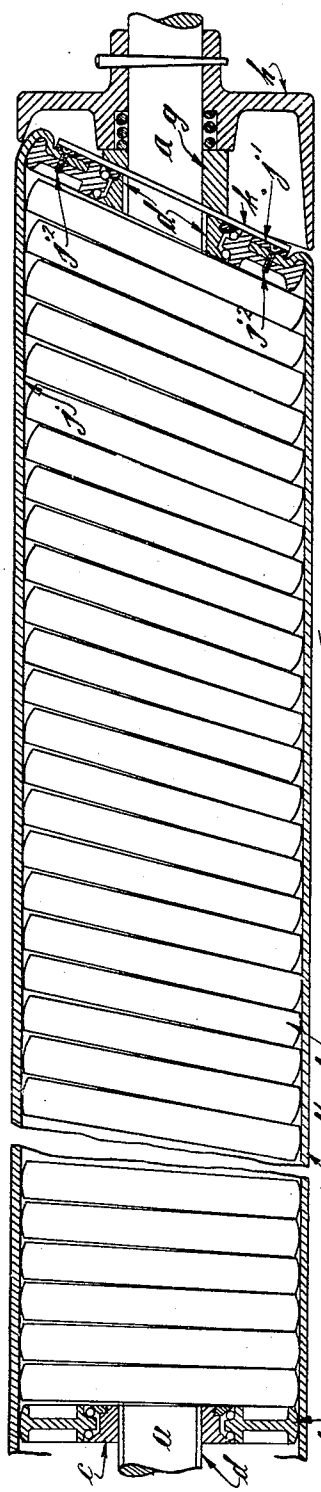
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CLOTH EXPANDER

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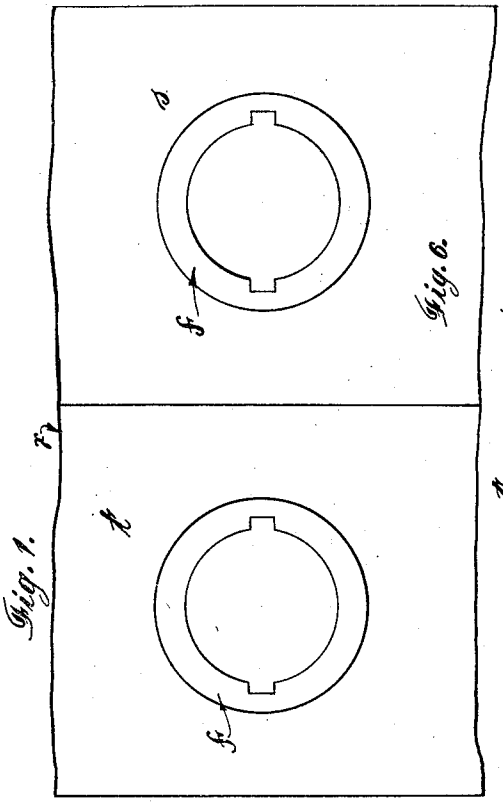


Fig. 6.



Fig. 7.

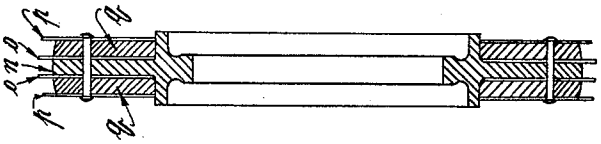


Fig. 5.

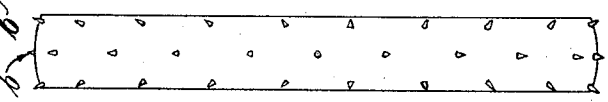


Fig. 4.

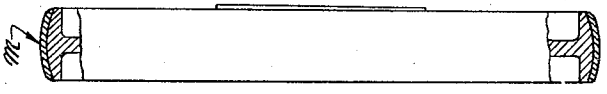


Fig. 3.

