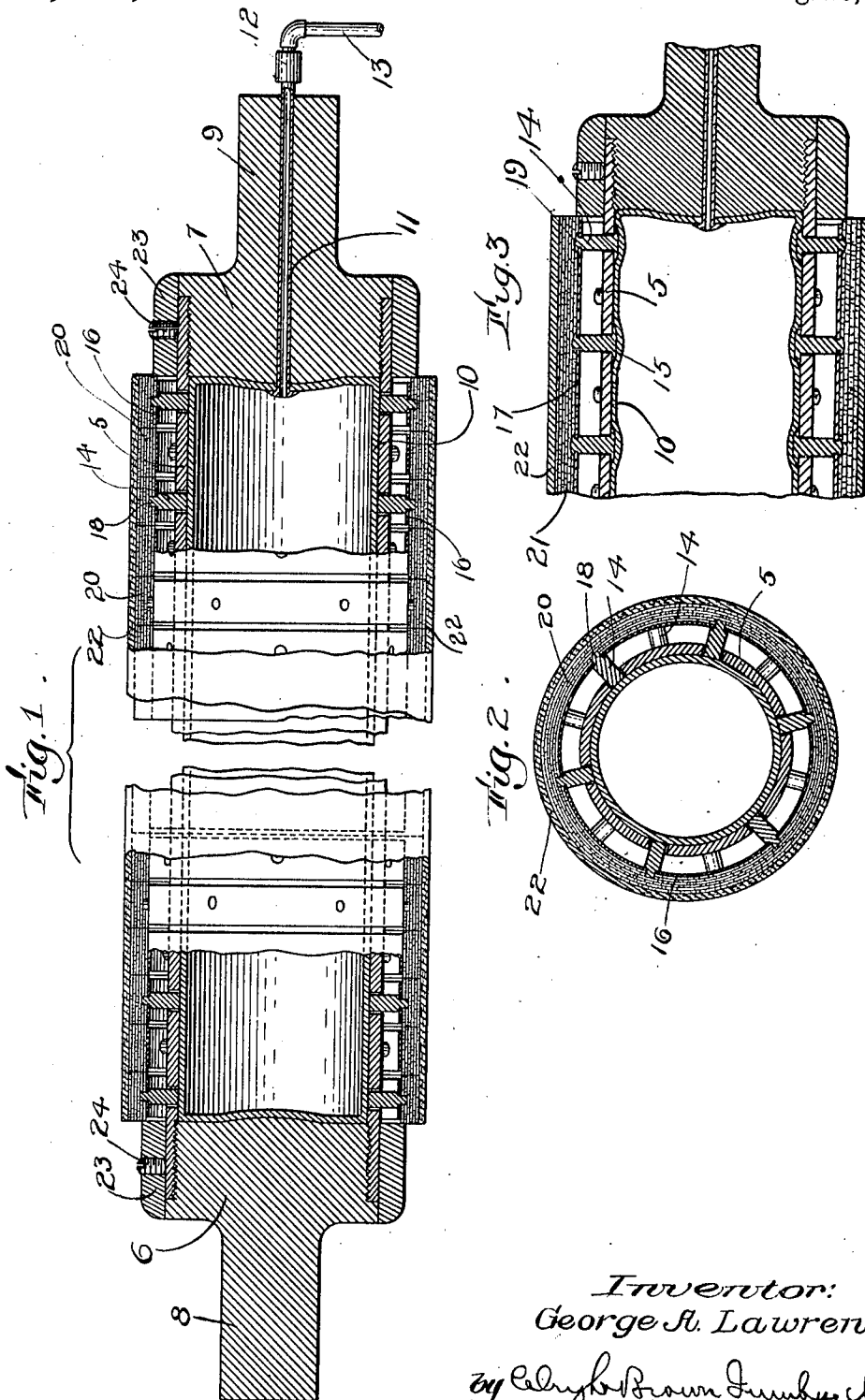


1,314,342.

Patented Aug. 26, 1919.



*Inventor:*  
George A. Lawrence  
*by* Clyde Brown & Company *Attorneys*

# UNITED STATES PATENT OFFICE.

GEORGE A. LAWRENCE, OF WOBURN, MASSACHUSETTS, ASSIGNOR TO THE TURNER TANNING MACHINERY COMPANY, OF PEABODY, MASSACHUSETTS, A CORPORATION OF MAINE.

## PNEUMATIC ROLL.

1,314,342.

Specification of Letters Patent.

Patented Aug. 26, 1919.

Application filed June 20, 1917. Serial No. 175,760.

*To all whom it may concern:*

Be it known that I, GEORGE A. LAWRENCE, a citizen of the United States, residing at Woburn, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Pneumatic Rolls, of which the following is a specification.

This invention has relation to pneumatic rolls or work supports for use in leather working or other machines in which it is desirable to support the material being formed, treated or operated upon in such manner that it may yield under pressure.

The invention consists of an instrumentality of the type referred to having certain improvements, the character of which will be fully disclosed in the following specification and pointed out in the appended claims.

On the drawing,—

Figure 1 illustrates in longitudinal section a pneumatic roll embodying my invention.

Fig. 2 represents a cross section thereof.

Fig. 3 illustrates in longitudinal section another form of roll likewise embodying the invention.

The invention comprehends a yielding or outer flexible member circular in cross section, and an inner inflatable member in which a fluid medium at the desired pressure may be stored. The inflatable member is contained within a rigid tubular member having a plurality of apertures through which pins are passed so as to bear at their inner ends against the inflatable member and at their outer ends against the outer flexible member. Preferably the pins are secured in some manner to the outer member so that the rotation of the tubular member will cause the rotation of the outer member and vice versa, while permitting each pin to yield inwardly under a pressure sufficient to overcome the pressure of the fluid in said inflatable member. The invention is capable of many different embodiments and many of the details of construction which are hereinafter described may be varied without departure from the spirit and scope of the invention as set forth in the claims.

