March 4, 1952 F. SLUSHER 2,587,776

APPARATUS FOR BUFFING FLEXIBLE ARTICLES

Filed July 24, 1947

Fig-1

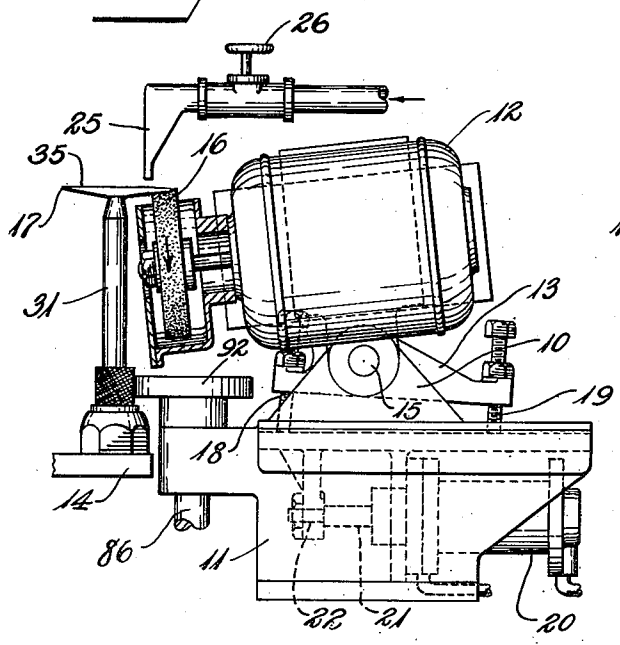


Fig-2

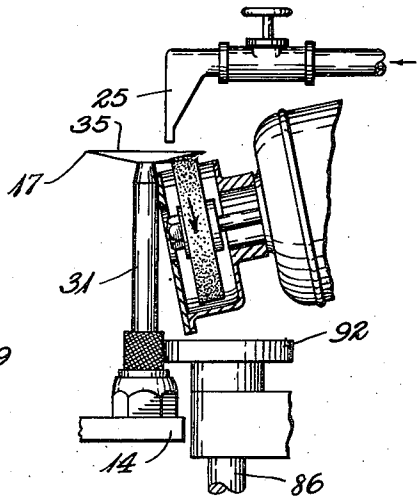
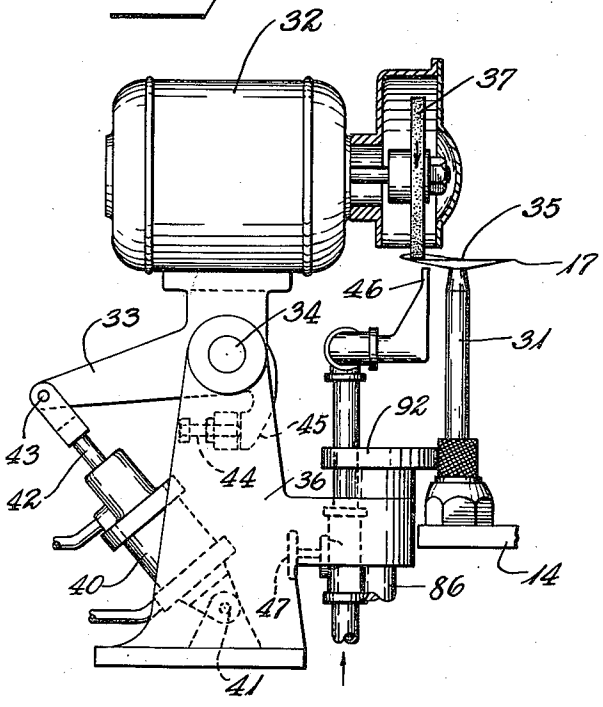


Fig-3



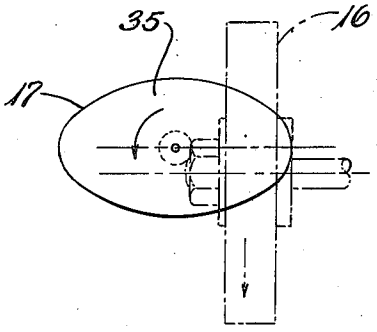


Fig-4

Inventor
Frank Slusher
By J. J. Brucker
Atty.

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APPARATUS FOR BUFFING FLEXIBLE ARTICLES

Frank Slusher, Carpinteria, Calif., assignor to The B. F. Goodrich Company, New York, N. Y., a corporation of New York

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7 Claims. (Cl. 51—108)

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This invention relates to the buffing of flexible articles of rubber or other rubber-like material and is especially useful in buffing the flexible flanges on rubber valve stems for tires.

