipulating, in conjunction with a print-  
ing operation, of plastic containers on which printing is  
to be applied, and particularly such flexible walled plastic  
containers having restricted or narrow neck openings or 15  
mouths. It may be stated that, as used herein, the term  
print or printing has reference to printed or design matter  
being applied to the container surface.

Under prior proposals, containers being printed have  
been supported either by some exteriorly engaged sup-  
porting apparatus or by inserting into the container a dog  
legged or cylindrical mandrel designed to reach in through  
the container neck and outwardly within the container  
to engage the interior wall of the container and support  
it while the desired printing is applied to the exterior. 20  
Exterior supporting during printing is unsuitable for use  
in printing plastic containers since the flexibility of the  
container permits it to distort resulting in imperfect print-  
ing on the exterior. The use of a dog legged arm or  
cylindrical mandrel, while acceptable with plastic con-  
tainers having a wide neck opening or mouth, is unsatis-  
factory for use with containers having narrow neck open-  
ings or mouths. The dog legged arm while enterable  
through the narrow container neck cannot render support  
over a sufficient area longitudinally of the container to  
prevent, during printing, flexing and distortion of the  
container wall at portions surrounding this limited area  
that is supported.

The problems and drawbacks of the prior art pro-  
posals, particularly with respect to flexible plastic con-  
tainers having narrow neck openings, in large measure,  
reside in the inability of such proposals to achieve ade-  
quate support for the flexible plastic container wall and  
also in their inability to accommodate variations in wall  
thickness or unevenness on the interior of the container  
wall. Further, prior proposals have not permitted the  
obtainment of full and even support for the container  
wall along substantially its entire length. Without such  
full support, the printing operation on the exterior of the  
container is limited, since attempts to print up to the  
ends of the container wall are defeated by the lack of  
interior wall support so that the flexible wall yields or  
distorts at its unsupported ends.

Considering the above problems and drawbacks existent  
in the prior art proposals, it is a principal object of the  
instant invention to provide a simple and effective appa-  
ratus for supporting flexible plastic containers in con-  
junction with a printing operation.

As an adjunct to the above object, the apparatus of  
the invention seeks to provide support on the interior of  
the container throughout substantially the entire length  
of the container wall to be printed so that a maximum  
exterior area of the container can be printed.

Another object of the invention is to provide a con-  
tainer wall support mechanism readily insertable through  
a restricted neck opening or mouth of a container, which  
mechanism is expandable from a collapsed state as in-

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serted through the neck opening to provide interior sup-  
port for a substantial length portion of the wall of the  
container in conjunction with a printing operation.

Also an object of this invention is to provide a con-  
tainer wall support mechanism wherein expansion and  
collapsing of the mechanism can be carried out with  
facility by manipulation performed exteriorly of the con-  
tainer and transmitted through the narrow neck of the  
container.

A further object of the invention is to provide a sup-  
port mechanism in connection with the above object,  
wherein a wall support element forming a part of the  
mechanism incorporates along its wall engaging edge,  
short bristles distributed therealong to provide a yield-  
able wall support which can better accommodate irregu-  
larities on the wall interior or of the wall thickness.

It is also an object to provide apparatus for container  
support in conjunction with a printing operation includ-  
ing expandable mechanism insertable through the con-  
tainer neck opening to offer wall support from the inside,  
and supporting and centering means cooperable with the  
opposite ends of the container to further support the con-  
tainer in conjunction with its being printed.

An additional object of the invention is to provide for  
controlling the operation of container support apparatus  
including expanding and collapsing a container wall sup-  
porting mechanism in conjunction with a printing opera-  
tion and to regulate movement of the supported con-  
tainer toward and away from a printing element, such  
as a printing blanket carrying printing drum, to avoid  
abrupt engagement of the leading edge of the printing  
element with the supported container.

Briefly stated, and not by way of limitation of the  
invention, the apparatus hereinafter described includes a  
rotatable printing drum which carries a printing blanket  
by means of which the printed or design matter is trans-  
ferred to the exterior of the container being printed in  
accordance with well known offset printing techniques.  
The container to be printed is mounted adjacent the sur-  
face of the drum to be rotatable on an axis parallel to  
the drum axis. This mounting includes a vacuum holder  
engageable with the container base and a centering cone  
biased to engage over the container neck in initially  
holding and aligning the container for printing.

