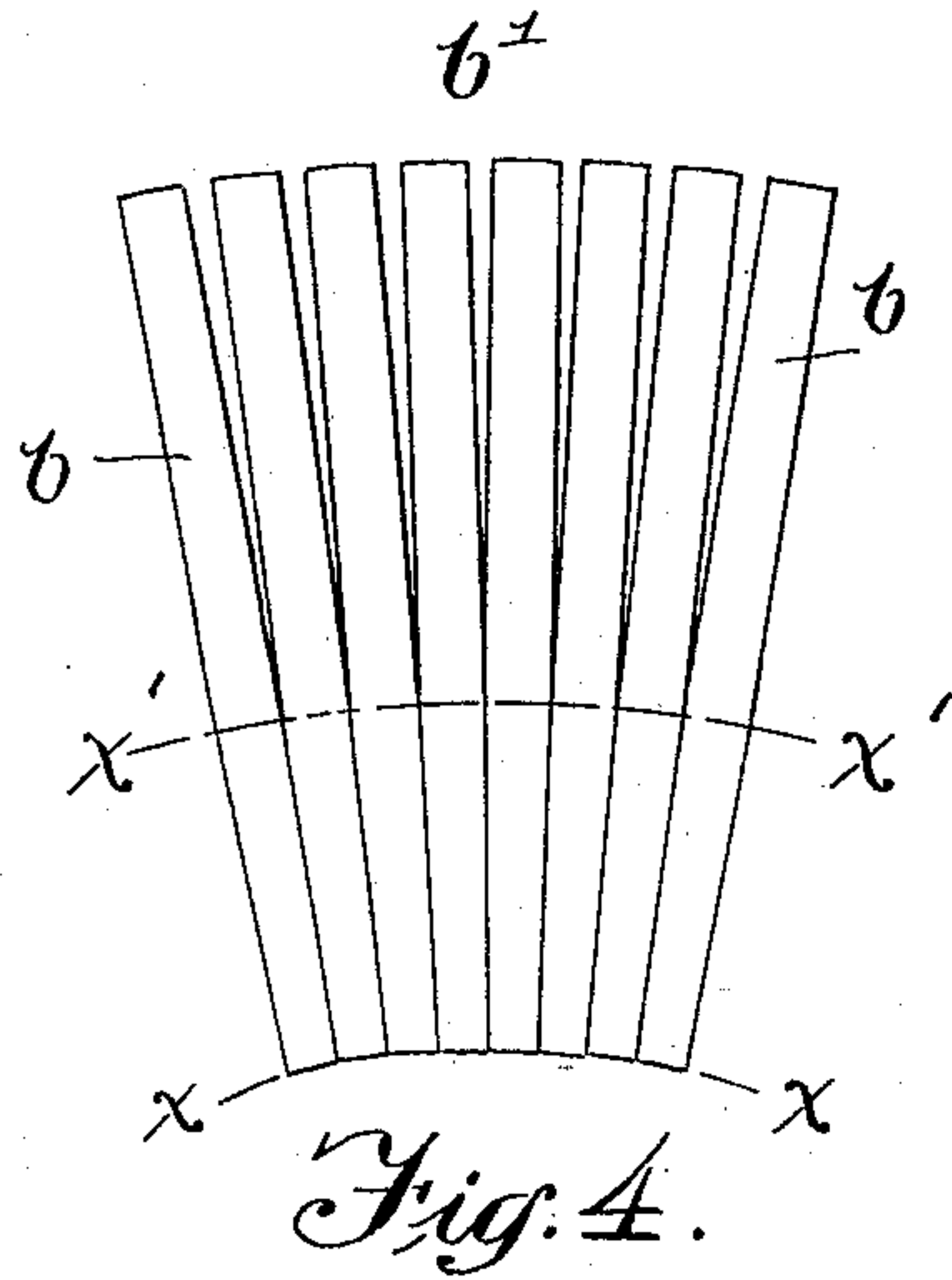
