

No. 639,532.

Patented Dec. 19, 1899.

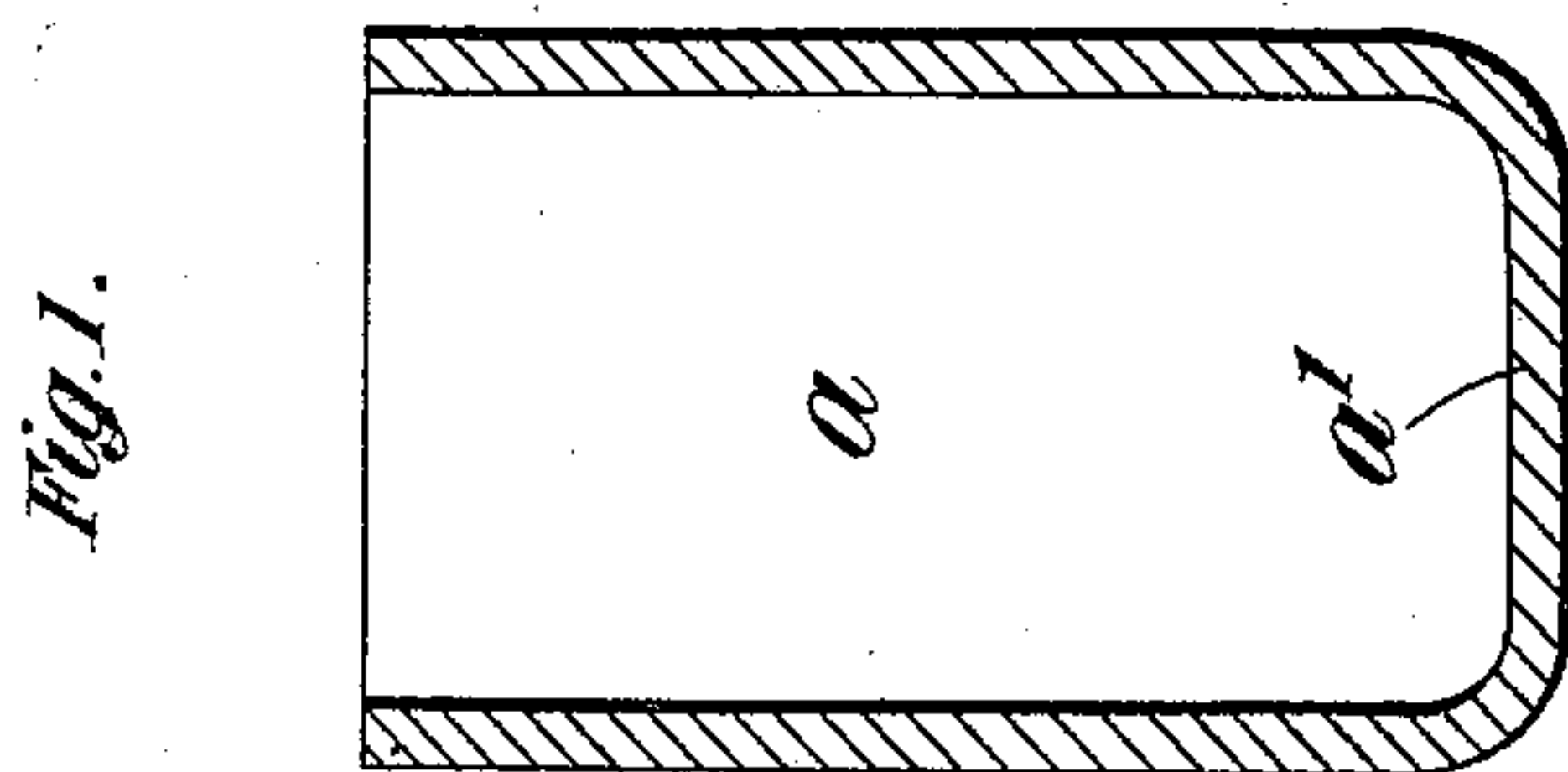
