

Jan. 20, 1953

T. L. FAWICK

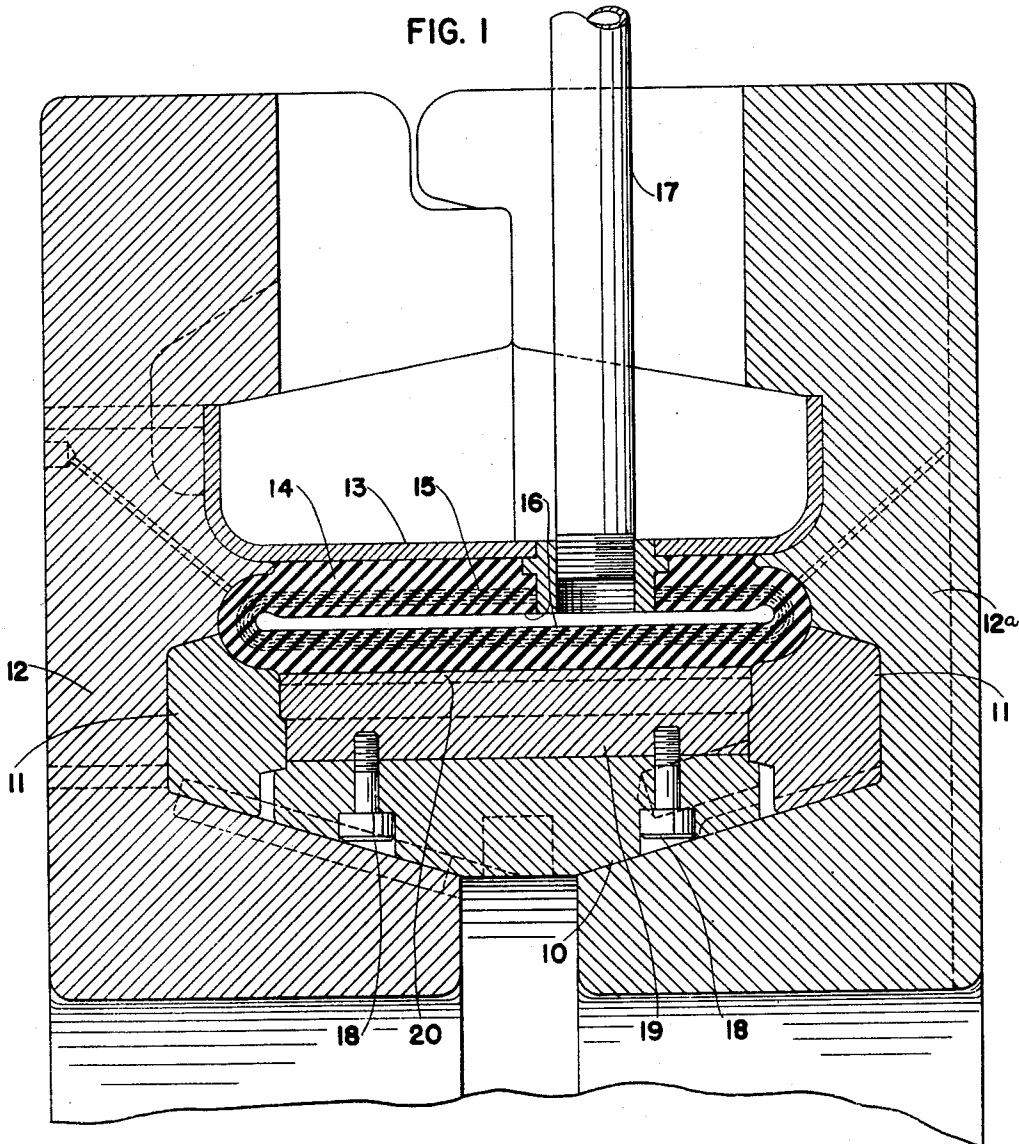
2,625,711

MOLDING APPARATUS FOR SHAPING FLUID DISTENSIBLE
BAGS FOR ACTUATION OF CLUTCHES AND BRAKES

Filed March 3, 1949

2 SHEETS—SHEET 1

FIG. 1



INVENTOR.

THOMAS L. FAWICK

BY *Willard D. Capin*

ATTY.

