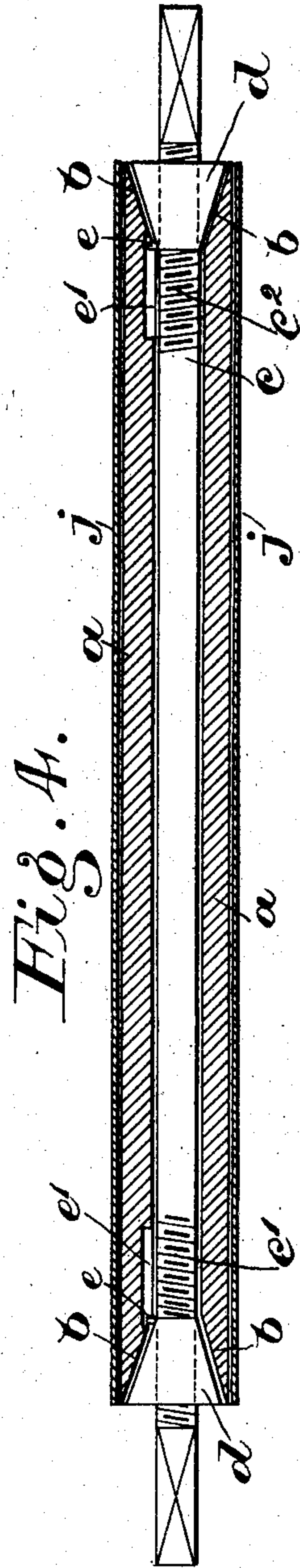
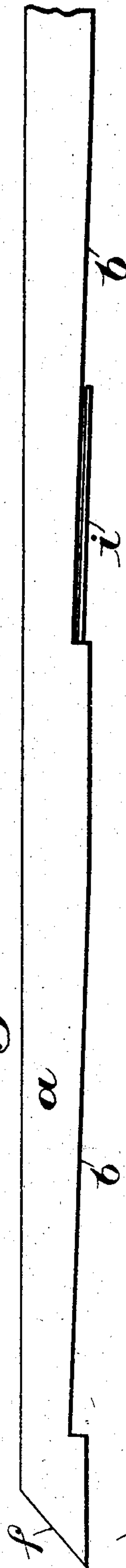
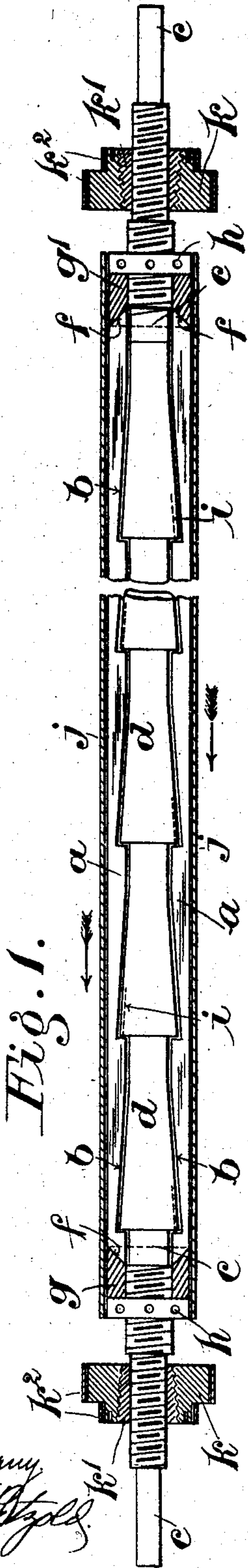


No. 796,212.

PATENTED AUG. 1, 1905.

F. HORSELL.  
PRINTING ROLLER.  
APPLICATION FILED SEPT. 10, 1904.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FRANK HORSELL, OF LEEDS, ENGLAND.

## PRINTING-ROLLER.

No. 796,212.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed September 10, 1904. Serial No. 224,022.

*To all whom it may concern:*

Be it known that I, FRANK HORSELL, residing at Leeds, in the county of York, England, have invented certain new and useful Improvements in Printing-Rollers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates especially to the inking, damping, and like rollers employed in lithographic and other printing machines and hand-printing processes. These rollers are covered with a suitable fabric or material—such as felt, cotton, or flannel, and in some cases with leather, composition, or rubber in addition—and it has hitherto been necessary when such covering has begun to sag and form into ridges or otherwise become uneven, as it invariably does however tightly and perfectly it may have been originally stretched or sewn on, to fill in the loose or empty space with packing or to re-cover the roller anew.

The object of my invention is to provide means for counteracting this sagging, loosening, or stretching of the covering, and this I propose to effect by making the roller capable of expansion—that is to say, in such a manner that its circumference can be increased—whereby the sagging can be followed up as required, and the covering consequently always maintained in a tightly fitting condition upon the roller.