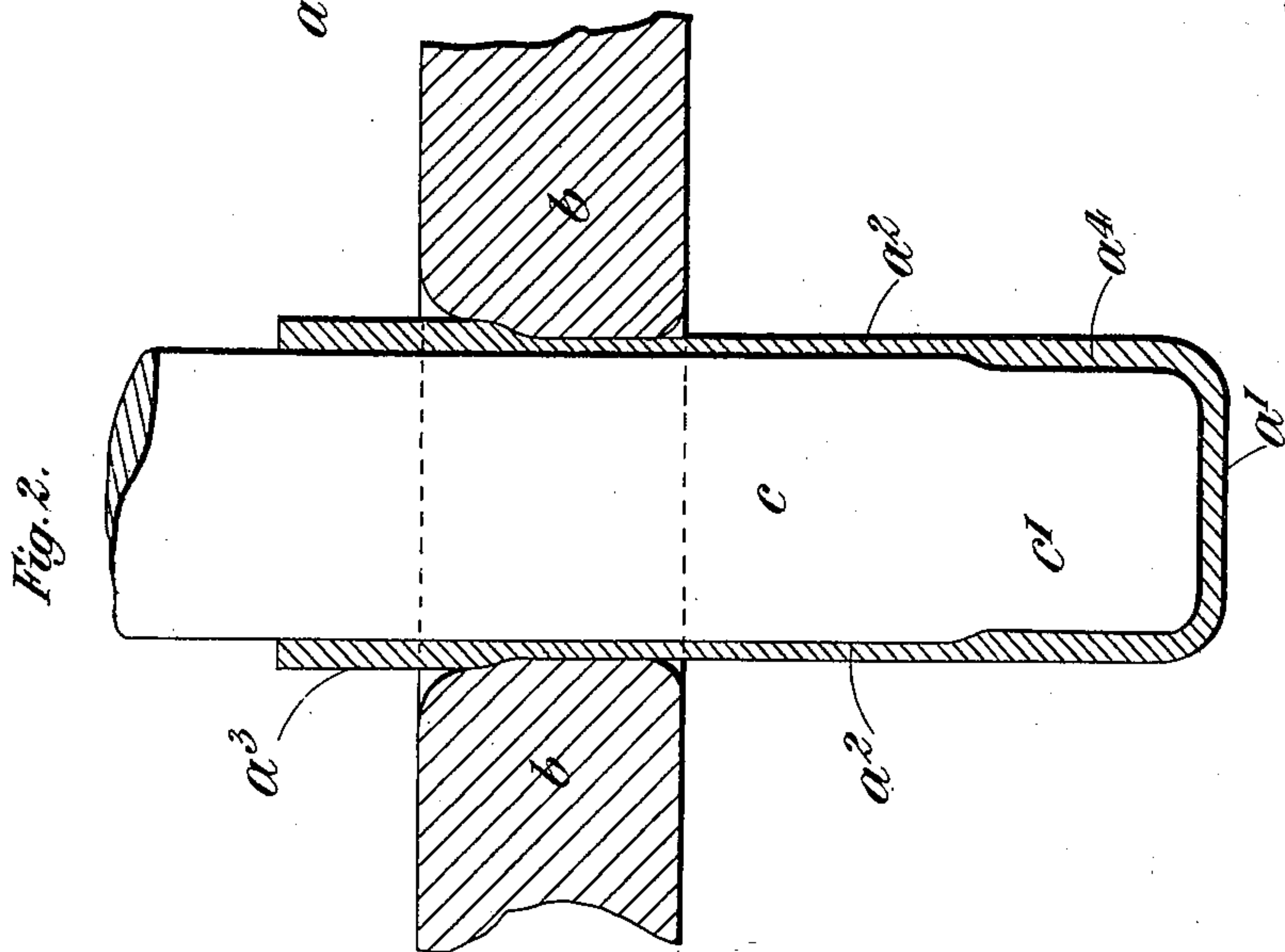
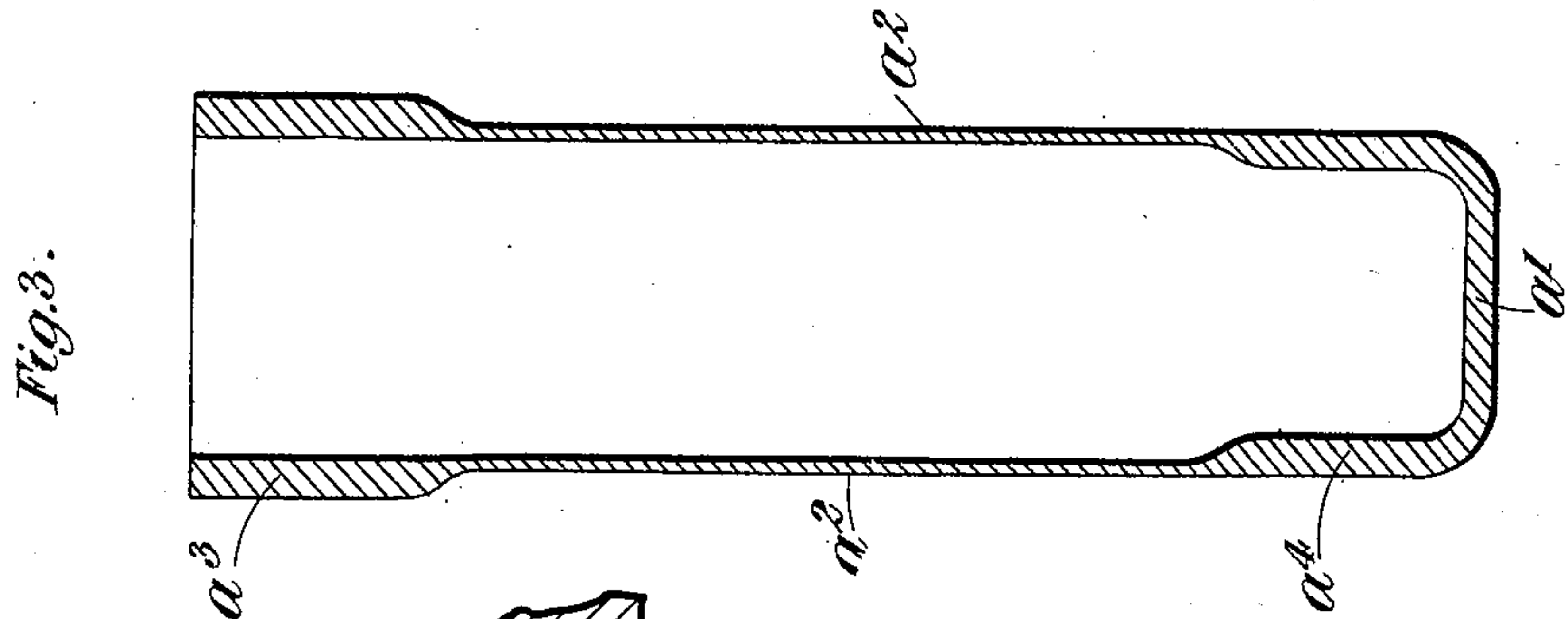
R. S. COURTMAN.

