

No. 871,966.

PATENTED NOV. 26, 1907.

G. F. STEWART.
METHOD FOR MAKING PAD COVERS.

APPLICATION FILED APR. 17, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

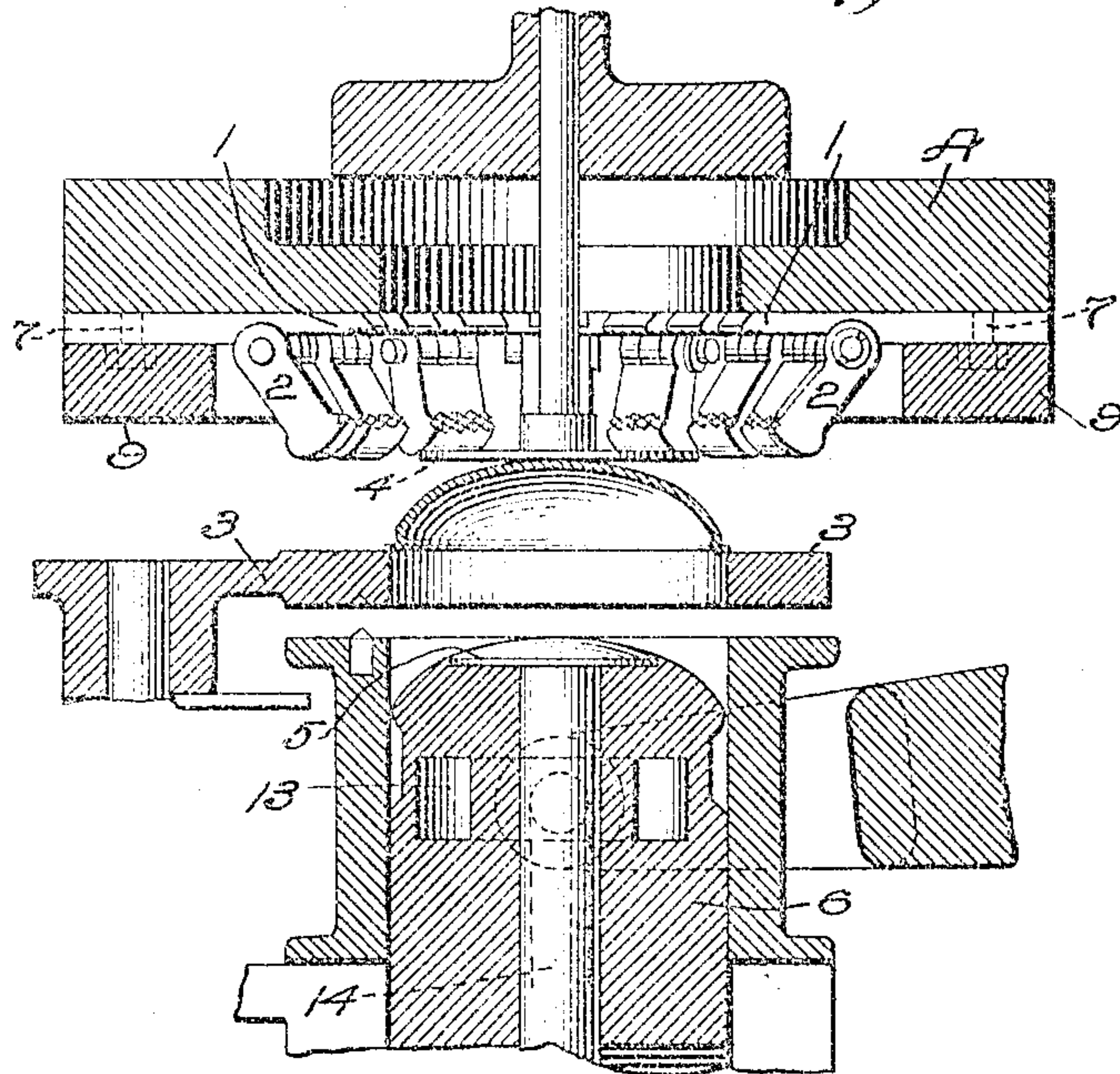
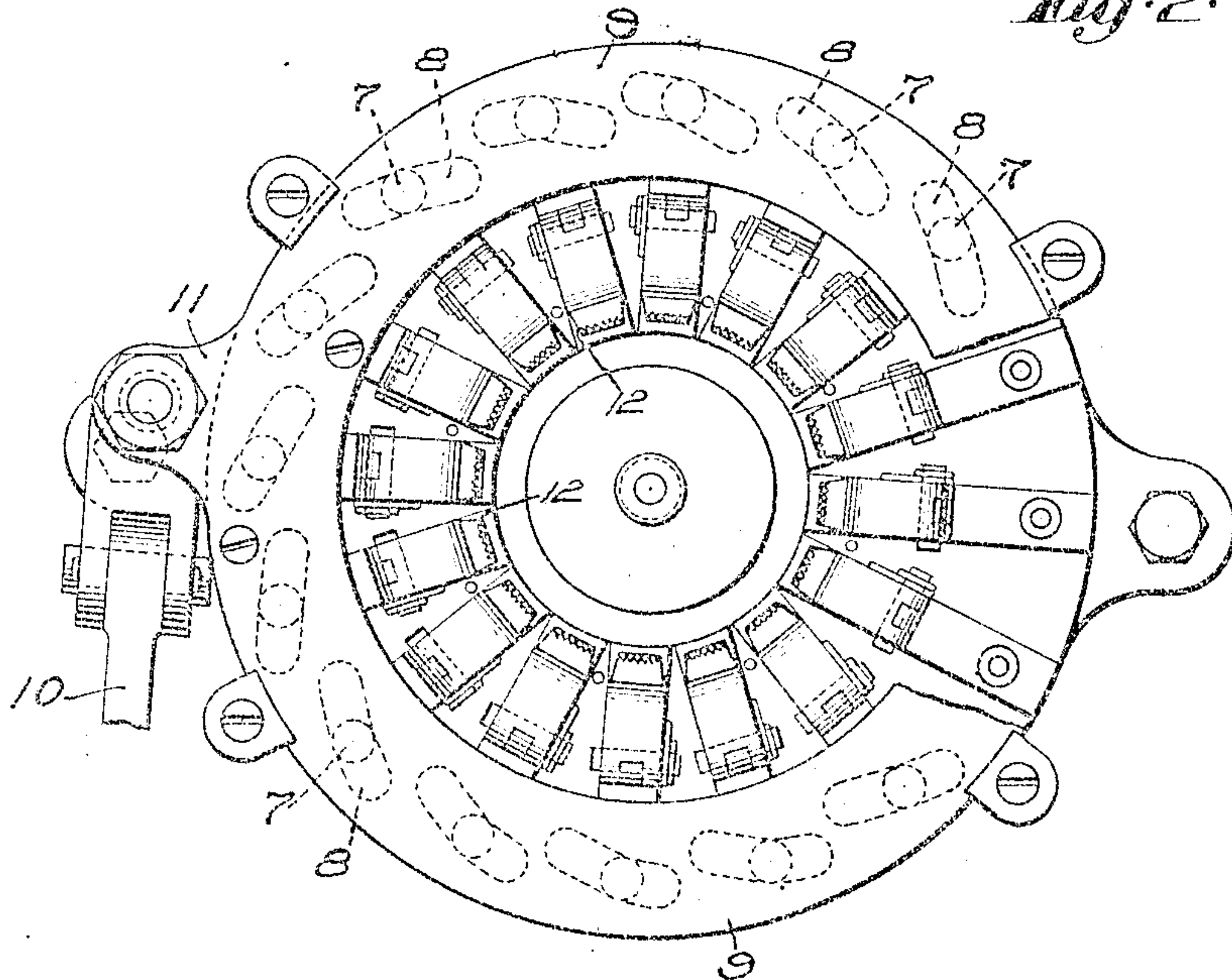