To interiorly support the container wall to be printed,  
an expandable mandrel mechanism is inserted through  
the cone and neck opening and expanded therein by  
reciprocation of an actuating rod extending through the  
neck opening to position an elongated wall support ele-  
ment longitudinally of the container wall interior and  
on the side of the container adjacent the printing drum.  
This element is pivotally connected by links to the man-  
drel mechanism housing and actuating rod. Following  
the printing operation, the mandrel mechanism is col-  
lapsed and withdrawn from the container. The expand-  
able mandrel mechanism is constructed to insure proper  
sequence of movement of the wall support element in  
expanding and collapsing so that the element may be of  
a length substantially equal to the length of the container  
wall being printed.

The supporting apparatus for the container is mounted  
to be swingable relative to the surface of the printing  
drum so that the container can be engaged with the  
printing blanket after the leading edge has passed the  
supported position of the container. Actuators for the  
centering cone, expandable mandrel mechanism and  
swinging movement of the container supporting apparatus  
are provided connected to be operated in proper se-  
quence and time in response to the rotary movements  
of the printing drum.

The above and other, more specific objects of the  
invention will be apparent as will be more readily appre-

ciated from reference to the specific description of particular embodiments as given hereinafter, taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a partial perspective view of an offset printing machine incorporating the instant invention with parts thereof shown in section;

FIGURE 2 is a detailed sectional view showing the expandable mandrel mechanism in a collapsed condition within a container;

FIGURE 3 is a view similar to FIGURE 2 showing the expandable mandrel mechanism in a partially expanded condition;

FIGURE 4 is a view similar to FIGURE 2 showing the expandable mandrel mechanism in its fully expanded container supporting condition;

FIGURE 5 is a detailed sectional view through the container wall support element of the expandable mandrel mechanism;

FIGURE 6 is a partial view of a modified wall support element useable with the expandable mandrel mechanism;

FIGURE 7 is an end elevational view of the wall support element of FIGURE 6;

FIGURE 8 is a schematic view showing the pneumatic control circuit for controlling the container supporting apparatus in timed relation to printing machine operation;

FIGURE 9 is a schematic view along the lines of FIGURE 8, but showing the container supporting apparatus in a different stage of operation; and

FIGURE 10 is a sectional view taken in line 10—10 of FIGURE 9.

Referring to FIGURE 1, the container supporting apparatus of the instant invention is shown associated with a suitable printing machine in the form of an offset printing machine 10. The details of construction of this machine are not shown since they form no part of the invention herein. It is to be understood that this printing machine, which may be of the multi-color type, would include the usual printing plate cylinders carrying the printing or design matter to be applied to the containers and an inking mechanism, all not shown on the drawings.

The machine includes a rotatably driven printing drum 11 having affixed to the periphery thereof an arcuate plate 12, which plate holds printing blanket 13 on the printing drum. In accordance with well-known offset printing techniques, the inked printing plate cylinders apply the printing or design material to the printing blanket 13 as the printing drum 11 rotates. Upon continued rotation of the printing drum 11, the printing or design material is transferred from the blanket to the surface of the container C by rotative engagement of the printing drum with the container exterior. Reference may be had to the prior art for various printing machines of the offset printing type or otherwise, which can be used with the container supporting apparatus of the instant invention as described hereinafter.

It may be noted with reference to the portions of the offset printing machine illustrated on FIGURE 1 that the printing drum 11 has a cam 15 mounted on one end thereof. This cam functions in a manner described in more detail hereinafter to coordinate control of the container supporting apparatus with the rotary movements of the printing drum 11 so as to secure proper sequence and timing in supporting the container wall to be printed and moving such wall into engagement with the printing blanket 13 at the proper point in rotation of drum 11.

In the proposal specifically illustrated on FIGURE 1, the containers to be printed are moved to and away from the printing location, where the container is engaged with the printing drum 11, on a rotatably mounted turret 20. This turret carries a series of vacuum holders 21 spaced around the periphery, three of these holders being shown on the portion of the turret illustrated in FIGURE 1. Each holder is pivotally mounted as at 22 on the turret to permit the desired manipulation of the container relative to the printing cylinder 11. The holders include a rotat-

ably mounted cup 23, the details of which are best shown in FIGURES 2, 3 and 4.