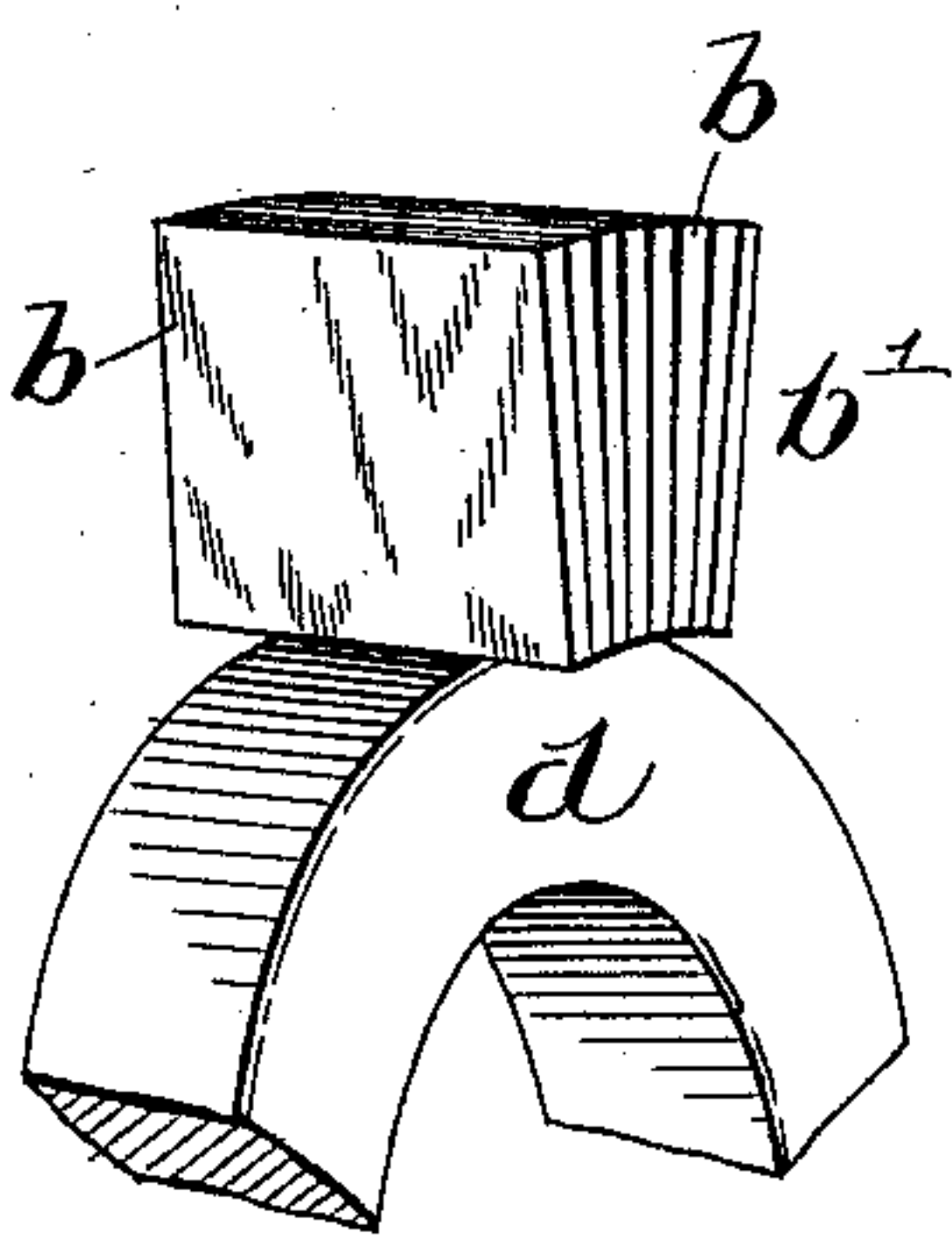
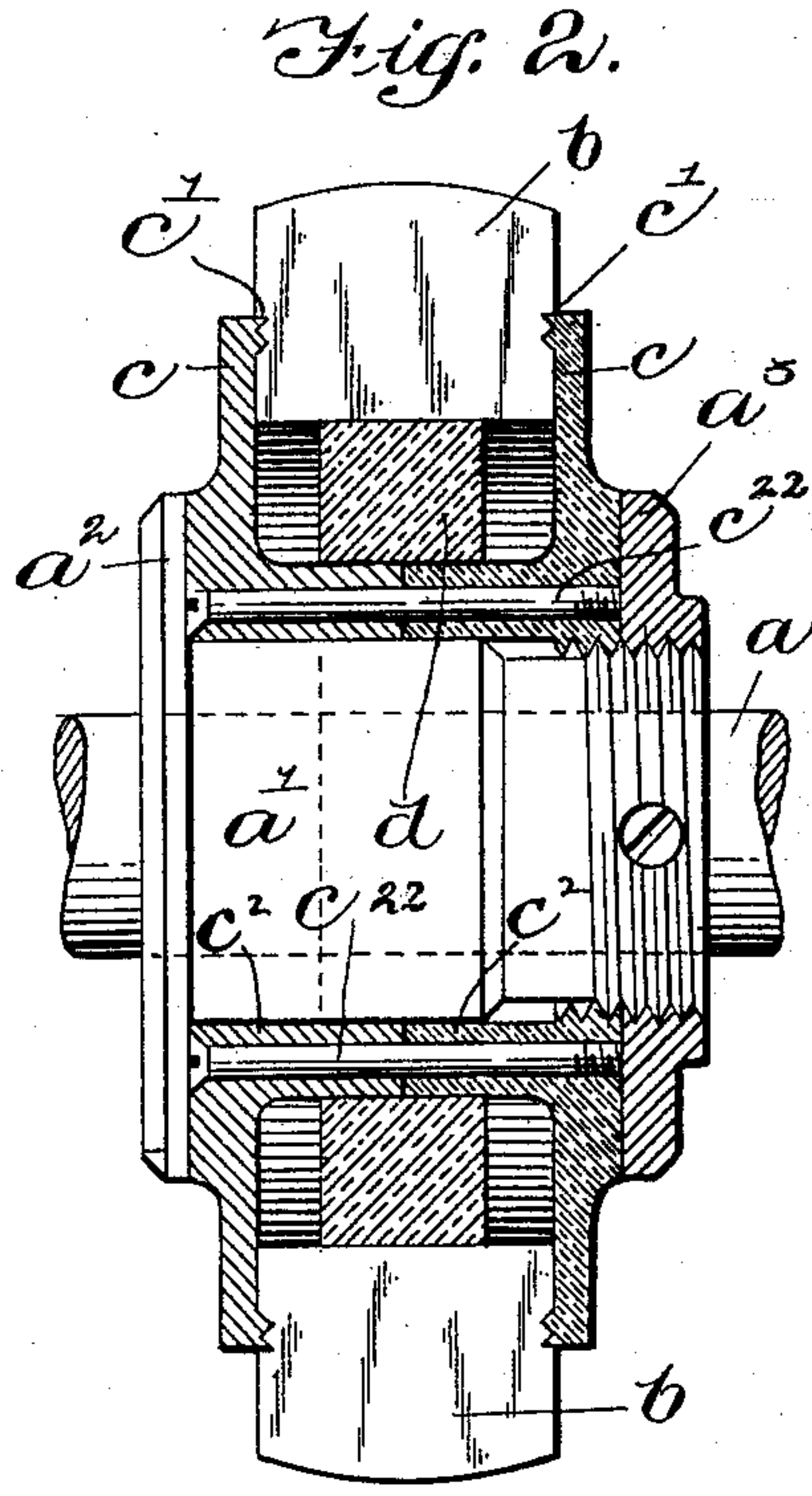