Fig. 2.



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2 SHEETS—SHEET 2.

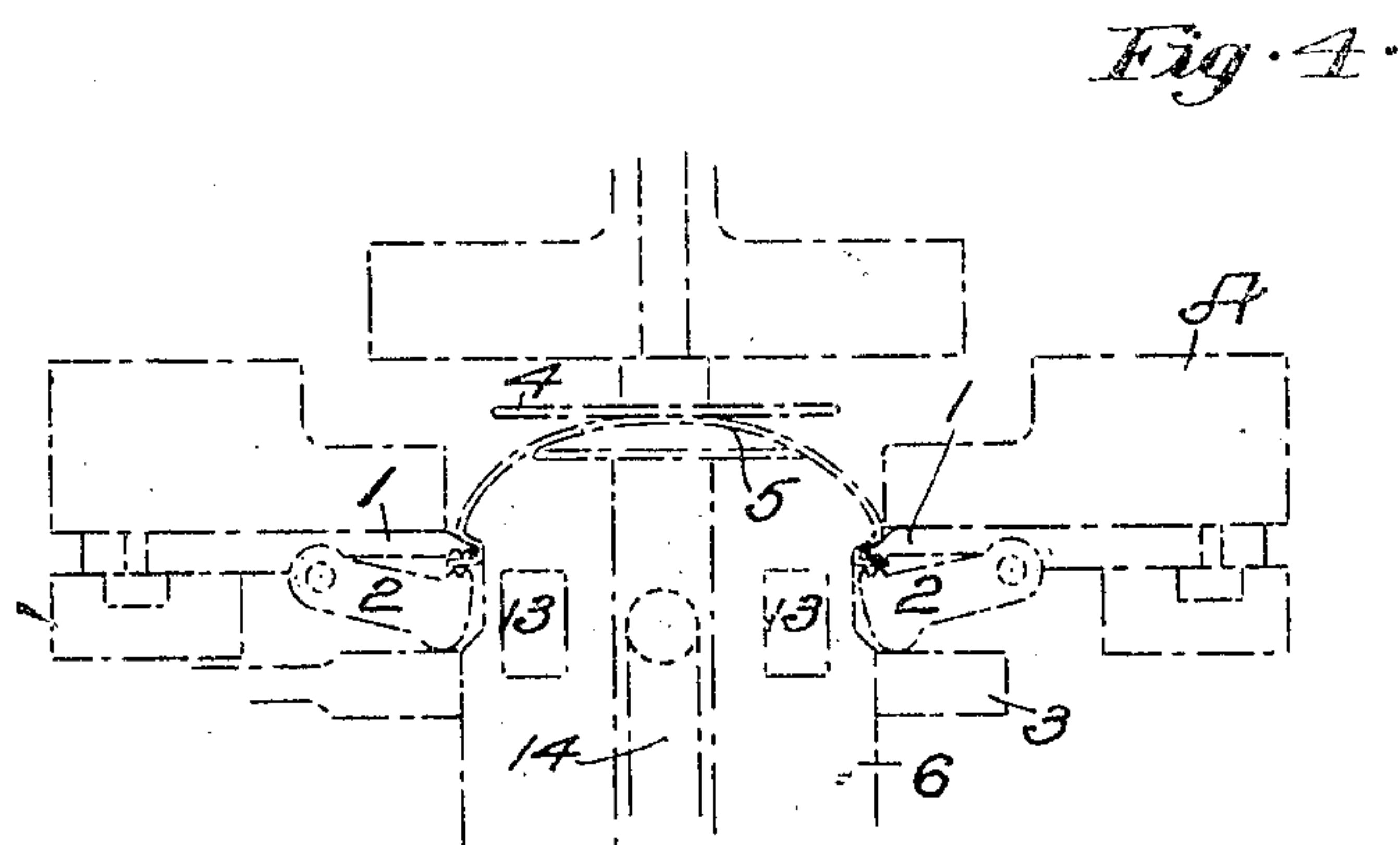
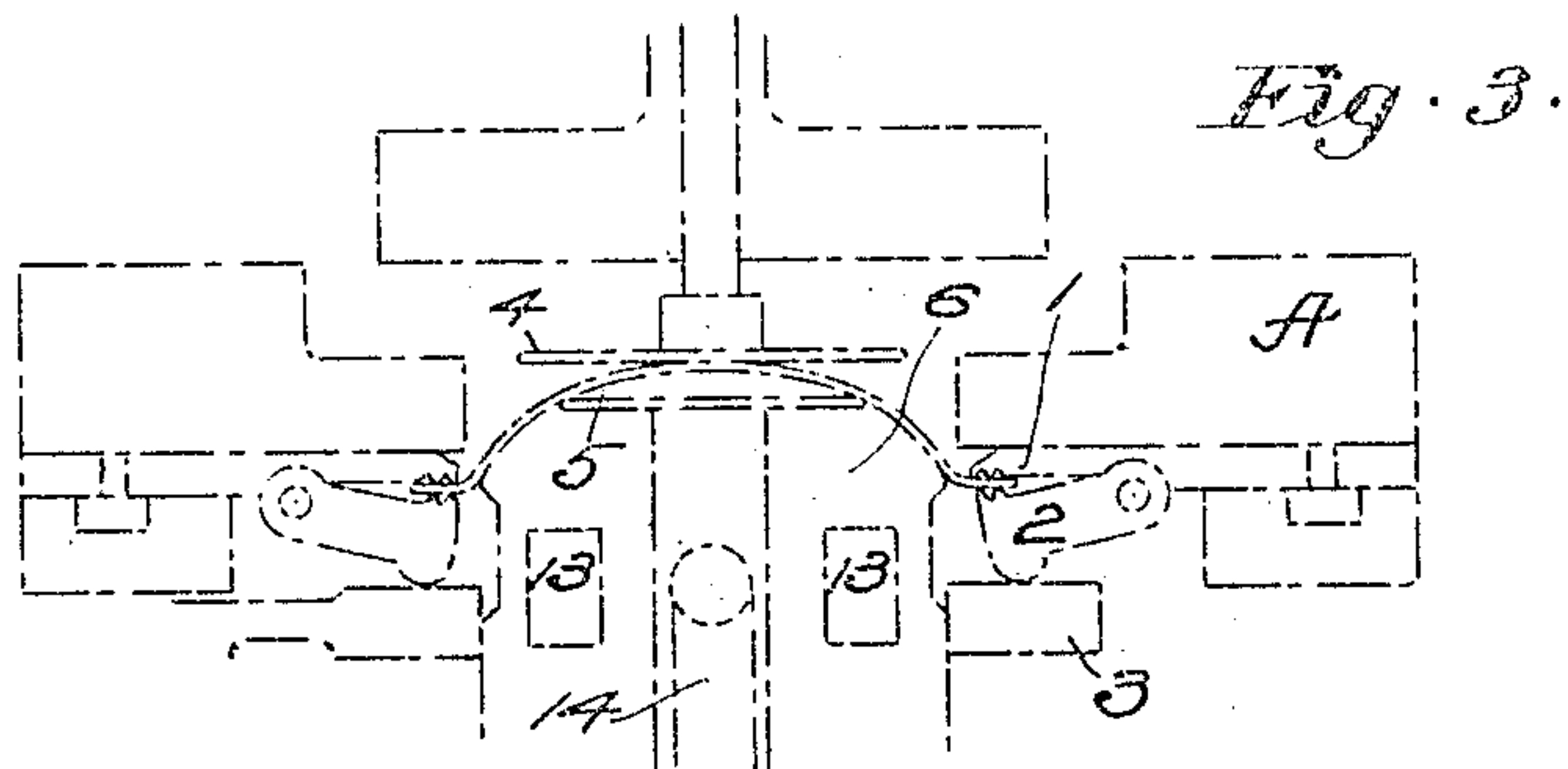