Referring to FIGURES 2, 3 and 4, the cup has a shoulder 24 in which the base of the container C to be printed is seated. A vacuum cup 25 is mounted in the bottom of the cup and connected through a passage 26 with a suitable vacuum source (not shown), the connecting of such source to cup 25 being controlled by a suitably controlled valve (not shown). It is to be understood that the timing of the application of vacuum to cups 25 is to be suitably controlled in relation to rotation of turret 20. Thus the container to be printed may be mounted in a holder 21 at the lower position on the turret shown in FIGURE 1, whereupon the vacuum will be applied to cup 25 to hold the container as the turret indexes, moving the container to the printing station adjacent printing drum 11. After the container is printed, the turret 20 again indexes and the printed container may be removed upon the vacuum being released from cup 25 at the upper position shown on turret 20 in FIGURE 1. The control of vacuum to cups 25 is not shown or described herein since the turret operation as far as the instant invention is concerned serves merely as a suitable means to facilitate moving the containers to and from the printing station.

When the turret 20 indexes, to move a container C held at its base in a vacuum holder 21, to position such container adjacent the printing drum 11 in readiness for printing the container exterior, the interior supporting of the container wall to be printed comes into operation. The interior support is provided by mechanism mounted on a framework 30 suitably enclosed in a casing 31 and pivotally mounted at 32 on a support 33 which is suitably affixed to the side of printing machine 10. The pivotal mounting of the framework 30 enables the container wall support mechanism to move the container to be printed toward and away from the printing drum 11 in timed relation to the rotary movement of drum 11 carrying printing blanket 13.

The casing 31 encloses actuators for an expandable mandrel mechanism which mechanism is carried by the framework and inserted into the container to provide the desired interior support for the wall to be printed. With a container held in vacuum holder 21 at the printing station, a centering cone 35, carried by and operated in conjunction with the expandable mandrel mechanism and which will be described in detail subsequently, cooperates with the container neck to align the container for insertion of the mandrel mechanism. The construction of the mandrel mechanism is shown in FIGURES 2 through 5, and reference will now be had to these figures for a fuller understanding of the mandrel mechanism structure.

The expandable mandrel mechanism includes an elongated housing 40 insertable through the neck opening or mouth of the container and having a tubular portion 41 adjacent the inner end thereof. The tubular portion 41 ends in a flange 42 for attachment of the housing to the actuator. The housing 40 is provided with an elongated laterally opening cavity 43 communicating with the bore of tubular portion 41 at one end and having an end wall 44 at its opposite end. A support element 45 positionable substantially within the cavity 43 and which serves in the expanded condition of the mandrel mechanism to support the container wall to be printed, has links 46 and 47 pivotally connected to its opposite ends at 48 and 49 respectively. Link 46 has its opposite end pivotally connected at 50 to housing 40, while link 47 is pivotally connected at 51 to an actuating rod 52 reciprocally received in the bore of tubular portion 41.

Pivotal movement of link 46 is restrained by a spring pressed ball 55 which engages in a detent recess 56 in the end of link 46 when the link extends normal to the axis of housing 40 as shown in FIGURES 3 and 4. It will also be noted that the end wall 44 of housing 40 forms an abutment limiting pivotal movement of link 46 against movement beyond the position shown in FIG-

URES 3 and 4 and that the pivotal connection between link 47 and element 45 is so formed that these parts are restrained against movement to an acute angle relation.

In the structure illustrated, it will be noted that both links 46 and 47 are provided with side wall configurations, where they engage the bottom of cavity 43 in housing 40, to prevent the links from assuming positions parallel to the housing. Thus, in a specific embodiment of the invention, an inclination of a line intersecting the pivot axes at opposite ends of each link of about 7° relative to the housing 40 has been found preferable. This retaining of the links in an inclined state relative to the housing is important to permit the mechanism to expand under control of movement of rod 52.

It may also be pointed out that the length of tubular portion 41 is such that a portion of link 47 is received within the bore of such portion in the collapsed condition of the mechanism as shown in FIGURE 2. Thus, upon initiating expansion of the mechanism, outward and swinging movement of link 47 will be prevented by the overlying part of the bore and therefore, link 46 will initially swing outwardly as rod 52 moves toward the outer end of the housing 40.

With the support element positioned outwardly against the interior of the container wall to be printed, such as shown in FIGURE 4, the container supporting apparatus may be moved to engage the container with the printing blanket 13 on drum 11 whereupon the container will rotate with the blanket 13 and, as it engages the container wall, the printing or design material on the blanket will be transferred to the exterior of the container.