Proceeding to a detailed description of the particular forms of roll illustrated upon the drawings, and referring first to Figs. 1 and

2, the roll there shown is constructed as follows.

5 indicates a tubular member having threaded ends into which are screwed heads 6, 7. These heads are formed with extensions 8, 9, to serve as trunnions or journals and which may be mounted in suitable bearings. One or the other of the journals may be fitted for the reception of a driving pulley or gear.

Within the tubular member or cylinder is placed the inflatable member 10 which preferably consists of a rubber bag or cushion of a shape to fit therein, and which is provided with a stem 11 passing through an axial aperture in the head 7 and journal 9. The stem is connected by a coupling 12 with a pipe 13 through which air or other elastic medium may be pumped into the inflatable member. Any suitable valve, not shown, may be employed in connection with the pipe 13 or the projecting end of the stem.

The tubular member 5 is provided with a series of equally spaced rows of equally spaced holes or apertures, which are preferably radial, to receive an equal number of pins 14, the inner ends of which bear against the cushion or inflatable member 10. The inner ends of the pins may be provided with heads 15 to bear upon the inner surface of the tubular member or cylinder 5 and thus limit the extent of outward movement of said pins, as indicated in Fig. 3.

The outer member preferably consists of a resilient metallic shell which is normally concentric with the tubular member but radially spaced therefrom, and an elastic covering therefor. Said shell may consist of a plurality of spaced rings or sections 16, 16, as shown in Fig. 1, or it may consist of a continuous cylinder 17 as indicated in Fig. 3. In any case, the shell is of thin resilient metal so that it can easily yield on the application of relatively light pressure. The pins 14 have reduced outer ends 18 which project through holes in the shell, the shoulders adjacent said reduced ends bearing against the inner surface of the shell. Said reduced ends may be upset to form heads 19 as indicated in Fig. 3. The elastic covering for the shell consists preferably of layers of rubber and textile material; and it

may comprise a plurality of sections 20, 20, placed end to end, one for each shell section, as shown in Fig. 1, or it may consist of a single tubular cylinder 21 as indicated in Fig. 3. I also employ, when it is desirable, an outer bolster 22 of yielding material, such as rubber, which extends from end to end of the elastic covering. The elastic covering, whether in sectional or non-sectional form, is vulcanized in place on the shell or the sections thereof as the case may be, and the bolster, if employed, is preferably vulcanized thereon. The tubular cavity between the outer member and the tubular member is closed at the ends by removable collars 23 encircling the heads 6, 7, and the ends of the tubular member 5 and secured in place by set screws 24.

The operation of the roll will be readily understood from the foregoing description. After the pressure in the inner inflatable member has been increased to the proper degree, the outer member will be yieldingly sustained in concentric relation to the tubular member by the pins 14 which bear against said inflatable member, and yet, upon superior pressure being applied exteriorly to any portion of the periphery of said outer member, it will yield, and the appropriate pin will be forced radially inwardly against the pressure of the inflatable member.

In Figs. 1 and 2 the outward movement of the pins is limited only by the shell sections, whereas in Fig. 3 the limitation is effected by the inner heads on the pins as well as by the shell.

A roll, constructed as herein described, is particularly applicable for use in leather working machinery, and may with great advantage be employed as the bed, or work-sustaining roll of unhairing, fleshing, shaving or like machines, or wherever a "rubber roll" so-called is utilized. By increasing or diminishing the air pressure in the inflatable member, the sensitiveness or resiliency of the roll may be decreased or increased. Preferably the pins should have only a sliding fit in their respective sockets or apertures, and should be formed with heads on their inner ends to prevent "blow outs". The expansion of the inflatable member is directly limited by its inclosing tubular member and the inner ends of the pins. It is of such dimensions that it acts as a reservoir and equalizes the pressure against all the pins, and through them against the outer

member. Of course the number of pins employed may be varied to suit particular requirements.

Having thus explained the nature of my said invention and described a way of making and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim is:

1. A pneumatic roll comprising an outer yielding metallic shell, an inner rigid tubular member, an inflatable cushion within said inner tubular member, and means interposed between said cushion and said shell for transmitting pressure from said cushion to said shell.

2. A pneumatic roll comprising an inner rigid tubular member, an inflatable cushion within said member, an outer tubular member, and means interposed between said cushion and said outer tubular member for transmitting pressure from said cushion to said member, said outer tubular member consisting of a yielding metallic shell and an elastic covering therefor.

3. A pneumatic roll comprising an outer yielding metallic shell, an inner rigid tubular member, an inflatable cushion within said inner tubular member, and means interposed between said cushion and said shell for transmitting pressure from said cushion to said shell, said shell consisting of a series of sections in axial alinement.

4. A pneumatic roll comprising an inner rigid tubular member, an inflatable cushion within said member, an outer tubular member, and means interposed between said cushion and said outer tubular member for transmitting pressure from said cushion to said member, said outer tubular member comprising a shell formed of sections arranged in axial alinement, and an outer flexible cover on said shell.

5. A pneumatic roll comprising a rigid tubular member closed at its ends and having a series of spaced rows of spaced holes or sockets, radial pins slidingly located in said holes or sockets and extending radially outwardly from said member, an inflatable cushion confined within said member and exerting outward pressure against said pins, and an outer yielding member spaced from but encircling said rigid member and secured to the projecting ends of said pins.

In testimony whereof I have affixed my signature.

GEORGE A. LAWRENCE.