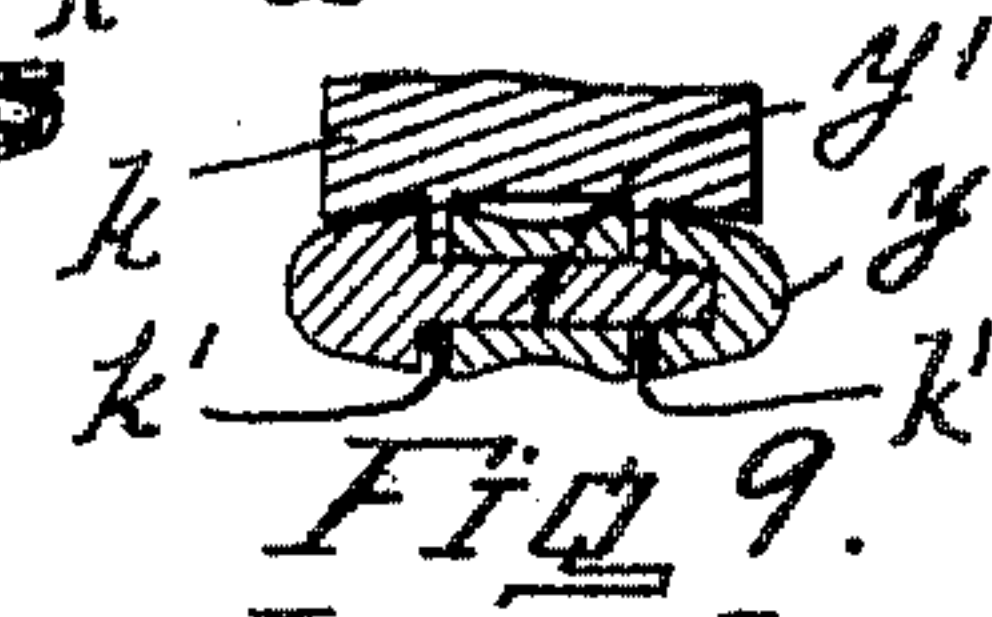
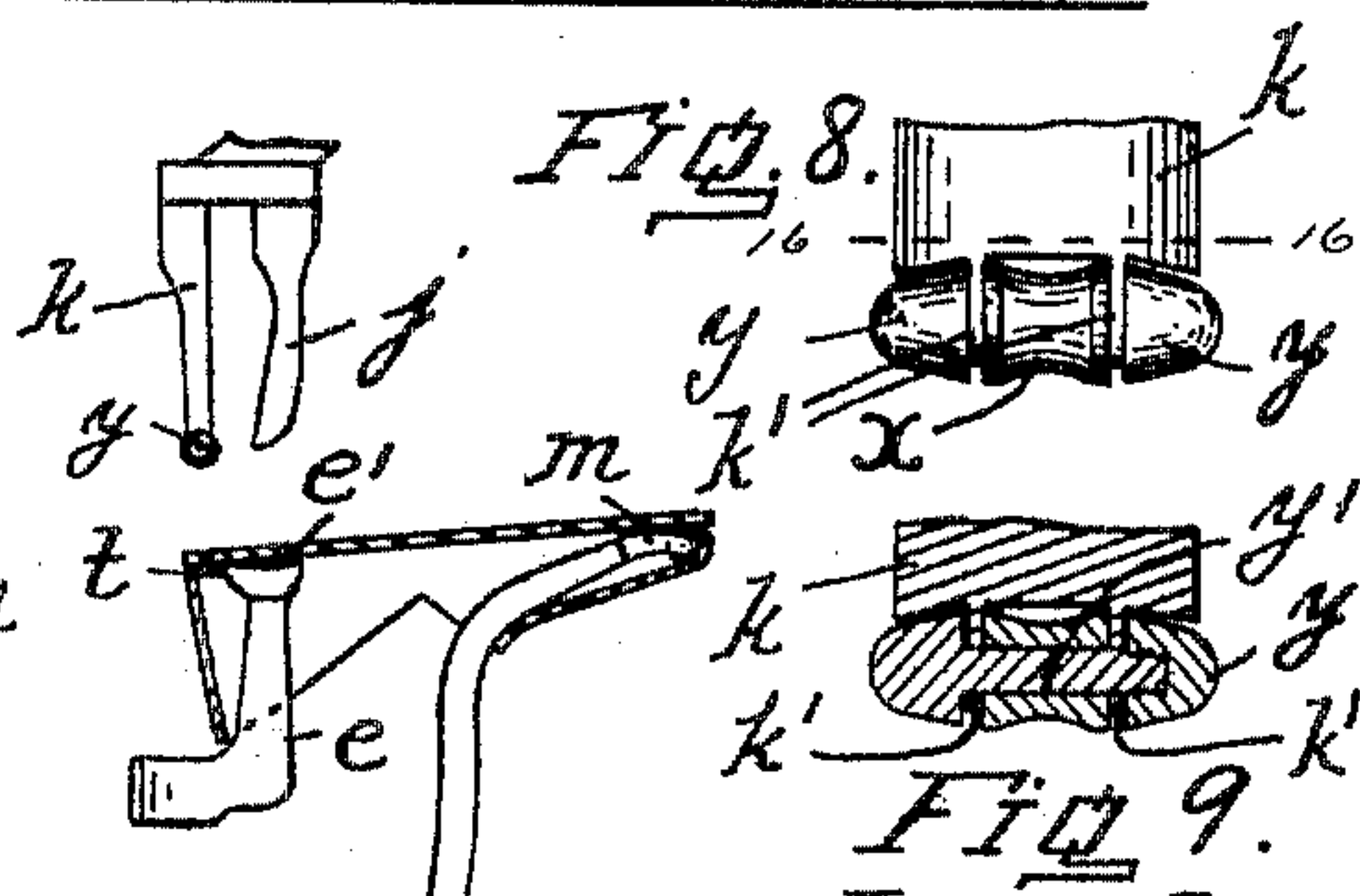
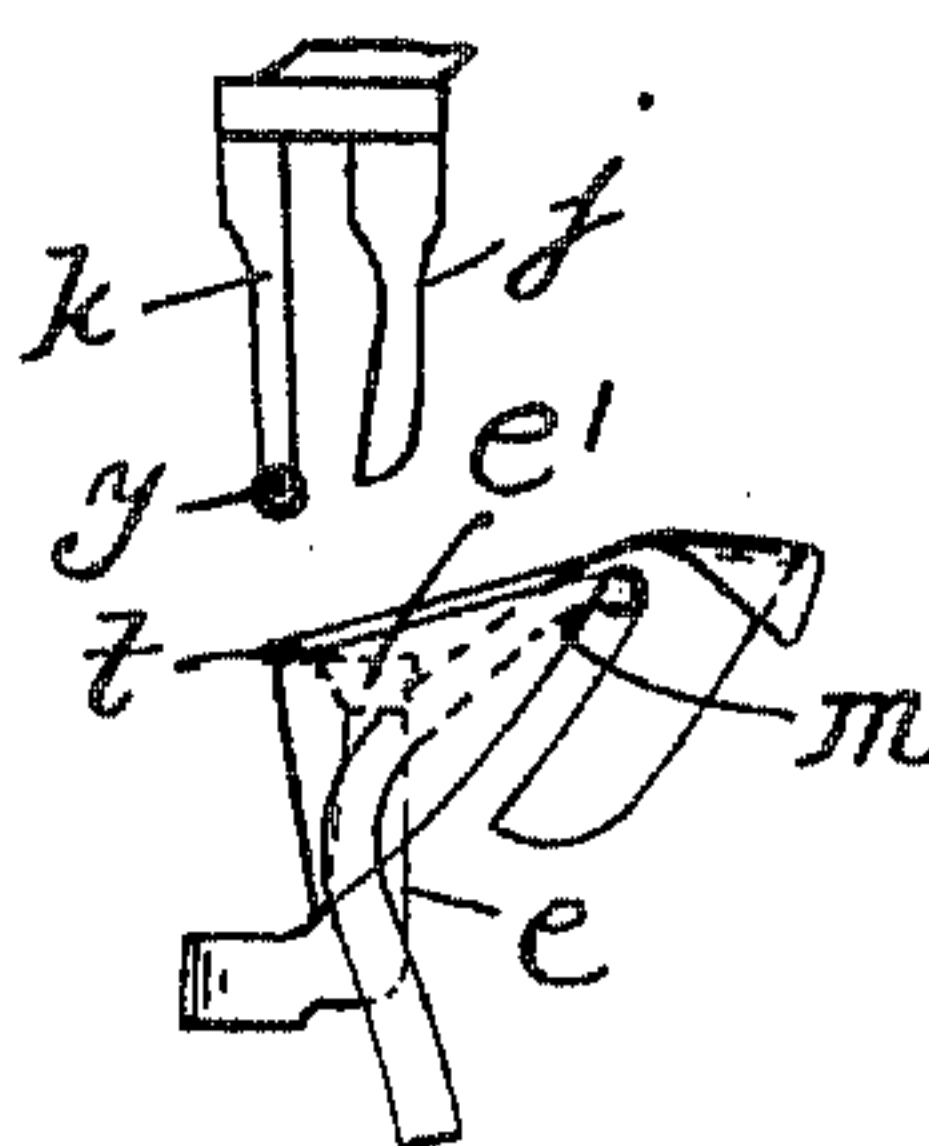