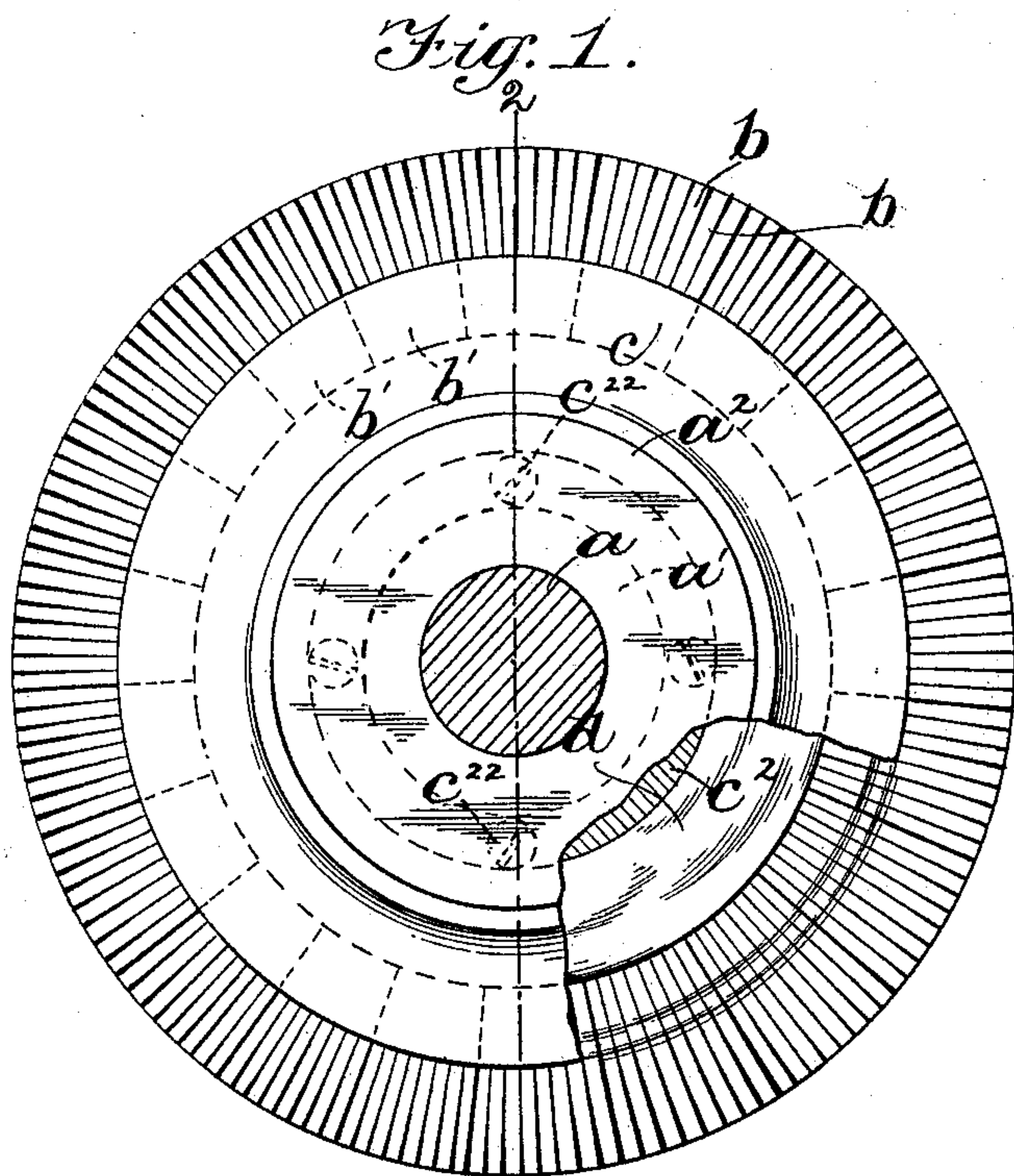