Fig. 5.

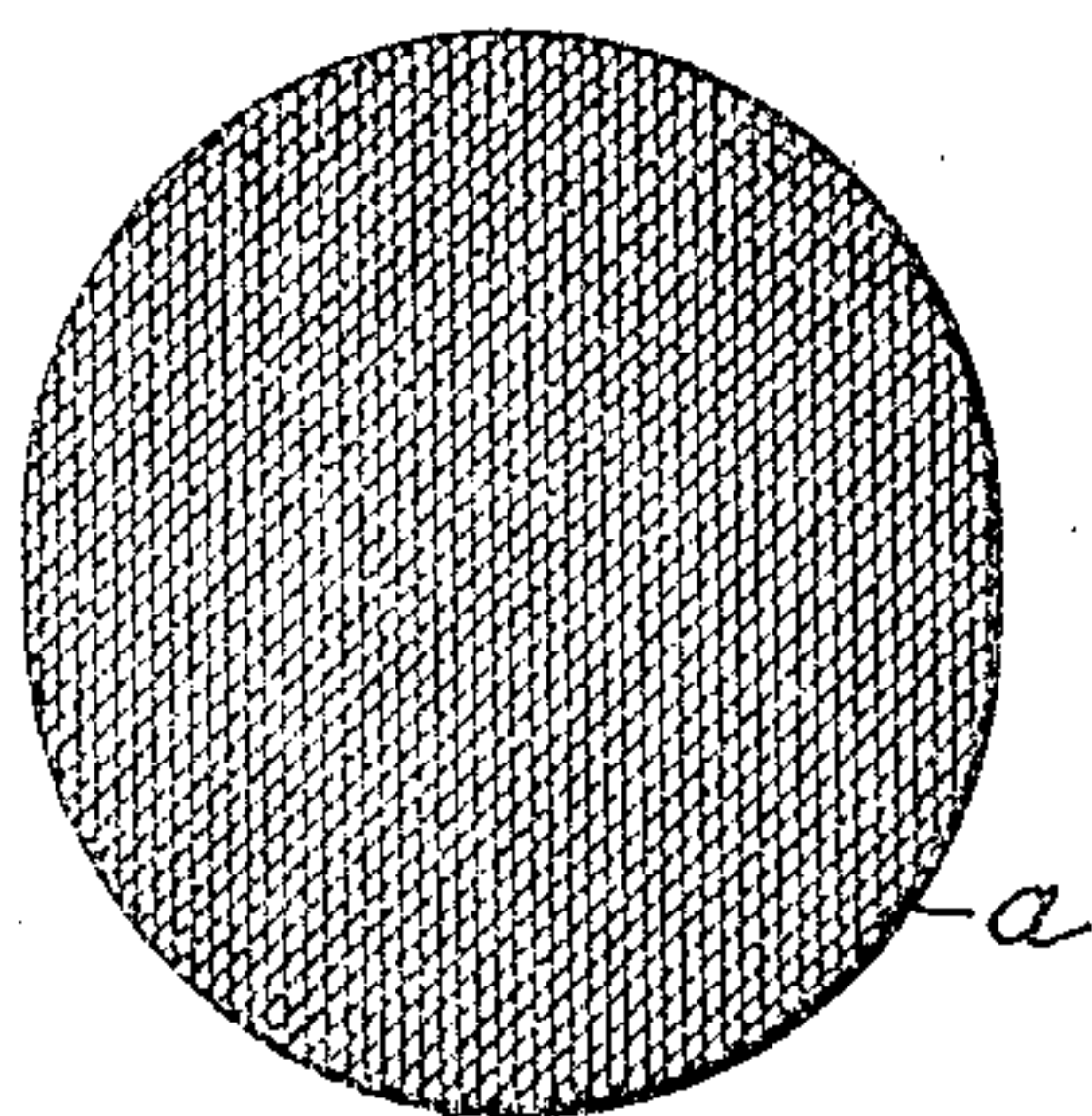


Fig. 6.