MANUFACTURE OF HUBS FOR WHEELS OF CYCLES.

(Application filed Oct. 29, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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By

James L. Norris
Att'y

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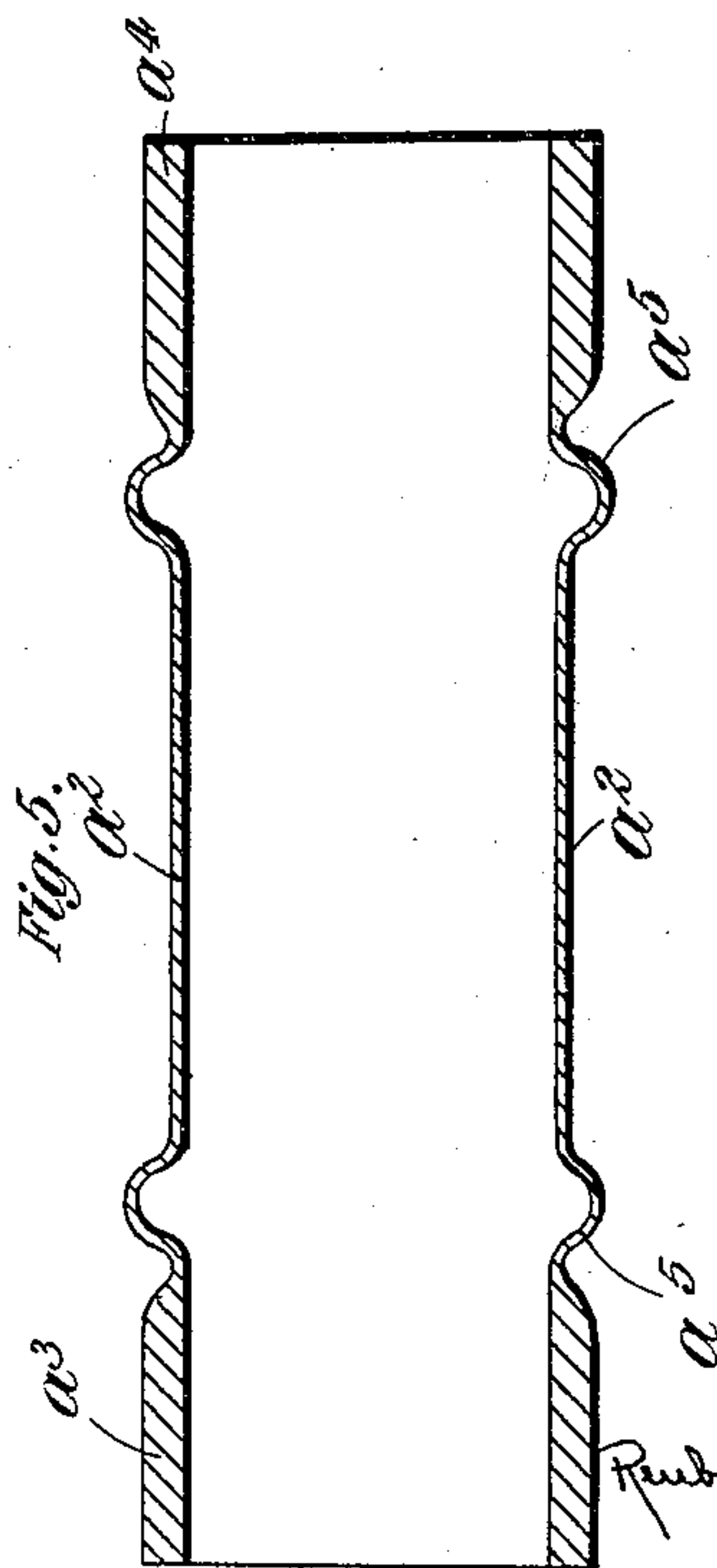