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CLOTH EXPANDER

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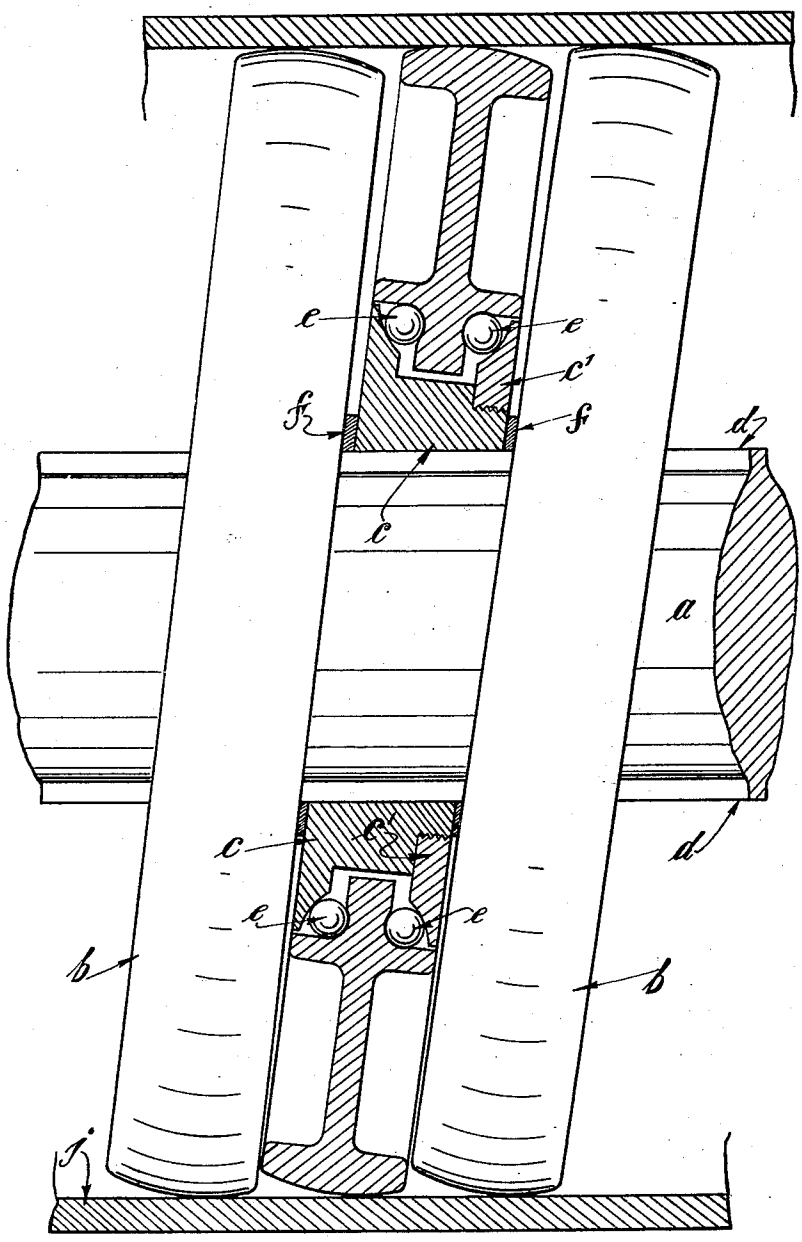


Fig. 2.

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Patented Dec. 10, 1929 1,738,700

UNITED STATES PATENT OFFICE

HARRY HADWIN, OF GLOSSOP, ENGLAND

CLOTH EXPANDER

Application filed January 4, 1928, Serial No. 244,467, and in Great Britain February 10, 1927.

This invention refers to an improved construction of apparatus of the straight bar type for expanding or smoothing out or spreading fabrics, as they pass to or from drying, calendering or like machines.

According to the invention, the expander, which expression includes a cloth expander and also a scrimp rail, comprises a straight through bar, equal in length say to the width of the machine with which the expander is to be used. Upon said bar is rotatably mounted a number of disc-like rings, each bored to receive an inner bush, which, in turn, slidably fits the bar. Instead, however, of the axis of the bush being co-axial with that of the ring, it is disposed at an angle thereto, so that when on the bar the ring lies at an angle to said bar. The several ring bushes are bored at different angles and keyed or secured to the bar against rotation, so that the rings lie at gradually increasing angles from the centre of the length of the bar to its ends, and so that the diameters, at the greatest angle to the bar of each ring, lie in a common plane. To facilitate manufacture and assembling, there may be a series of rings, side by side, lying at the same angle, followed by another series lying at a greater angle. Anti-friction bearings may be introduced between the rings and their bushes.

The rings are preferably all the same width and the circumference of each is reduced or rounded transversely, and, to cause the upper surface of the expander to be parallel with the bar, the rings are made larger in diameter, singly, or in groups, towards the ends of the bar, the radius also varying so as to present everywhere a series of curved surfaces having substantially a common tangent at the surface of the expander.

With the foregoing arrangement of rings, a rubber or like sleeve may be provided, which will be properly supported throughout its length by the rings, and have an expanding and contracting surface as it rotates with the rings.

The invention will be further described with reference to the accompanying drawings showing one example thereof, in which:

Fig. 1 is a part sectional elevation of one half (partly broken away) of the improved expander.

Fig. 2 is a part sectional elevation (twice full size) of a part of the expander.

Fig. 3 is a part sectional elevation of a modified form of ring and also shows a tapered spacing washer.

Figs. 4 and 5 are an outside elevation and a sectional elevation respectively of other forms of rings for use in building a scrimp rail.

Figs. 6 and 7 are a plan and section respectively showing a preferred method of producing the required tapered spacing washers.