Valve stems for pneumatic tires usually have been molded from soft rubber composition or other flexible rubber-like material. They have in some cases been formed with a metal-reinforced stem at the attaching end of the stem. The stem, whether including metal or not, is relatively stiff, and has a flexible flange, usually of oval or elliptical shape and tapering in thickness to a very thin edge at its margin. In the preparation of the vulcanized molded valve stems for attachment to the inner tube of the tire, the attaching face of the flange has usually been buffed by an abrasive wheel or scratch brush to provide a good surface for cementing it to the tube.

Heretofore, the buffing of valve stems having a round flange has been accomplished on machines such as that of the Leguillon Patent No. 2,177,898 where the stems are chucked on rotatable spindles mounted on a revolving support and are presented step by step to abrasive buffing elements. These buffing elements contact the attaching face of the flange of the valve stem, while means is provided for rotating the valve stem at the buffing station. In said patent, support of the flange is effected by a contacting supporting wheel or disc.

Where valve stems have been formed with oval flanges difficulties have been experienced in supporting the flanges of the valve stems and presenting them to the abrasive wheels due to the extremely flexible nature of the flanges especially in the region of the major axis of the flanges. Similar difficulties, to a less degree, have been experienced in buffing round flanges.

It is an object of the present invention to overcome the foregoing and other difficulties by providing for pneumatic support of the flanges at the buffing element.

Other objects are to provide for movement of the buffing element into and out of contact with the article at the buffing station, to provide for application of buffing force in directions toward the edge of the flange, and to provide for adjustment of the valve supporting spindle and the abrasive element relative to each other.

These and other objects will appear from the following description and the accompanying drawings.

Of the drawings,

Fig. 1 is a view in elevation of a buffing mechanism corresponding to and embodying the invention as applied to buffing the margin of the lower face of a valve stem flange, parts being broken away.

Fig. 2 is a similar view of the same apparatus as adjusted to buff the area within the margin thereof, parts being broken away.

Fig. 3 is a similar view of the apparatus as arranged to buff the margin of the upper face of the flange, parts being broken away.

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Fig. 4 is a diagrammatic plan view of the apparatus of Fig. 1, showing the relative relation of the buffing wheel and the valve stem.

Referring to the drawings, the numeral 14 designates the turntable support of the machine of U. S. Patent No. 2,177,898 which supports at spaced intervals thereabout a plurality of rotatable hollow spindles 31 for rotatably supporting rubber valve bodies 35. The table 14 is adapted to be rotated step by step as shown and described in the patent to advance the spindles step by step to buffing stations thereabout. At each buffing station, a friction wheel 92 frictionally engages the spindles for driving them, and is driven by a shaft 36.

According to the present invention, there is provided at one station, shown in Fig. 1, a carriage 10 slidably mounted on a bracket 11 for movement radial of the turntable. A buffing motor 12 is mounted on a saddle 13 pivotally secured as at 15 to carriage 10. The motor has a buffing wheel 16 secured to its spindle in a position to engage the lower margin of the flexible flange 17 of the valve stem. Contact of the wheel with the valve stem is accomplished by adjusting screws 18, 19 threaded through the saddle 13 and impinging against the carriage 10.

Movement of the buffing wheel into and out of contact with the valve stems is accomplished by a double-acting fluid pressure operated cylinder 20 secured to bracket 11 and having its piston rod 21 secured to the carriage 10, as at 22. The arrangement is such that as a spindle 31 arrives at the station where the wheel 92 carried by the bracket 11 is in driving relation to the spindle 31, the carriage 10 is advanced toward the spindle 31 until the buffing wheel just clears the flange of the valve stem. At this position the buffing wheel is arranged, as shown in Fig. 4, with the vertical plane including its axis spaced from the axis of the valve stem in a direction such that the wheel is closest to the trailing edge of the valve flange.

For forcing the flange into engagement with the buffing wheel, an air jet 25 is mounted above the valve stem flange and directed downwardly toward it directly over the face of the buffing wheel so that air from the jet forces a local portion of the flange against the wheel to the rear of the vertical plane of the wheel axis. By means of a valve 26 in the line supplying compressed air to the jet 25, the deflection of the flange may be adjusted to provide the desired abrasion of the flange to a nicety and without rolling up of the flexible flange upon the face of the wheel.

Buffing of the under face of the flange is best accomplished in stages, the wheel at one station being adjusted, as in Fig. 1 to contact the ex-

treme margin thereby buffing the margin at the ends of the major axis of the oval flange. At a following station, a similar buffing unit is adjusted closer to the axis of the spindle, as shown in Fig. 2 to buff the inner portion of the flange.