The support element 45 remains on the inner side of the wall being printed, opposite the printing blanket 13. The support element 45 is constructed, to facilitate rotation of the container C during printing, as shown in section on FIGURE 5. Such element has a shaft 60 pivotally connected at 48 and 49 to the links 46 and 47. A metal sleeve 61 is rotatably received on shaft 60 and is covered by a rubber sleeve 62. Thus, the support element having this construction forms a roller which engages the interior of the wall being printed as the container rotates in the printing operation.

FIGURES 6 and 7 show a modified construction for the support element 45 and one which has particular advantages over the roller construction described above. In FIGURES 6 and 7, the support element 45 is formed by an elongated bar 65 which is provided along its outer edge with short bristles 66 forming a yieldable edge surface on the support element. These bristles are preferably made of nylon such that long wear life in supporting plastic containers such as those made of polyethylene, is achieved. This construction for support element 45 has been found to be particularly advantageous in two respects. First, the short bristles 66 provide a yielding edge which very effectively can accommodate variations in wall thickness of the container or unevenness of the interior surface of the container wall so that these differences in containers being printed will not deleteriously effect the quality of the final printed product. Secondly, with this support element construction, the element can extend outwardly at its ends to overlie the outer ends of links 46 and 47 (see FIGURE 6) so that the wall support offered by the short bristles 66 will extend closer to the ends of the container wall and consequently a greater area of the container wall may be exteriorly printed.

Reference will now be had to the control and actuation of the above-described mandrel mechanism in conjunction with rotary movements of the printing drum 11. In this connection, whereas the general relationship of the parts can be best appreciated from the perspective view of FIGURE 1, it appears best to refer to FIGURES 8 through 10 for specific details and understanding the mode of operation.

Manipulation of the expandable mandrel mechanism is effected by two air cylinders. A third air cylinder re-

ferred to subsequently is employed to control swinging of the framework 30 and parts carried thereby toward and away from the printing drum at the proper times.

Framework 30 carries a primary air cylinder 70, the actuating rod 71 of which is connected at 72 to a slide 73. Slide 73 has mounted thereon a secondary air cylinder 74. The projecting end of cylinder 74 is connected to flange 42 on the expandable mandrel mechanism housing 40. The actuating rod 75 of air cylinder 74 is connected by a suitable releasable coupling 76 to the end of rod 52 of the mandrel mechanism (see FIGURE 4).

The centering cone 35 which, as mentioned above, initially engages the container neck to align the container for insertion of the mandrel mechanism is mounted by a holder 80 on a rod 81, such rod being slidably carried by the framework 30 by means including a bearing 82. Rod 81 has secured thereto a first collar 83 with a coil spring 84 engaged between this collar and the end of bearing 82. Spring 84 serves to bias the rod 81 outwardly and accordingly urge the centering cone 35 toward engagement with the container neck. A second collar 85 is mounted on rod 81 to be engaged by a part 86 carried by air cylinder 74.

In the condition of the parts shown in FIGURE 8, the mandrel mechanism is collapsed and in its retracted position with centering cone 35 also retracted by reason of part 86 engaging collar 85 and holding spring 84 compressed. In this state, the slide 73 carrying cylinder 74 is fully retracted and the parts are in readiness for centering the container, and inserting and expanding the mandrel mechanism therein.

Broadly stated, actuation of air cylinder 70 moves slide 73 and air cylinder 74 forwardly to insert the mandrel mechanism. As cylinder 74 moves forwardly, spring 84 urges rod 81 and centering cone 35 forwardly so that the cone engages and aligns the container so that the leading end of the mandrel mechanism may properly thread through the container neck. Thereafter, cylinder 74 is actuated to expand the mandrel mechanism by pushing rod 52 through coupling 76.

With the mandrel expanded, the supported container is moved into engagement with the printing blanket 13 by swinging framework 30 under control of an air cylinder 90 supplied through a flow control valve. To avoid undesired abrupt engagement of the container with the printing blanket 13 on drum 11, the movement of the container to engage the blanket is timed to insure that it will engage immediately following passage of the leading edge of the blanket past the position of the supported container. It will be understood that the movement necessary to engage the container with the blanket is not very great. Also as the framework 30 carries the container on the mandrel mechanism toward and away from the printing drum, the holder on the container base will pivot relative to the turret to move with the container.