(No Model.)

C. E. GRAHAM.
FLEXIBLE ROTARY WHEEL OR BRUSH.

No. 603,761.

Patented May 10, 1898.



Witnesses:

A. D. Harrison.

D. W. Pezzetti.

Inventor:

Charles E. Graham
by Knight, Brown & Quincy
attys.

UNITED STATES PATENT OFFICE.

CHARLES E. GRAHAM, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO
GEORGE H. P. FLAGG, TRUSTEE, OF BOSTON, MASSACHUSETTS.

FLEXIBLE ROTARY WHEEL OR BRUSH.

SPECIFICATION forming part of Letters Patent No. 603,761, dated May 10, 1898.

Application filed December 9, 1897. Serial No. 661,273. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. GRAHAM, of Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Flexible Rotary Wheels or Brushes, of which the following is a specification.

This invention relates to rotary appliances for rubbing or brushing surfaces of boot and shoe soles and other articles which have been treated with wax and blacking in order to properly finish and polish the surfaces thus treated. It is desirable that an appliance for this purpose be sufficiently yielding to conform to the curvatures of the surface of a boot or shoe sole and at the same time be adapted to exert a sufficiently forcible pressure thereon to accomplish the desired result.

My invention has for its object to provide an appliance for the purpose above mentioned in which the yielding rubbing or brushing surface shall be composed of the ends of a series of radially-arranged leather strips assembled and combined with a supporting-hub in such manner as to constitute a strong, durable, and effective appliance.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a rotary wheel or brush embodying my invention, a portion of one of the clamps being broken away. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a perspective view showing parts of my improved wheel. Fig. 4 represents an enlarged end view of one of the sections of the annular brushing or rubbing device.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I mount upon a suitable hub *a'*, adapted for connection with a shaft *a*, an annular brush surrounding said hub and composed of a series of strips *b* of flexible material, preferably a suitable kind of leather, such as calfskin or split leather. Said strips are radially arranged, as shown in Fig. 1, and are rigidly connected at their inner ends, so as to make the inner edge of the annular brush practically rigid, so that it

cannot yield to external inward pressure. The outer portions of the strips are free to move laterally to a certain extent independently of each other, so that the outer portion or periphery of the brush is not rigid, but is composed of a series of independently-yielding sections, each of which is the outer end of one of the strips. These outer ends or sections collectively constitute a yielding rubbing or brushing periphery.