Jan. 20, 1953

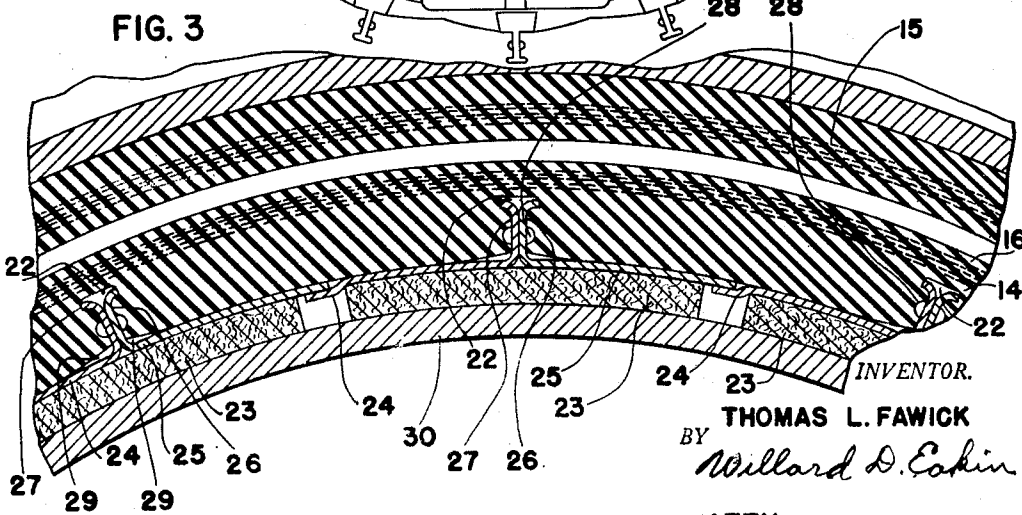
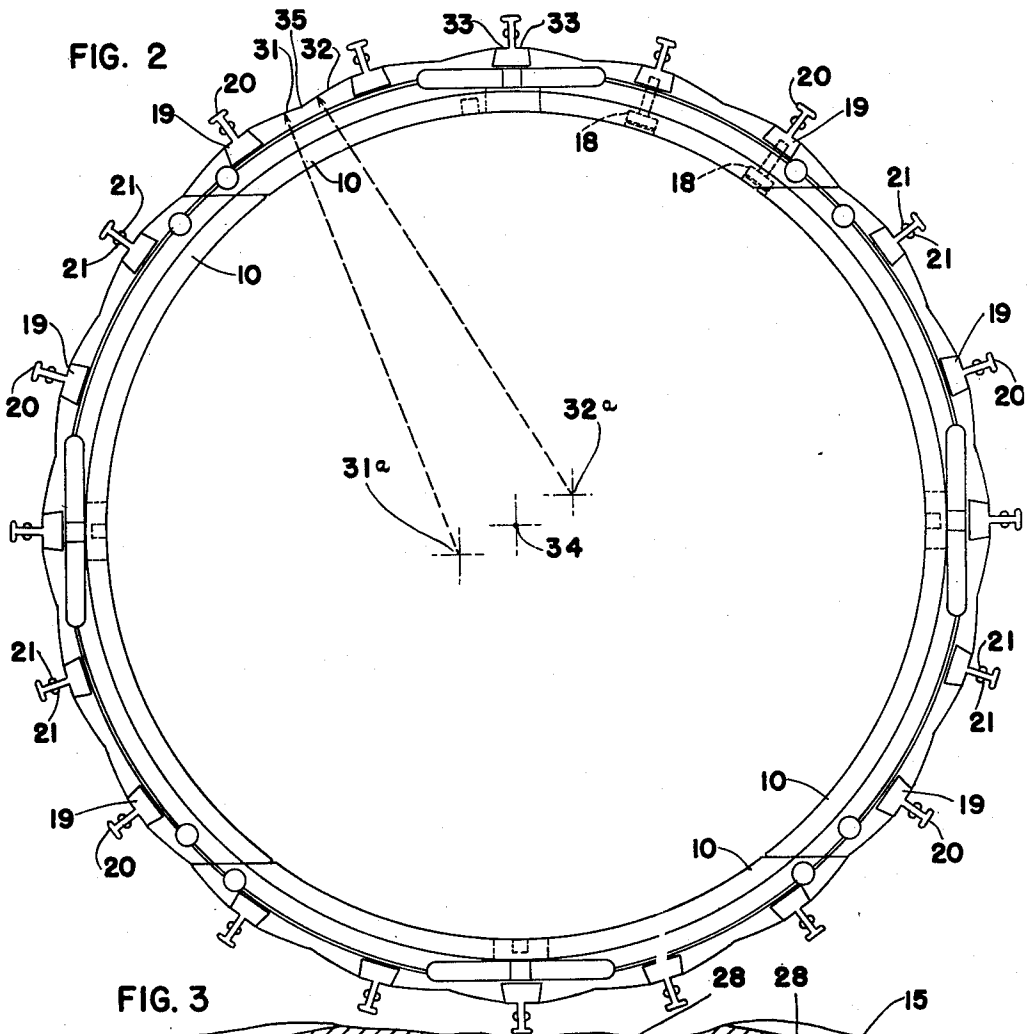
T. L. FAWICK

2,625,711

MOLDING APPARATUS FOR SHAPING FLUID DISTENSIBLE
BAGS FOR ACTUATION OF CLUTCHES AND BRAKES

Filed March 3, 1949

2 SHEETS—SHEET 2



INVENTOR.
THOMAS L. FAWICK
BY *Willard D. Eakin*
ATTY.