The control of the air cylinders is effected in response to movement of cam 15 carried on printing drum 11. A valve 95 is mounted on the printing machine frame to have the actuator thereof engaged by cam 15. Air under pressure is connected to valve 95 through line 100. With the valve actuator resting on cam 15 and valve 95 operated, as shown in FIGURE 8, the pressure in line 100 is connected to line 101, while line 102 is vented to atmosphere through valve 95.

The pressure in line 101 actuates air cylinder 70 to move slide 73, air cylinder 74 and the mandrel mechanism in the manner mentioned above. When the mandrel mechanism is fully inserted, the end of slide 73 engages valve 96 whereupon pressure in line 101 is applied to line 103.

While slide 73 is being actuated and before any actuation of air cylinder 74, the rod 75 of this cylinder holds a valve 97 in open condition so that line 104 is vented to line 102 and to atmosphere by reason of the actuation of valve 95. When valve 96 is opened by engagement thereof by the end of slide 73, the pressure applied through

line 103 actuates cylinder 74 to expand the mandrel mechanism within the container and actuate air cylinder 90 through a flow control valve to swing the framework 30 and casing 31 about pivot 32 so that the container C will be engaged with the printing blanket immediately after the leading edge of such blanket has, by rotation of drum 11, passed the position at which the container is held.

After the printing has been effected by rotation of printing drum 11 with blanket 13 and container C in rotary engagement, the cam 15, on continued rotation of drum 11, releases valve 95, whereupon pressure in line 100 is applied through line 102 and line 101 is vented to atmosphere. The pressure in line 102 then returns cylinder 74 to collapse the mandrel mechanism and as rod 75 of this cylinder returns valve 97 is reopened. Thereupon, pressure in line 102 is applied through line 104, returning the slide 73 by means of cylinder 70 and swinging the container away from the rotary path of the printing blanket by actuation of cylinder 90. The mandrel mechanism as well as the centering cone 35 will thereby be withdrawn from the container and the turret 20 may index to a position where the printed container can readily be removed.

Specific embodiments of the instant invention have been shown and described in detail hereinabove. However, it is not meant that the described embodiments should be limiting. Many variations in construction and operation may be made all within the contemplation of the instant invention. Accordingly, it is to be understood that such variations in the parts and their arrangements are within the scope of the instant invention as may be commensurate with the spirit and scope of the appended claims.

I claim:

1. Apparatus for supporting and printing the exterior of a container comprising an expandable mandrel mechanism having an elongated housing insertable through the mouth of the container, an elongated support element movable outwardly of said housing to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the outer end thereof, an actuating rod reciprocally cooperable with said housing, said second link being pivotally connected to said rod, means connected to said housing and said rod to insert said housing into the container to be printed and operate said rod to expand and collapse said mandrel mechanism in conjunction with a printing operation, and printing means adjacent said mandrel mechanism for printing the exterior of the container supported by the expanded mandrel mechanism.

2. Apparatus for supporting and printing the exterior of a container comprising an expandable mandrel mechanism having an elongated housing insertable through the mouth of the container, said housing having a tubular portion adjacent one end thereof, an actuating rod reciprocally received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion, means connected to said housing and said rod to insert said housing into the container to be printed and operate said rod to expand and collapse said mandrel mechanism in conjunction with a printing operation, and printing means adjacent said mandrel mechanism for printing the exterior of the container supported by the expanded mandrel mechanism.

3. Apparatus for supporting and printing the exterior of a container comprising a rotatably mounted holder for supportingly engaging the base of the container to be

printed, an expandable mandrel mechanism mounted coaxially of and spaced from said holder to be insertable into the mouth of a container on said holder, said mandrel mechanism including a housing provided with a laterally opening cavity extending therealong communicating with a bore extending outwardly of one end of said housing, an actuating rod reciprocally received in said bore and extending outwardly of said one end of said housing, a first link pivotally mounted within said cavity adjacent the other end of said housing to be swingable from a first position essentially within said cavity to a second position extending generally normal to said housing, a second link pivotally mounted on the end of said rod within said housing to be swingable from a first position essentially within said cavity to a second position extending generally normal to said housing, a support element pivotally connected adjacent its opposite ends to the outer ends of said first and second links respectively, said support element having a longitudinal edge portion thereof supportingly engageable with the interior wall of the container to be printed, means connected to said housing and said rod to insert said mandrel mechanism into the container on said holder and operate said rod to expand and collapse said mandrel mechanism in conjunction with a printing operation, and printing means for printing the exterior of the container wall while it is supported by the expanded mandrel mechanism.