Referring to Figs. 1 and 2, a is the central stationary bar of the expander on which are arranged the expander rings b, b, mounted on bushes c, c, fitting on the bar a arranged at progressive angles and engaging the keys d, d on the bar. The bushes c each have a detachable flange c^1 and are built into the rings b enclosing two races of balls e, whereby the rings are rotatably supported on anti-friction bearings on the bushes. Between the bushes are wedge-shaped spacing washers f and all the bushes are secured on the bar from the end by means of a wedge-shaped collar g and end cover h. The rings b are recessed on their side faces for lightness and are radiused on their circumferences. A rubber sleeve j is provided over all the rings and secured to the end rings by means of a washer or plate j^1 and screws j^2. A dust-excluding and oil-retaining washer k is provided on the bar between the collar g and the end ring. The radius on the circumference of the rings is made as flat as possible consistent with ensuring that the rubber sleeve shall lie tangentially thereon, and not on a corner or edge, and therefore, the radius of the rings towards the ends of the bar is smaller than that of those near the centre of the bar.

As shown in Fig. 3, the ring may be provided with a rubber tread m, vulcanized on the circumference and radiused in a similar manner to the rings for use with a rubber sleeve. These rings may obviously be used alone, or with a rubber sleeve.

As shown in Fig. 4, the outer circumference of each ring, while still retaining its radiused shape, may be provided with short pins b^1 for use in scrimp rails.

As shown in Fig. 5, the outer edge of the ring is reduced to leave a central web n, to each side of which are secured thin metal washers or plates o and further washers or plates p with spacing washers q, the plates o and p standing out above the web p and spacing washers q, and their outer edges lying on a radius similar to that of the surface of the rings in the previously described examples. The washers q are preferably made of fibre.

As shown in Figs. 6 and 7, in order to enable the production of the wedge-shaped spacing washers f, a strip of metal r is rolled with a flat back and slightly inclined upper surfaces s and t, each of such surfaces lying at an angle of half a degree to the back surface. From this strip of metal the spacing washers are cut and broached at the required angles.

In one example of the invention, as illustrated, the expander comprises a bar a of round cross-section, some 60 inches long and $1\frac{3}{16}$ inches diameter. On the bar are mounted the expander rings b, rotatably mounted on the bushes c, the two centre rings being mounted coaxially on the bar, while the other rings (on each side) each lie in their own plane of progressively increasing angles towards the ends of the bar, the bushes of the rings being slidably keyed or otherwise secured to the bar.

The rings are each in the form of a flat-sided annulus about $4\frac{1}{2}$ inches diameter and $\frac{9}{16}$ inch thick with rounded periphery and each ring is rotatably mounted on its bush, bored diagonally to fit the shaft, the diagonal boring of the bush varying with the position of the ring along the bar. Between the bush and its annulus are anti-friction bearings.

The rings are arranged in groups or series as follows: The rings of each series are of the same diameter and have the same circumferential radius, but each ring has its own angle of inclination progressive in half degrees outwards from the centre of the bar.

Group	Diameter	Radius of transverse curvature
	Inches	*Inches*
½ to 6 degrees inclusive	$4\frac{7}{16}$	$\frac{7}{8}$
6½ to 10½ degrees inclusive	$4\frac{15}{32}$	$1\frac{3}{16}$
11 to 14 degrees inclusive	$4\frac{1}{2}$	$\frac{3}{4}$
14½ to 17 degrees inclusive	$4\frac{17}{32}$	$1\frac{1}{16}$
17½ to 19½ degrees inclusive	$4\frac{9}{16}$	$\frac{5}{8}$
20 to 21½ degrees inclusive	$4\frac{19}{32}$	$\frac{9}{16}$

Owing to the progressive nature of the expansion and contraction of the rubber sleeve, due to the progressive angles of the rings, said rings individually only take a small part of the total force required to stretch or compress the sleeve as a whole, and operate on the cloth in like manner.

The rings may be made of metal or wood, and they may be of even section, or of web or T section. In the space between the rings may be felt washers or other suitable means for retaining oil or lubricant for the bearings.

The expander will preferably be symmetrical about its centre, so as to give equal expansion of the material from the centre but the same gradual expansion is obviously obtainable using say only one half (i. e. one end) of the expander, or the expander may be arranged to expand only on one side for stretching only one side of the material.

When used for expanding cloth, the expanders will usually be mounted in a frame in groups so that the material is bent to lie over that part of the circumference of each expander which is expanding, each succeeding expander adding to the expansion of the cloth.

What I claim is:

1. An expander for expanding cloth or smoothing out fabrics and the like comprising a straight stationary bar, a plurality of flat sided rings and bushes and anti-friction bearings between the rings and their bushes, said bushes being threaded and keyed on to the bar and arranged at progressive angles to right and left of the centre of the bar, wedge-shaped spacing washers between the bushes, and means at the end of the bar for clamping the bushes and spacing washers together on the bar, the peripheries of the rings being radiused to present a portion lying tangential to the effective surface of the expander and the diameters of the rings increasing towards the ends of the bar so that at the points of maximum expansion, the effective diameter of the expander is the same throughout its length, as set forth.

2. In combination with an expander as claimed in claim 1, a close-fitting rubber sleeve enclosing the expander rings from end to end and rotating with the rings, as set forth.

In testimony whereof I have signed my name to this specification.

HARRY HADWIN.