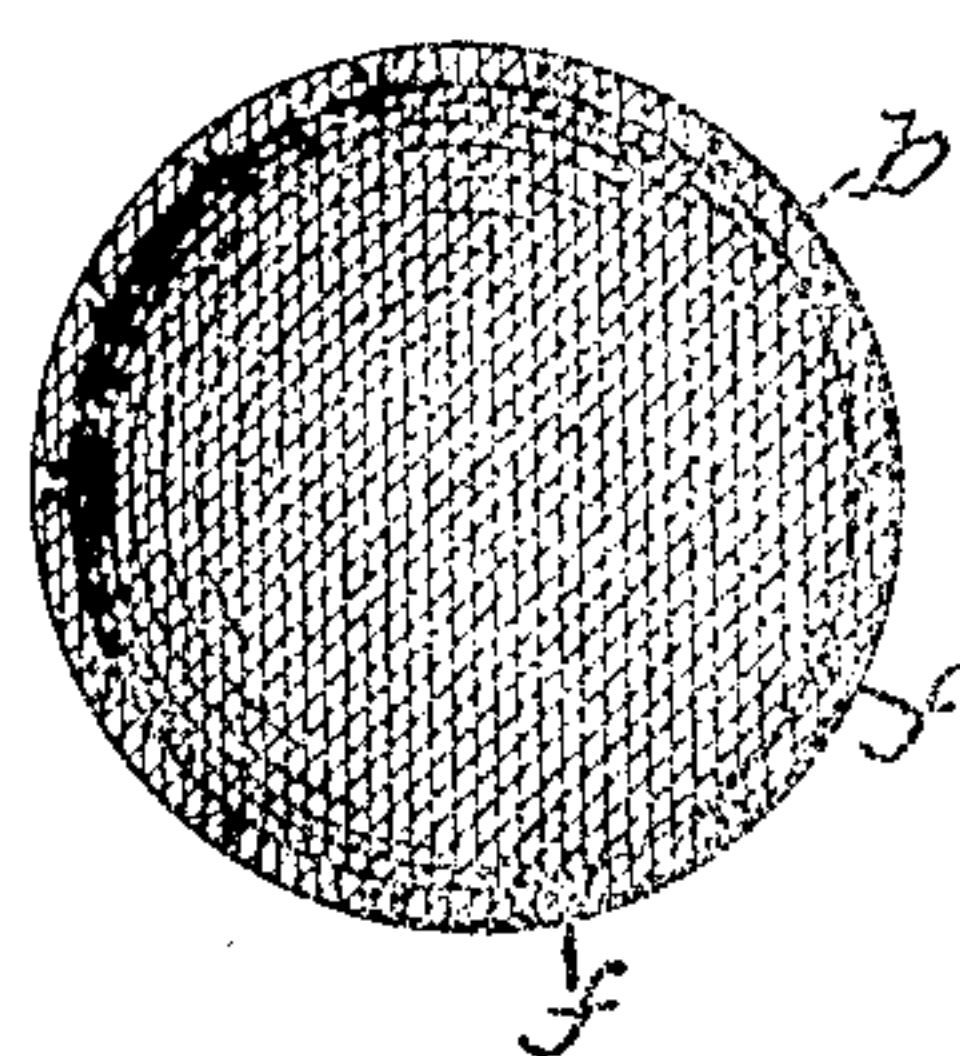
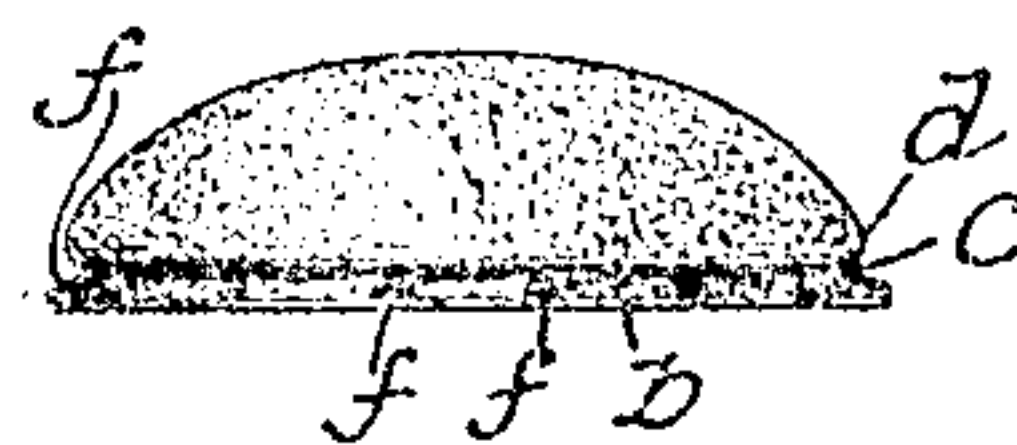


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METHOD FOR MAKING PAD-COVERS.

No. 871,966.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Original application filed July 13, 1906, Serial No. 326,147. Divided and this application filed April 17, 1907. Serial No. 368,649.