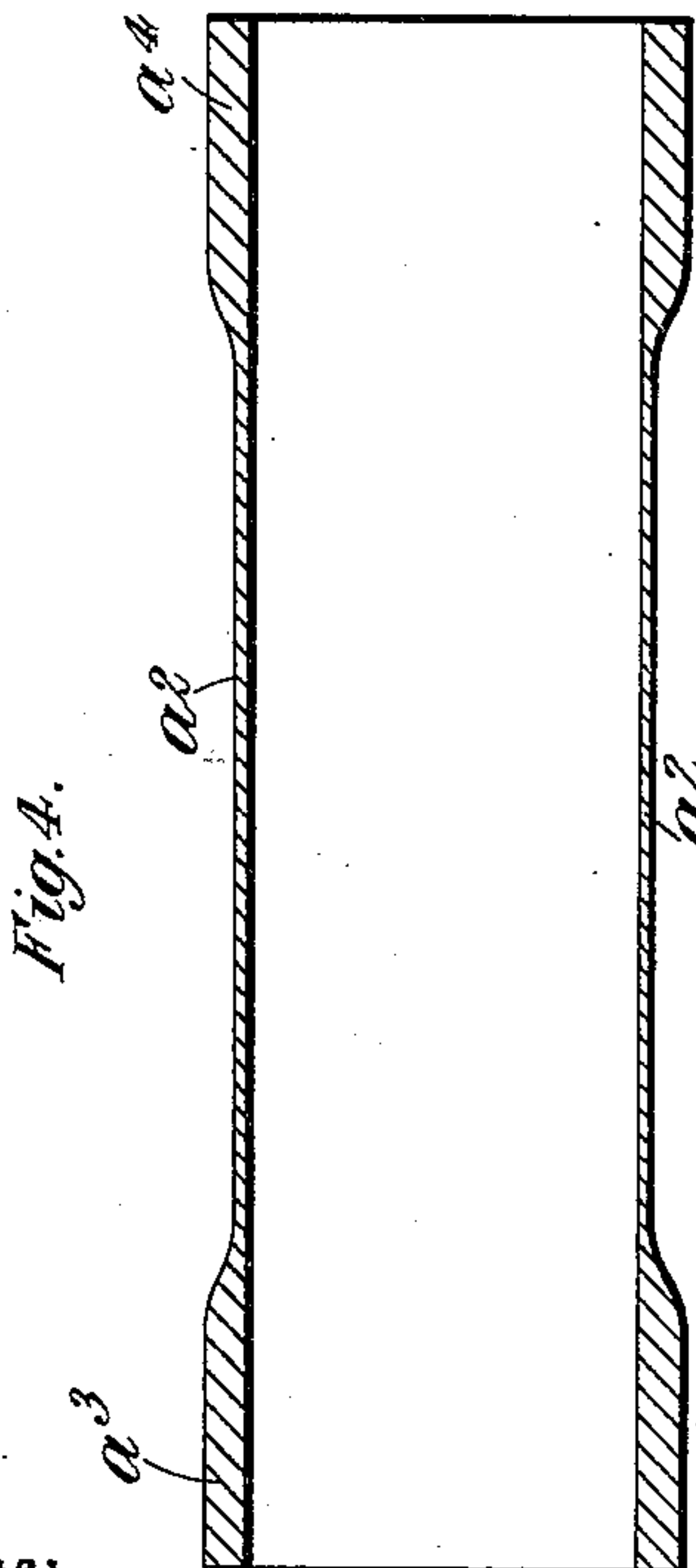
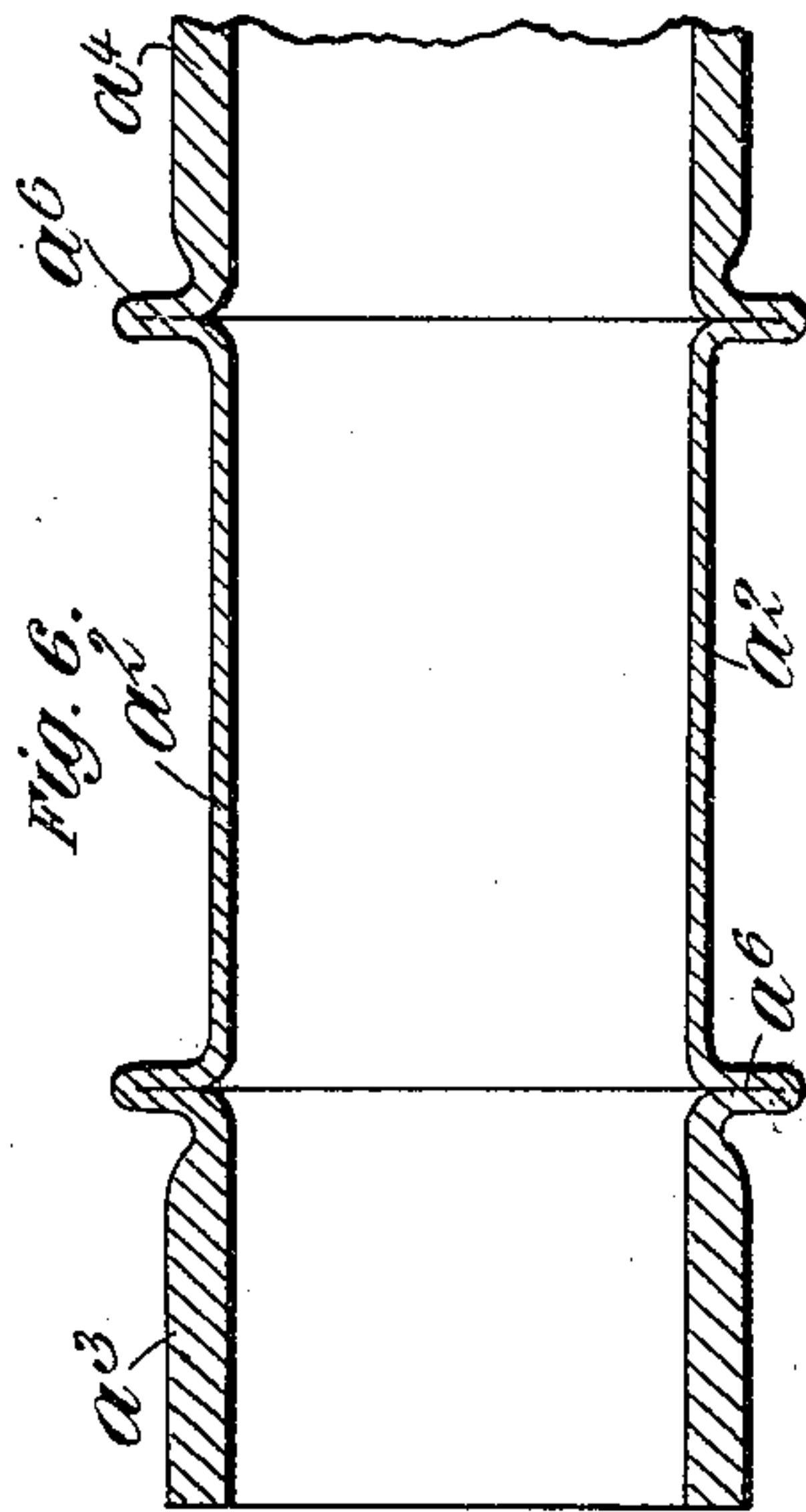
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UNITED STATES PATENT OFFICE.