UNITED STATES PATENT OFFICE

2,625,711

MOLDING APPARATUS FOR SHAPING FLUID
DISTENSIBLE BAGS FOR ACTUATION OF
CLUTCHES AND BRAKESThomas L. Fawick, Cleveland, Ohio, assignor to
The Fawick Airflex Company, Inc., a corpora-
tion of Indiana

Application March 3, 1949, Serial No. 79,424

3 Claims. (Cl. 18—35)

1

This invention relates to fluid-distensible, tire-like bags such as are employed in clutches or brakes wherein driving or braking engagement is effected by distending the bag and thus moving rigid wear members or shoes into frictional engagement with an external or internal cylindrical face of another member, and to apparatus for molding such bags. The invention relates more specifically to apparatus for shaping a rubber wall portion of the bag for anchoring reception of suitably shaped wear-shoe members thereafter associated with it.

It has been proposed heretofore to shape the rubber, tread-like face of the bag with undercut, transverse grooves for the reception and retention of complementary T-shaped, transverse ribs on the base-plates of the wear-shoes, but difficulty has been encountered because, when the tread face of the bag, between the grooves, is shaped in the mold to simply cylindrical form, with the same radius of curvature as that of the seating faces of the wear-shoe plates, shrinkage of the rubber upon removal of the bag from the mold so changes the shape of the wear-shoe-contacting faces of the rubber that it does not fit the base-plates of the wear-shoes and consequently, when the bag is distended to effect the frictional engagement, the pressure of the bag against the wear-shoe is not uniform, or may even not be continuous, throughout the desired area of contact between the bag and the base-plate of the wear shoe. This problem occurs especially when the bag is of the constricting or inwardly-distending type, adapted to move the shoes radially inward, to engage the outer face of a drum, and has its outer periphery bonded to a surrounding rigid rim or base member in the mold-vulcanizing operation.

In the case of such a bag assembly, with the rib and groove anchorage at the middle of the length of the shoe, the non-conformance of the rubber surface to the arcuate faces of the base-plate is such that the two have their chief or only contact at the middle of the shoe, in the vicinity of the rib-and-groove anchorage, with the result that when the bag is distended inwardly and thus engages the shoes with the drum, each shoe is rocked by the torque, on an axis in that middle region, and consequently has highly non-uniform pressure of the rubber against it, and, even though it and its base-plate be rigid, has non-uniform pressure against the drum.

The chief objects of my invention are to remedy this matter and to provide in a simple and economical manner a bag-and-shoe assembly in which

2

each shoe will have a stable instead of an unstable mounting upon the bag, so that greater uniformity of pressure will be had between the bag and the shoe and between the shoe and the drum.

Of the accompanying drawings:

Fig. 1 is a fragmentary cross-section, with the work in place, of a mold assembly embodying my invention.

Fig. 2 is a side view of a segmental mold-ring assembly for molding what may be called the tread face of a bag of the constricting type.

Fig. 3 is a fragmentary middle-plane section of parts of the finished bag-assembly, showing the relationship of the shoes to the bag.

The molding apparatus comprises a segmental mold-ring assembly made up of a set of separable sections or segments 10, 10, with the usual means, as shown, for holding them as a ring, for the molding operation, but permitting them to be disassembled for removal from the finished bag.

The apparatus comprises also the usual side-rings 11, 11 and main annular mold-sections 12, 12^a.

The bag assembly constituting the work comprises, with reference to Fig. 1, an annular metal rim or base member 13, here shown as of channel form, a rubber bag body 14, to be vulcanized to the rim 13, and having the usual cord reinforcement 15 and a precured rubber lining 16, permitting it to be distended in the mold without a curing bag, by pressure fluid conducted into it through a temporary hollow stem 17.

Each of the mold-ring sections 10 is adapted to mold on the tread face of the bag a surface area of such extent, in the present embodiment, as to receive five of the wear-shoes and at the middle position with respect to each wear shoe the ring section has, seated in a dove-tail groove in its outer face, and held by screws 18, 18, a transverse bar 19 having a cross-sectionally T-shaped rib 20 projecting from the outer face of the ring section and formed on the opposite faces of its stem portion with dimple-molding projections 21, 21.