To all whom it may concern:

Be it known that I, GEORGE F. STEWART, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented an Improvement in Methods for Making Pad-Covers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to a method of making covers for buffing machine pads used in treating boots and shoes and is a division of application serially numbered 326,147, filed July 13, 1906.

As well understood by those skilled in the art, buffing machines of the Naumkeag type are provided with buffing pads of substantially disk-like form, usually inflatable to give the desired rounded and resilient surface or working face. Such pads are usually provided with detachable covers, preferably formed of some abradant material suitable for acting upon the work and are mounted upon spindles driven at high speeds. Owing to wear and changing conditions of the work to be treated, it becomes necessary from time to time to change the covers upon the pads. In providing detachable covers for the pads of such machines it has been proposed to form the cover with a substantially flat circular unmolded central portion and a marginal portion molded or turned into a position substantially parallel with the central flat portion. Owing to the flat unmolded character of the working face of such a cover, however, it could be applied to the pad only when the latter was in a flattened or deflated condition. It has also been proposed to mold the entire pad cover, including the working face and marginal portion, to a shape substantially the same as such parts are to have during working conditions, that is, to the shape the cover should have when upon the inflated pad. In the method of forming the first of these proposed pad covers, the working face of the blank from which the cover is formed, is not materially stretched, but remains substantially in the original condition of the material of which the blank is composed, while the marginal portion is, by a molding operation, turned in over the working face to produce a substantially smooth intumed flange or attaching portion, the fold at the junction of said attaching portion with

the periphery of the working face being molded to circular form to correspond with the periphery of the pad upon which the cover is used. This result is attained by forcing the marginal portions of the blank, while in a tempered condition and yieldingly held by suitable clamps, directly inward over a flat former applied to and corresponding in size and shape with the working face of the pad cover.

In order to produce a pad cover in accordance with the second of the proposed forms, a flat blank or piece of suitable material, preferably the emery cloth of commerce, is yieldingly secured around its marginal portion and the middle unclamped portion is then subjected to lateral pressure, which stretches and bulges the material and at the same time causes the marginal clamped portion to slip between the clamps and to contract or draw in towards the center of the blank, which, at the end of this operation, is of smaller size at its periphery than the original blank, but is stretched laterally, so as to provide fullness within the contracted periphery. The stretched or full portion is then extended or stretched radially outward, so that the material within the clamped periphery and which forms the working face of the cover, becomes extended to a larger diameter than the clamped periphery, the stretching and extending being performed preferably as two consecutive operations. Thus, in both of the proposed methods of forming pad covers of the character hereinbefore mentioned, the marginal portion of the blank was allowed to slip or draw through the holding means without positive or compensating control of the marginal movement during the molding action, and to secure the full molded form to the working face of the cover in the second of the proposed methods, such face portion, already in a laterally stretched condition, was given an additional outward radial stretching.

The method of making pad covers constituting the present invention differs essentially from each of these not only in the acts or series of acts and the sequence of their performance upon the blank, but in the principles involved, whereby there is produced an initially strong pad cover of the desired molded form, both as to face and marginal portion, easily placed upon or removed from a pad without deformation of either,

and wherein the molding strains or other acts have been so disposed and controlled as to permit the component elements of the cover material to remain in their initially durable relation to each other. The method of the present invention distinguishes in principle from each of those hereinbefore referred to, in that while the blank is held at its marginal portion and subjected at its central portion to a molding pressure transverse to the plane of the blank, the said marginal portion is held and given a controlled compensating movement to counteract any tendency to unequal stretching, economize in amount of material used, and to carry the marginal portion about the molding element proportional to the molding stretch imparted to the blank. This and other characteristics of the present method, as distinguished from those heretofore proposed, will more clearly hereinafter appear, as the present method is more fully developed in connection with the accompanying drawings, which are illustrative of one embodiment of means adapted for carrying it into effect.

In the drawings,—Figure 1 is a sectional elevation illustrating the agencies, as embodied in one form of appropriate mechanical device, that act upon the blank in carrying out the present method; Fig. 2 is an underneath plan view of the top portion of Fig. 1, showing the agencies for imparting controllable compensating radial movement to the marginal portion of the blank to carry it about the molding element; Fig. 3 is a diagrammatic view showing the agencies, in the mechanical devices selected for illustration thereof, in the condition they assume with relation to the blank during the first portion of the molding operation; Fig. 4 is a view similar to that of Fig. 3 showing the agencies in the condition assumed near the end of the molding operation; Fig. 5 is a plan view of the preferred form of blank which may be employed; Fig. 6 is a top plan view of the pad cover completed; Fig. 7 is a side view of the completed cover.