REUBEN SAMUEL COURTMAN, OF LONDON, ENGLAND.

MANUFACTURE OF HUBS FOR WHEELS OF CYCLES.

SPECIFICATION forming part of Letters Patent No. 639,532, dated December 19, 1899.

Application filed October 29, 1897. Serial No. 656,835. (No model.)

To all whom it may concern:

Be it known that I, REUBEN SAMUEL COURTMAN, engineer, a subject of the Queen of Great Britain, residing at 19 Sibella road, London, England, have invented certain new and useful Improvements in the Manufacture of Hubs for the Wheels of Cycles, Motor-Cars, or other Vehicles, (for which I have obtained Letters Patent in Great Britain, No. 9,297, dated April 12, 1897; in Germany, No. 102,263, dated October 24, 1897; in France, No. 271,678, dated October 26, 1897, and in Belgium, No. 131,529, dated October 26, 1897,) of which the following is a specification.

15 This invention relates to improvements in the manufacture of hubs for the wheels of cycles, motor-cars, and other vehicles, and has for its object to enable such hubs, more especially those known as lubricating or oil-retaining (reservoir) hubs, to be manufactured in a single piece, having the thick end portions, on which are the screw-threads for fixing the ball-races, chain-wheel, and nuts, formed integrally with the comparatively thin central portion thereof.

According to my invention I take a tubular or cup-shaped blank, closed at one end and of the same, or approximately the same, thickness as the end portions of the finished hub are intended to be. Then by suitable means, such as mandrels and dies, I gradually reduce the thickness and extend the length of the central or intermediate portion of the blank. I thus obtain a partially-formed hub consisting of a long thin tube having an externally-projecting thick portion on its upper or open end and an internally-projecting thick portion at its lower or closed end. The latter end is then opened, and after the thick internally-projecting portion has been expanded to the required extent by any convenient means—such as mandrels, drifts, or expanding-rollers—suitable annular protuberances or creases are produced in the thin intermediate portions of the tube to form the parts for receiving the ends of the spokes. After the formation of the said annular protuberances the hub is ready to be screw-threaded and finished in the ordinary manner.

50 In order that the invention may be clearly understood and readily carried into effect, I

will proceed to describe the same fully by aid of the accompanying drawings, which are sectional views illustrating the successive stages of manufacture.