4. Apparatus for supporting and printing the exterior of a container comprising means for printing the exterior container wall including a rotatable printing drum carrying means for transferring printing or design matter to the container wall upon rotary engagement between said container and drum, an expandable mandrel mechanism mounted adjacent said drum to be swingable toward and away from said drum, means for expanding said mechanism within the container to support the container wall during printing, means controlled in relation to rotary movements of said drum to effect swinging movement of said mandrel mechanism in its expanded state to engage a container carried on said mechanism with said transferring means immediately after the leading edge of said transferring means has moved beyond the supported position of the container, and means preventing operation of said means for effecting swinging movement of said mandrel mechanism prior to actuation of said mandrel mechanism expanding means.

5. Apparatus for supporting a container to perform an exterior printing operation thereon comprising a rotatably mounted holder for supportingly engaging the base of the container to be printed, an expandable mandrel mechanism mounted coaxially of and spaced from said holder to be insertable into the mouth of a container on said holder, said mechanism including an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocally received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion, and means connected to said housing and said rod to insert said housing into the container on said holder and operate said rod to expand and collapse said mandrel mechanism in conjunction with a printing operation.

6. Apparatus as recited in claim 5 wherein said means includes pneumatic actuators connected respectively to said housing and said rod, and control means for applying actuating pressure to said actuators operable to initiate operation of said rod following insertion of said housing into the container on said holder.

7. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongatable housing insertable through the mouth of the container, an elongated support element movable outwardly of said housing to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the outer end thereof, an actuating rod reciprocably cooperable with said housing, said second link being pivotally connected to said rod whereby inward movement of said rod will act through said second link to swing said links outwardly and thereby position said support element for supporting engagement with the container wall to be printed.

8. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion whereby inward movement of said rod will act through said second link to swing said links outwardly and thereby position said support element for supporting engagement with the container wall to be printed.

9. An expandable mandrel mechanism as recited in claim 8 wherein said support element comprises a roller covered with resilient material.

10. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said support element having a longitudinal edge portion thereof provided with short bristles distributed therealong and extending outwardly to give a yieldable surface supportingly engageable with the interior of the container wall to be printed, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion whereby inward movement of said rod will act through said second link to swing said links outwardly and thereby position said support element for supporting engagement with the container wall to be printed.

11. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said

rod received in said tubular portion, and means for preventing said links from assuming positions parallel to said housing.

12. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion, and braking means cooperating with said first link to restrain pivotal movement thereof relative to said housing.

13. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion, braking means cooperating with said first link to restrain pivotal movement thereof relative to said housing including spring biased detent means between said first link and said housing to frictionally latch said first link in a position generally normal to said housing, and means for preventing said links from assuming positions parallel to said housing.

14. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing insertable through the mouth of the container and having a tubular portion adjacent one end thereof, an actuating rod reciprocably received in said tubular portion, an elongated support element movable outwardly of said housing by manipulation of said rod to supportingly engage the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said tubular portion, said tubular portion of said housing having a length such that a portion of said second link is received therein when said support element and said first link are in substantial alignment, means for preventing said links from assuming positions parallel to said housing whereby inward movement of said rod will act through said second link to swing said links outwardly and thereby position said support element for supporting engagement with the container wall to be printed.

15. An expandable mandrel mechanism for supporting a container from the interior thereof while performing an exterior printing operation on the container comprising an elongated housing provided with an elongated laterally opening cavity communicating with a bore extending outwardly of one end of said housing, an actuating rod reciprocably received in said bore and extending outwardly of said one end of said housing, an elongated wall support element positionable substantially within said cavity and movably outwardly of said cavity by manipulation of said rod, said element having a longi-

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tudinal edge portion thereon supportingly engageable with the interior of the container wall to be printed, first and second links pivotally connected adjacent opposite ends of said element respectively, said first link being pivotally connected to said housing adjacent the other end of said housing, said second link being pivotally connected to the end of said rod received in said bore, said bore of said housing having a length such that a portion of said second link is received therein when said support element and said first link are in substantial alignment within said cavity, and means for preventing said links from assuming

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positions parallel to said housing whereby inward movement of said rod will act through said second link to swing said links outwardly and thereby position said support element for supporting engagement with the container wall to be printed.

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