In order to produce a molded pad cover for buffing machines in accordance with the present invention, a blank *a*, Fig. 5, of suitable size and shape, preferably though not necessarily of somewhat elliptical form, has its marginal portions secured between clamping members, which in the selected illustration thereof, may be in the form of a series of jaws 1 and 2, arranged upon a head *A*, substantially as shown, said jaws being provided with serrated or roughened faces to securely and positively clamp and hold the blank. The clamping members may be caused to engage the margin of the blank and hold it during the molding operation by any suitable means, that shown being a ring or carrier 3, which, when the blank has been placed in

position either by hand or by the positioning devices 4, 5, as fully set forth in the application hereinbefore referred to, is caused to move upward and engage the jaws 2, closing them firmly upon the marginal portion of the blank. The said blank with its marginal portion thus clamped and positively held, then has its middle portion pressed in a direction transverse to its plane, preferably by a plunger or molding element 6, having a convex end conforming substantially with the surface contour desired for the working face of the cover. As the middle portion of the blank is being thus molded to shape, the clamping members, while still positively holding the marginal portion of the blank, are given a controlled compensating movement, in the present instance, radially inward or towards each other, to carry the marginal portion of the blank about the molding element or plunger head and preferably into a recess extending about the plunger, thus completing the molded character of the working face, and forming an encircling channel *c* with outer flaring and inner walls *b*, *d*. The controlled compensating movement of the clamping members may be secured by any appropriate means, as, for instance, that set forth and fully described in my pending application referred to and best herein shown by Figs. 1 and 2, wherein the clamping members are each provided with a pin or stud 7, projecting into inclined or eccentrically arranged grooves 8, movable with or formed in a ring 9, which is given a partial rotation with respect to head *A*, at appropriate times by an actuator 10, connected to an ear 11, projecting from said ring and operated to the desired extent by suitable means.

Pad covers are usually, though not necessarily, made of emery cloth, and when such material is employed it is found to stretch unevenly during the molding operation, owing to the fact that some of the threads thereof yield more than others. This tendency to unevenly stretch is, in the present method, practically nullified by the described manner of giving to the marginal portion of the blank a controlled compensating movement, regardless of the particular shape or contour desired for the resulting product, because, by holding the marginal portion of the blank without slip and controlling the movement thereof all portions of the blank are caused to stretch uniformly, only a narrow marginal portion need be held, sufficient to produce the flaring outer wall or peripheral portion, thus resulting in economy of material as compared with prior methods of production, and all liability of injury to the abrading material on the part of the blank thus positively and controllably held is avoided, as will be obvious to one familiar with the art. To fur-

ther compensate for uneven stretching an elliptical form of blank may be used, as indicated in Fig. 5, though obviously the present invention is in no sense dependent thereon, although when used a differential compensating movement is given the clamping members, so that the marginal portion of such elliptical blank at or near the major axis thereof will be given a controlled movement greater than that at or near the minor axis during the molding operation. In the devices selected for illustrating the agencies that act upon the blank, this differential compensating movement of the clamping members is secured by giving appropriate variation of inclination to the grooves 8, those adjacent the major axis of the ellipse being more inclined with reference to the perimeter of ring 9, than those adjacent the minor axis, as will be readily understood by those skilled in the art.

The present method contemplates as a part thereof a molding action upon the marginal portion of the blank such that the completed cover, molded to the shape it must assume when in position upon the inflated pad, shall have an outwardly flaring and strengthening peripheral edge to the end that it may be more readily applied to and conform with the pad without deformation and maintain its molded character. This strengthened flaring characteristic is secured by molding ribs, corrugations, or pinnacles *f, f* transversely of the outer flaring wall *b*, and such transverse ribs, corrugations, or pinnacles are appropriately formed during the operation of molding the cover by circumferentially contracting the outer flaring wall while positively holding it at intervals between radially movable elements. As one means of securing this end the clamping members or jaws 1, 2, in the selected illustration, are so disposed that when in position to receive between them the flat blank, the jaws constituting one clamping member are spaced a short distance circumferentially from the next adjacent members, the ends of the jaws being slightly beveled or chambered off on their vertical edges, as at 12, Fig. 2, so that as the clamping members are moved radially inward, positively holding the marginal portion of the blank, they will produce the ribs, corrugations, pinnacles between the adjacent clamping members, while maintaining the marginal portion between the jaws in smooth flaring condition.

While the method thus far pointed out and described has been found advantageous and of distinct advantage over any of the prior methods known to me for producing buffing pad covers molded to the form they are to have on the inflated or distended pad, I have found improved results secured in the treatment of some materials by giving to the

blank during the described molding operation, an attritive or so-called ironing treatment either with or without the simultaneous application of heat. This may be done by relatively moving the blank and molding element or plunger while in molding contact and during such action maintaining the molding element at the desired temperature. In the devices illustrating the operation of the present invention the molding element or plunger 6 is provided with a heating chamber 13, connecting by a suitable passage 14 with a source of heat supply, and such molding element may be given a partial turning or oscillating movement back and forth about its longitudinal axis, as fully explained in the said pending application and as will be readily understood by those skilled in the art without further elucidation.