These T-shaped ribs mold in the tread-rubber of the bag 14 respective complementary T-shaped undercut grooves such as the groove 22, Fig. 3, each adapted to have slid into it, transversely of the bag, a T-shaped anchoring rib of a wear-shoe structure. In the embodiment here shown each of those structures comprises an arcuate block 23 of substantially rigid frictional material of the brake-lining type, secured to a base plate here shown as comprising two metal stampings 24, 25 having bent-out marginal flange portions 26 and

27 which are held together face to face by a set of rivets such as the rivet 28, the two heads of each rivet being adapted to fit, as detents, into the dimples in the rubber that are molded by the mold-ring projections 21, 21, Fig. 2, to prevent creepage of the wear-shoe structure transversely of the bag.

To provide the stability of the wear-shoe structure that is above mentioned and thus attain the above stated objects, the outer, molding faces of the mold-ring sections 10, Fig. 2, instead of being formed as respective arcs of a single cylindrical figure, are given a shape, as shown in Fig. 2, such that when the bag is removed from the mold and allowed to cool, and the wear-shoe structures are assembled with it, the rubber of the tread of the bag will press against both end portions of the shoe structure with at least approximately as much force per unit of contact area as against the middle portion of the wear-shoe structure.

This condition is illustrated, with slight exaggeration for clarity, in Fig. 3, where the rubber and metal faces are shown as being even out of contact with each other in small areas at each side of the anchoring rib, at 29, 29, firmer contact at the two ends of the wear-shoe structure nevertheless providing stability of the structure against rocking and assuring good distribution of the bag pressure, and of the pressure of the shoe against the drum, 30, throughout the extent of the shoe.

A good shape for the molding faces of the ring-sections 10 can be arrived at by forming each molding-face area between two of the bars 23 as cylindrical arcs, 31, 32, having the same radius as the radii from the outer shoulders 33, 33 of the dove-tail base portions of the bars, such drawn from respective centers 31^a, 32^a each offset a suitable distance from the geometrical center 34 of the mold ring, the two arcs 31, 32 thus meeting each other at an angle, at 35.

Modifications are possible within the scope of the invention as defined by the appended claims.

I claim:

1. Molding apparatus for shaping the tread face of a fluid-distensible annular bag for effecting frictional engagement between relatively rotatable structures, said apparatus comprising an enclosing mold defining a molding cavity of greater axial than radial dimension for externally shaping the bag, and means for supplying fluid under pressure to the interior of the bag for distending the bag in the mold, one of the elements of the said mold being a molding ring having a circumferentially spaced set of projections shaped for molding wear-shoe-anchoring recesses in said tread face and having, between the base of each such projection and the base of the next such projection, along the great circle of the assembly, a recessional molding face having its greatest recession in its middle region, the said recessional molding faces constituting only moderate departures from a great circle of the assembly as compared with the said recess-molding projections.

2. Molding apparatus for shaping the tread face of a fluid-distensible annular bag for effecting frictional engagement between relatively rotatable structures, said apparatus comprising an enclosing mold defining a molding cavity of greater axial than radial dimension for externally shaping the bag, and means for supplying fluid under pressure to the interior of the bag for distending the bag in the mold, one of the elements of the said mold being a molding ring having a circumferentially spaced set of projections shaped for molding wear-shoe-anchoring recesses in said tread face and having, between the base of each such projection and the base of the next such projection, along the great circle of the assembly, a recessional molding face having its greatest recession in its middle region, said recessional face having the form of two meeting cylindrical arcs drawn from different geometrical centers, and the said recessional molding faces constituting only moderate departures from a great circle of the assembly as compared with the said recess-molding projections.

3. Molding apparatus for shaping the tread face of a fluid-distensible annular bag for effecting frictional engagement between relatively rotatable structures, said apparatus comprising an enclosing mold defining a molding cavity of greater axial than radial dimension for externally shaping the bag, and means for supplying fluid under pressure to the interior of the bag for distending the bag in the mold, one of the elements of the said mold being a molding ring having a circumferentially spaced set of projections shaped for molding wear-shoe-anchoring recesses in the said tread face of the bag, and said ring having, in the vicinity of each of the said projections, local prominence of molding face such as to cause the product to have less molded material there than it would have if such local prominence were not present, the said prominences being moderate in height as compared with the said projections.

THOMAS L. FAWICK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,536,022	Kuhn	Apr. 28, 1925
1,625,284	Seaton	Apr. 19, 1927
1,632,490	Martin	June 14, 1927
1,727,391	Blake	Sept. 10, 1929
2,024,092	Cox	Dec. 10, 1935
2,324,644	Powell	July 20, 1943
2,414,005	Van Aradell	Jan. 7, 1947
2,422,227	Fawick	June 17, 1947
2,451,992	Grotenhuis	Oct. 19, 1948

FOREIGN PATENTS

Number	Country	Date
192,211	Great Britain	Feb. 1, 1923
503,437	France	Mar. 17, 1920