A practical mode of operation in making the improved appliance is as follows: The strips are assembled in blocks or packs *b'*, as shown in Figs. 3 and 4 and as indicated by the dotted lines in Fig. 1, said dotted lines indicating the portions of the packs which are covered by the clamping-plates *c c*. The inner edges of the strips composing each pack are rigidly secured together, preferably by means of glue or cement, the connection extending from the line *x x*, which is the inner end of the pack, to the line *x' x'*, which may be about half-way between the inner and the outer end of the pack. Between the line *x'* and the outer end of the pack the strips are disconnected from each other and are free to yield laterally to a limited extent and also to yield somewhat to inward pressure toward the axis of the hub. The strips are originally of uniform thickness from their inner to their outer ends. The parts that are glued together between the lines *x x'* are compressed by the pressure exerted in assembling the packs, so that said parts become slightly wedge-shaped, as best shown in Fig. 4. The parts outside the line *x'* are not compressed, so that their radial arrangement and uniform thickness causes the formation of crevices between the outer portions of the strips, said crevices increasing slightly in width from the line *x'* to the outer ends of the strips. These crevices permit the limited lateral flexure above referred to, as well as a limited yielding movement under pressure against the ends of the strips toward the axis of the hub. When the packs are assembled to form an annulus, their inner glued portions are compressed, as above stated, and are glued together to form a continuous rigid base. In the said annulus is inserted a ring *d*, of wood or other suitable material, which is formed to closely fit the inte-

rior of the annulus and the exterior of the hub, its periphery being glued to the inner ends of the strips. The ring d forms a seat or support for the inner ends of the strips
 5 and prevents the annulus formed by the strips from collapsing inwardly and from being broken at any point. The annular brush thus formed and stiffened is extremely strong and durable. The brush may be secured to the
 10 hub by any suitable means, preferably clamping-plates $c c$, which are suitably secured to the hub and are formed to bear upon the sides of the brush. The plates $c c$ are here shown as provided with teeth or corrugations c' ,
 15 which are embedded in the rigid portions of the sides of the brush. The plates are connected and drawn toward each other by screws c^{22} as far as the tubular flanges $c^2 c^2$ on said plates will permit, said flanges abutting
 20 against each other when the teeth c' have sufficiently entered the sides of the brush. The flanges c^2 inclose the hub a' and fit the interior of the ring d . The hub a is provided at one end with a flange a^2 , its other end being
 25 screw-threaded and provided with a flanged nut a^3 . The flange a^2 and nut a^3 bear against the outer sides of the plates $c c$ and hold said plates and brush in place on the hub.

It will be seen that the improved annular
 30 brush or rubbing device composed of radially-arranged strips and a stiffening-ring assembled to form a practically rigid annular base and a flexible or yielding sectional outer portion or periphery adapted to conform to the
 35 curved surfaces of a boot or shoe sole or other article is very strong, durable, and effective and is adapted for use with any suitable hub having clamping-plates adapted to grasp the sides of the annular brush.

40 The annular brush, with its stiffening-ring, constitutes an article of manufacture adapted to be supplied to owners of the hubs to take the place of worn brushes, the operation of applying and removing the brushes being
 45 very simple.

I do not limit myself to the form of the parts here shown and described and may variously modify the same without departing from the

spirit of my invention. The solidity and rigidity afforded by the gluing together and
 50 compression of the inner portions of the strips will enable the annular brush to be firmly held by the clamping-plates $a^2 a^3$ without the use of the ring d . The ring is very desirable,
 55 however, because it increases the strength of the brush not only when it is in use, but also when it is unattached to the hub, the ring enabling the brush to be shipped and kept in stock without danger of breakage.

My approved appliance is distinguished
 60 from anything that has heretofore been devised for the same purpose, so far as I am aware, in that the leather strips are assembled to form an annulus which is practically
 65 rigid at its inner portion and flexible or yielding at its outer portion, so that there is a strong and durable connection between the two parts, while the flexible outer portion projects from the hub in position for operation.
 70

I claim—

1. As an article of manufacture, an annular brush composed of radiating strips compressed and glued together at their inner portions and provided with an internal stiffening device, their outer portions being free
 75 and flexible and constituting sections of a yielding rubbing or brushing periphery.

2. An appliance of the character specified, comprising a hub, an annular brush thereon
 80 composed of radially-arranged strips rigidly connected at their inner portions to form a continuous rigid annular base, and free at their outer portions, which constitute sections of a yielding rubbing or brushing periphery, and clamping devices on the hub,
 85 engaged with the sides of the brush.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of
 90 November, A. D. 1897.

CHARLES E. GRAHAM.

Witnesses:

C. F. BROWN,
 A. D. HARRISON.