In molding the pad cover in accordance with the present method the blank may, if desired, be moistened on the side thereof to be subjected to the molding pressure, the moistened portion preferably being confined to parts well within the margin. Since a heated molding element may be employed it is apparent that the moisture on the blank will be converted into steam or vapor between the molding element or plunger and the face of the blank against which it acts, and, having no escape, will pass through the material of the blank, imparting thereto a condition of pliability most suitable for molding purposes without at the same time injuriously wetting or injuring the abrading surface. Preferably, the lower side of the blank is thus moistened, and the molding pressure applied from beneath, as shown.

The flat blank having been placed in and held by the clamping members; its working face is subjected to the molding pressure; its marginal portion is moved by a controlled compensating action to carry the marginal portion about the molding element; the ribs, corrugations, or pinnacles are formed and molded at intervals upon the flaring continuous marginal portion constituting the outer wall of the encircling groove produced in the blank by the compensating movement of the clamping members; and the molding action may be facilitated by heat, moisture and attrition or any one or two of them, if desired. The flaring marginal and reinforced portion is released by the clamping members, and the molding element or plunger is withdrawn, leaving the now molded cover complete and in the condition it would assume upon an inflated or distended pad.

The present invention relates solely to the process or method of making pad covers, and is in no way dependent upon or limited to any specific appliances for carrying out the method, it being obvious that the herein described method may be performed by other

means than those herein indicated, the mechanical construction of which is not fully shown and is not herein claimed. Complete and suitable mechanism embodied in an organized machine for producing pad covers in accordance with the method of forming the subject of the present invention, is presented in my application Se. No. 326,147, filed July 13, 1906, of which this is a division.

From the method of the present invention, as has been pointed out, it will be clear to one skilled in the art, that it is quite distinct from either of those hereinbefore referred to as constituting the prior attempts to produce buffing pad covers. It differs from each of these proposed methods not only in the particulars hereinbefore noted, but in the further fact that by the present method the marginal portion of the blank is given a reinforced molded and strengthening character readily adapting it for application to a pad, that it imparts to the cover transverse ribs, corrugations or pinnacles during the molding operation and subjects the blanks to no strain calculated to destroy or otherwise injure or disturb the component elements which compose the blank, thereby preserving its initial strength and abrading character.

In view of the inherent principle involved by the present method, it is unnecessary to wet the margin of the blank to insure the proper set of the molded margin, since by ridging or corrugating the same the margin is strengthened and held from deformation; by ridging or corrugating the margin to provide it with pinnacles, there is provided a capacity for elastic action in the application of the cover to the pad; by flaring the margin and molding it in the process of manufacture, the application of the cover to the pad is facilitated. It will be apparent to one skilled in the art that by positively controlling the marginal movement of the blank during the molding thereof, a cover is obtained of the proper form; and by moving or feeding the margin radially inward during the stretching incidental to the molding action and proportional thereto, deformation is prevented; that if the cover be subjected to a so-called ironing action during the molding operation, the proper shaping thereof is facilitated; and that by heating the blank while the same is being molded, a more readily molded form is produced.

Claims.

1. The method of molding buffing pad covers which consists in applying a molding pressure to the body of a blank within the marginal portion thereof and controllably moving the marginal portion during the action of a molding pressure.

2. The method of molding buffing pad covers which consists in positively holding the marginal portion of a blank against slip, applying a molding force to the body of the

blank within the marginal portion, and giving to the marginal portion a controlled compensating movement while the molding force is acting on the body of the blank.

3. The method of molding buffing pad covers which consists in positively holding the marginal portion of a blank against slip, applying a molding force to a portion of the blank within the margin, and carrying the marginal portion of the blank radially inward about the molding element by a controlled compensating movement during the action of a molding force.

4. The method of molding buffing pad covers which consists in positively holding the marginal portion of a blank against slip, applying a molding force to a portion of the blank within the margin, and controllably moving the marginal portion differentially while the molding force is acting on the blank.

5. The method of molding buffing pad covers which consists in holding the marginal portion of a blank against slip, applying a molding force and attritive action to a portion of the blank within the margin, and giving to the marginal portion a controlled compensating movement radially inward.

6. The method of molding buffing pad covers which consists in holding the marginal portion of a blank to be molded, applying a molding force to a portion of the blank within the margin, and molding on the marginal portion transverse ribs or corrugations.

7. The method of molding buffing pad covers which consists in holding the marginal portion of a blank against slip at intervals, applying to a portion of the blank within the margin a molding pressure in a direction transverse to its plane, and giving to the held portions of the margin a controlled compensating movement radially inward and producing on the margin of the blank between the held portions transverse ribs, corrugations; or pinnacles.

8. The method of molding buffing pad covers which consists in applying a molding force to the body of a blank within the marginal portion thereof; and forcing moisture through the material of the blank during the molding action.

9. The method of molding buffing pad covers which consists in moistening that surface of the blank which is to be subjected to molding pressure, applying heat and molding pressure to the body of the blank and forcing the moisture through the texture of the blank.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE F. STEWART.

Witnesses:

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REDFIELD H. ALLEN.