The buffing unit shown in Fig. 3 is arranged to buff the upper surface of the flange. A buffing motor 32 is fixed to a lever 33 pivotally secured, as at 34 to a bracket 36 which rotatably supports the wheel 92. A buffing wheel 37 is fixed to the spindle of the motor 32. For adjusting the buffing wheel into and out of buffing relation to the valve stem 35, a double-acting fluid-pressure operated cylinder 40 is pivotally secured, as at 41, to bracket 36, and its piston rod 42 is pivotally secured, as at 43 to lever 33. An adjustable stop screw 44 is mounted on bracket 36 and in position to engage a stop 45 on lever 33.

For forcing the flange of the valve stem into engagement with the buffing wheel, an air jet 46 controlled by a valve 47 is mounted below the flange. The stop 44 may be adjusted to a position where the buffing wheel 37 just clears the flange of the valve stem, and the valve 47 adjusted to a position where the jet 46 deflects the flange against the wheels. The buffing wheel is so arranged with relation to the spindle 31 as to buff outwardly of the flange toward the trailing margin of the flange.

In the operation of the buffing apparatus, the valve bodies are placed in the chucks of the spindles 31, and the turntable 14 is rotated step-by-step to move the valve bodies from station-to-station into operating position with the buffing wheels. At each buffing station the air jet deflects the flange of the valve body against the buffing wheel at the station while the valve body is rotated by its spindle to progressively buff its flange surface. As the valve body approaches a station for a buffing operation the wheels, 16 or 37, may be moved by the air cylinders, 20 or 40, into operating position, and as the valve leaves the station the buffing wheels may be retracted. At each station the valve is rotated through at least one revolution while its flange is in contact with the wheel.

Variations may be made without departing from the scope of the invention as it is defined by the following claims.

I claim:

1. Apparatus for buffing an article having a flexible flange, said apparatus comprising rotatable buffing means, means for supporting and rotating the article at said buffing means with its flange near an operating face of the buffing means, means for effecting relative translational movement of said article and said buffing means, and means for directing a flow of fluid against the flange of the article for deflecting said flange into contact with said buffing means.

2. Apparatus for buffing an article having a flexible flange, said apparatus comprising rotatable buffing means, means for supporting the article at said buffing means with the flange of the article near and spaced apart from an operating face of the buffing means, means for effecting relative translational movement of said article and said buffing means past one another in a direction tangent to said buffing means with the article spaced apart from said buffing means, and a jet arranged to direct a blast of fluid against said flange to deflect the flange into contact with said buffing means.

3. Apparatus for buffing a resilient valve stem having a flexible flange, said apparatus comprising a support a rotatable buffing wheel mounted on said support, a rotatable spindle supported for movement past said wheel for supporting and rotating the valve stem with its flange spaced from the face of said wheel, means for rotating the spindle and means mounted on said support and directed toward said buffing wheel for projecting a jet of air against the flange of the valve stem to deflect it against said buffing wheel.

4. Apparatus for buffing an article having a flexible flange, said apparatus comprising a support, an abrading member mounted thereon and having a travelling abrading face, means for supporting an article at said abrading member with its flange spaced apart from and near said abrading face, means for effecting relative translational movement of said supporting means and said abrading member one past the other, and means for directing a flow of fluid against the flange of the article for deflecting said flange into contact with said abrading face.

5. Apparatus for buffing an article having a flexible flange, said apparatus comprising an abrading member having a travelling abrading face, means for supporting and rotating an article at said abrading member with its flange near said abrading face, means for effecting relative translational movement of said supporting means and said abrading member, and an air jet for directing a flow of air under pressure against the flange of the article for deflecting said flange into contact with said abrading face.

6. Apparatus for abrading a thin flexible portion of an article, said apparatus comprising an abrading member having an abrasive surface, means for supporting the article with its flexible portion near and normally spaced from the abrasive surface, means providing relative movement of one of said abrasive surface and said article past the other with the flexible portion of thearticle spaced from said abrasive surface, and fluid pressure means for deflecting the flexible portion of the article into abrasive contact with said abrasive surface.

7. Apparatus for abrading a thin flexible portion of an article, said apparatus comprising an abrading member having an abrasive surface, means for supporting the article with its flexible portion near and normally spaced from the abrasive surface, means providing relative movement of one of said abrasive surface and said article past the other with the flexible portion of the article spaced from said abrasive surface, and a fluid pressure jet for deflecting the flexible portion of the article into abrasive contact with said abrasive surface.

FRANK SLUSHER.

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