In carrying out my improvements I may divide the roller longitudinally into a suitable number of parts or segments and cut in the internal wall thereof a number of cone-shaped or inclined recesses into which fit a corresponding number of cones, steps, projections, or wedges, constituting or being provided in connection with the stock or spindle of such roller. By this means if the stock or the segments be traversed longitudinally, or it might be rotated for part of a revolution, the roller will be caused to expand, as above explained.

In the accompanying drawings I have illustrated, by way of example, two alternative modes of carrying my invention into practice.

Referring first to Figures 1 and 2, which are respectively plan view (with a number of the segments removed for the sake of clearness) and end elevation of one form of roller constructed according to my invention, letter *a* indicates the segments or longitudinal sections into which the roller is divided. In each of these segments or sections *a* is cut or formed

a number of cone-shaped or inclined surfaces or steps *b*. The stock or spindle of the roller *c* is made in the form of a succession of truncated cones *d*, which fit within the inclined recesses or steps *b*, cut into the segments *a*. The segments *a* are formed with wedge-shaped ends *f* and are held in position on the stock or spindle *c* by caps or nuts *g g'* and lock-nuts *h*. The caps *g g'* are made to fit upon the cone-shaped ends *f* of the segments, which they grip and hold together. In order to expand the roller, the cap *g* and its lock-nut *h* are unscrewed and the cap *g'* tightened up with a suitable key. By this means the segments *a* are moved in the direction of the arrows and the steps *b* therein caused to ride up the cones *d* on the stock or spindle *c*, whereby the circumference of the roller is increased. The cap *g* and lock-nuts *h* are then screwed up into position again. In order to prevent the segments *a* from "bowing" or bending upwardly from the stock or spindle in the center, as they would otherwise be liable to do, I provide the segments *a* with pins *i*, adapted to fit into slots or recesses in the cones *d* and hold the segments closely to the stock or spindle. The pins are clearly shown in Fig. 3, which is a view of a portion of one of the segments *a* on a larger scale; but they may, if desired, be fitted onto the cones *d* and the recesses made in the segments.

Fig. 4 shows another mode of carrying my invention into practice. In this case the stock or spindle *c* is provided with a truncated cone *d* at either end and the segments made with corresponding inclined surfaces *b* to fit upon them. The spindle has right and left handed screw-threads *e e'* cut therein, and it will be obvious that by rotating the spindle the cones *d* will be made to approach the center of the spindle and each other and that the segments will rise away from the spindle as before. The cones *d* are prevented from rotating with the spindle *c* by means of pins or projections *e*, formed thereon, which fit into slots *e'* in one of the segments *a*, and thus admit of longitudinal movement of the cones.

When the roller has been expanded and the segments *a* moved somewhat apart from one another circumferentially, the latter are liable to slip slightly out of position as the roller is revolving. To prevent this, small wedges may be inserted between the ends of the segments, so that the latter are kept always firmly fixed in position and the same distance apart. If the caps *g g'* are arranged to be pressed



forward by the nuts  $h$  on a plain portion of the stock or spindle  $c$ , the wedges may be cast to the caps and will then fit into the spaces between the segments as the roller is expanded.

The segments of the roller are preferably inclosed in one or more shells or tubes  $j$ , made of pen-steel or other like elastic metal or material having an open or, preferably, an overlapping edge or joint either spiral in form or otherwise, as shown in Fig. 2, whereby the outline of the covering, which is applied over the shell  $j$ , will be kept in circular form after the roller has been expanded.

Lithographic-printing rollers are provided with runners at either end, which travel upon bearers in the intervening spaces between the stone and the inking and damping slabs. These runners are indicated in the drawings by letter  $k$ , Fig. 1. When the roller has been expanded, it is necessary also to increase the circumference of the runners, as otherwise the rollers would not work at a uniform speed. The runners are therefore made in segments, which may be expanded conveniently when required by means of a screwed cone  $k'$ . The segments may be held together by means of lapped springs or caps  $k^2$ .

When reduced to their smallest circumference, the rollers will of course allow of new covers being loosely drawn on, after which they can be tightened as required.

My invention has been described with par-

ticular reference to rollers for lithographic-printing machines; but it is applicable also to rollers employed in cotton-printing, bronzing, varnishing, wall-paper printing, and the like machines.

I claim as my invention—

1. In a roller, the combination, with an expansible shell of resilient material, of a driving-spindle provided with a series of cones, segmental portions for expanding the shell engaging with the said cones, means for causing the said cones to move the said segmental portions radially of the spindle, and guide-pins engaging with the said segmental portions and spindle and preventing the middle parts of the said segmental portions from being moved in excess of the end portions.

2. In a roller, the combination, with an expansible shell of resilient material, of a driving-spindle, segmental portions secured between the said shell and spindle, means for moving the said segmental portions radially of the spindle to expand the said shell, and expansible runners secured on the end portions of the said spindle.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK HORSELL.

Witnesses:

LEONARD H. CROSSLEY,  
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