Figure 1 shows a blank such as that hereinafter referred to. Fig. 2 shows the said blank with the die and mandrel acting thereon. Fig. 3 shows the partially-formed hub after the dies and mandrels have completed their action. Fig. 4 shows the said partially-formed hub after the lower end has been opened and the thick internally-projecting portion has been expanded. Figs. 5 and 6 illustrate different stages in the formation of the annular protuberances on the hub.

a, Fig. 1, is the tubular or cup-shaped blank with which the manufacture commences and which is conveniently formed by being stamped or drawn from sheet metal. It is closed at one end, as shown at *a'*, and its wall has the same, or approximately the same, thickness that the end portions of the finished hub are intended to have.

For the purpose of reducing the thickness and extending the length of the intermediate portion of the blank in the manner above specified the said blank is forced through a suitable die *b* by means of a mandrel *c*, as indicated in Fig. 2. The diameter of the mandrel, except at its lower or operative end *c'*, is the same as the internal diameter of the blank. The said lower or operative end *c'* is, however, contracted to such an extent that the space between it and the surface of the die is equal to the thickness the adjacent part of the blank is intended to have, while its length is equal to or slightly exceeds the intended length of that portion of the hub carrying the ball-race. The stroke or travel of the mandrel is so adjusted—say by a stop attached to the apparatus—that the blank is not forced completely through the die, but only up to a certain distance from the open end thereof to avoid contracting the said end, this distance being approximately equal to the length of that portion of the finished hub carrying the chain-wheel and lock-nut. By this means the intermediate portion of the blank is drawn down slightly, as at *a²*, Fig. 2, while, however, the end portion *a³* is not reduced in thickness, and the end portion *a⁴* is

only reduced to the extent required, although the internal diameter of the said portion a^4 is slightly reduced in passing through the die.

By repeating the drawing-down operation 5 in successive dies, each of smaller diameter than the preceding one, the blank being annealed after each operation, a tube, such as shown in Fig. 3, is obtained having a thick upper end a^3 projecting externally and a 10 thick lower end a^4 projecting internally in the manner above specified, while its intermediate portion a^2 is very considerably reduced in thickness. It will be observed that the lower end portion a^4 of the tube at this 15 stage of the manufacture has the same external diameter as the intermediate portion a^2 and of appreciably less diameter than the upper end portion a^3 .

In the succeeding stages of the manufacture 20 the closed end a' of the tube is cut away and the lower end portion a^4 thereof is contracted or expanded by dies, mandrels, or any other suitable means until its internal diameter is either equal to that of the remainder 25 of the tube or is such that the ball-race can be suitably carried in it. The upper end portion of the tube may be either expanded or forced inward for the purpose of carrying the ball-race, and by this means the tube is 30 brought to the shape shown in Fig. 4.

For the purpose of producing the parts for receiving the ends of the spokes the portion a^2 of the partially-finished hub has formed in it in proximity to each of the end portions 35 a^3 a^4 annular protuberances or swellings, as at a^5 , Fig. 5, which are afterward closed up or flattened, as at a^6 , Fig. 6. The expansion of the metal to form the protuberances and their subsequent endwise compression may 40 be effected in any suitable manner.

Although I prefer to employ dies and man-

drels of the kind above referred to, yet I may, if desired, employ dies which are adapted to inclose the blank completely, as in molds. The dies may at their upper part for a distance 45 corresponding to the length of one of the end portions of the hub be of the original diameter of the blank, and the mandrel may have a contracted extremity of the same length, so as to avoid reducing the metal at 50 the other end of the tube. In some cases, moreover, I may employ revolving dies or rollers in combination with an inner mandrel similar in shape to those before described, these revolving dies working upon the exterior 55 of the metal and serving to reduce the thickness of the intermediate portion thereof. The said rollers may be of any suitable number and be either cylindrical or tapered.

What I claim is— 60

The herein-described method of manufacturing a drawn-metal wheel-hub from a cup-shaped metal blank, which consists in lengthening said blank and reducing its thickness 65 except at its ends which are left at about the original thickness of the blank, one of said ends being thickened externally and the other thickened internally, then removing the closed end of said blank, then changing the diameter of the thick end portions of the 70 tube to the required extent, then forming annular protuberances on said tube near its thick end portions, and finally flattening said annular protuberances, substantially as set forth. 75

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

REUBEN SAMUEL COURTMAN.

Witnesses:

CHAS. B. BURDON,
A. B. CROFTS.