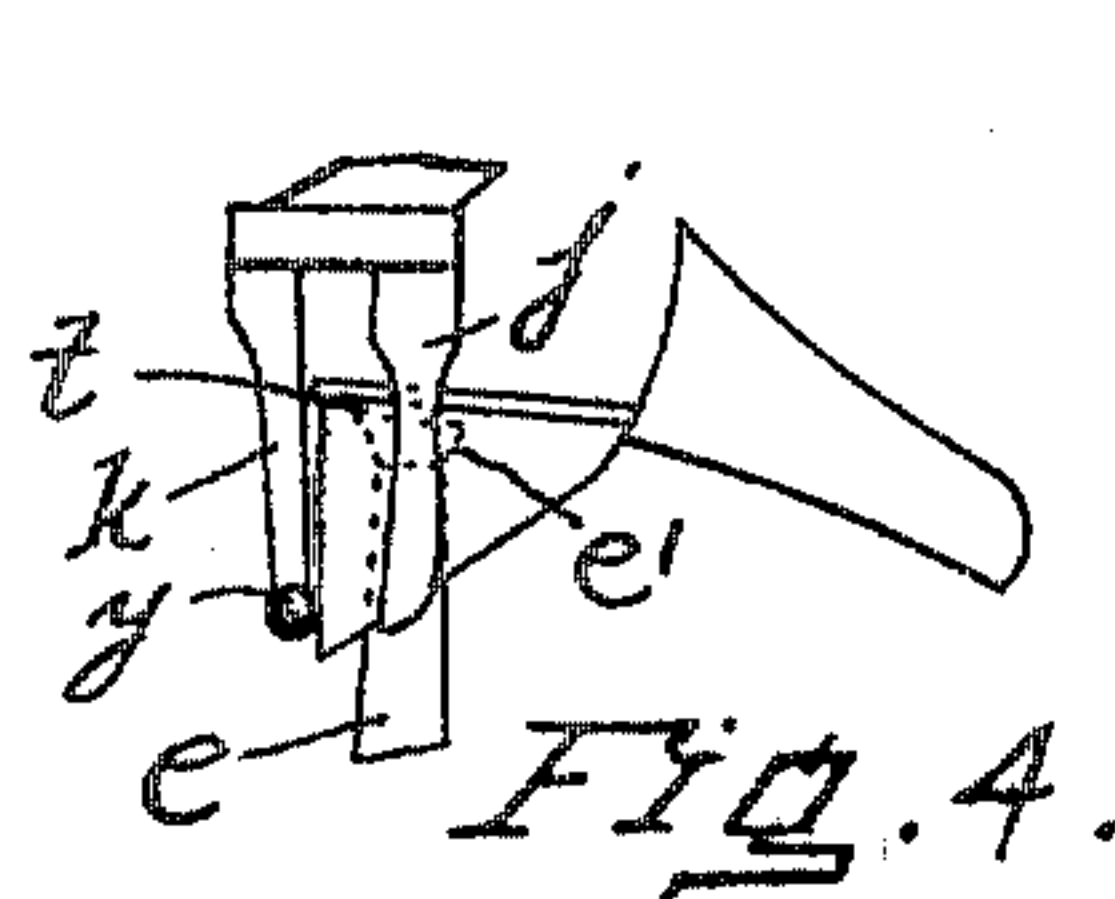
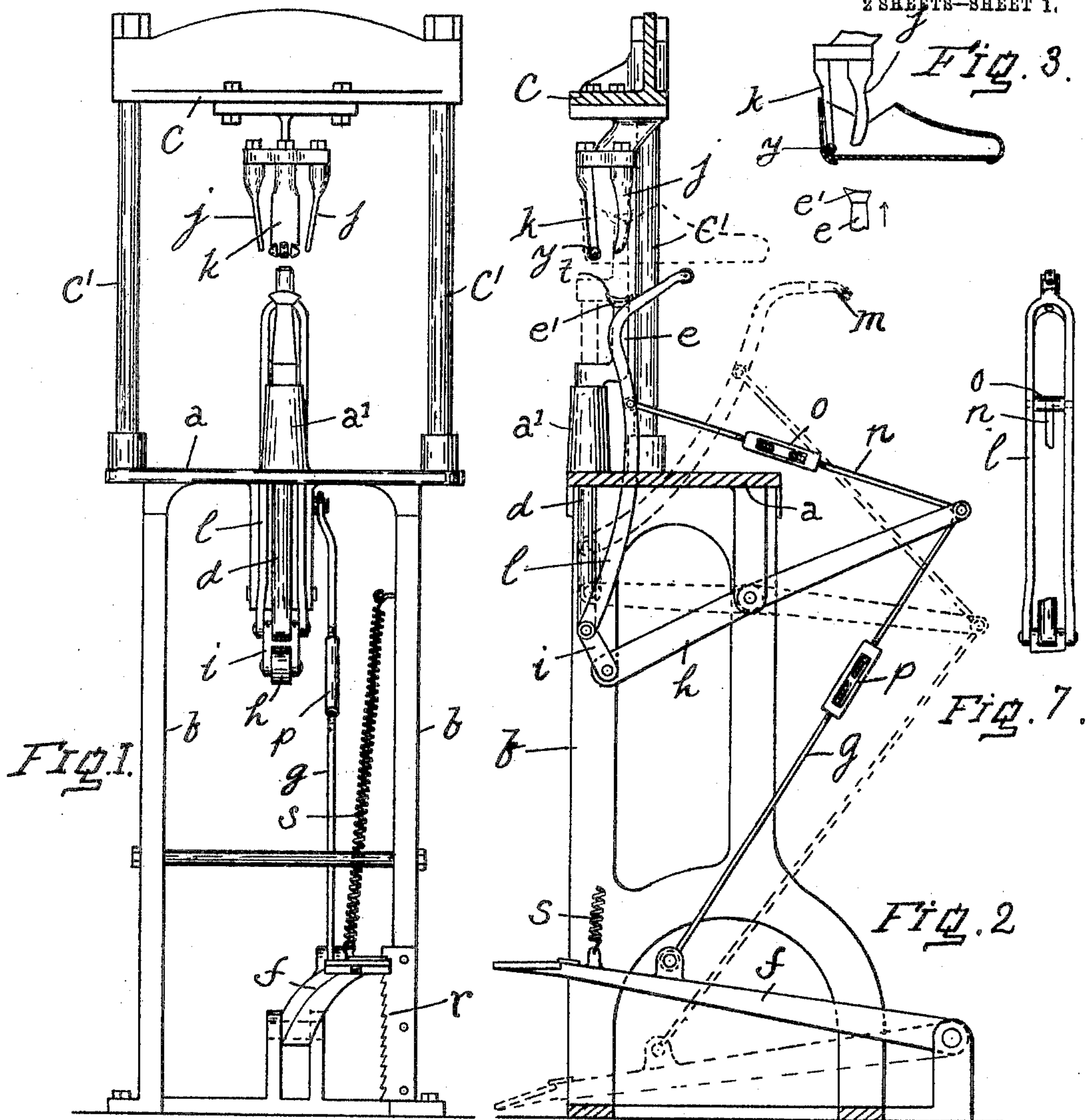


G. B. GARDNER.
SHOE TURNING MACHINE.
APPLICATION FILED MAY 27, 1904.

2 SHEETS—SHEET 1.



Witnesses:
H. B. Davis.
Maud M. Piper

Fig. 5.

Fig. 6. Inventor:
Geo. B. Gardner
by Noyes & Conner
Attys

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2 SHEETS SHEET 2.

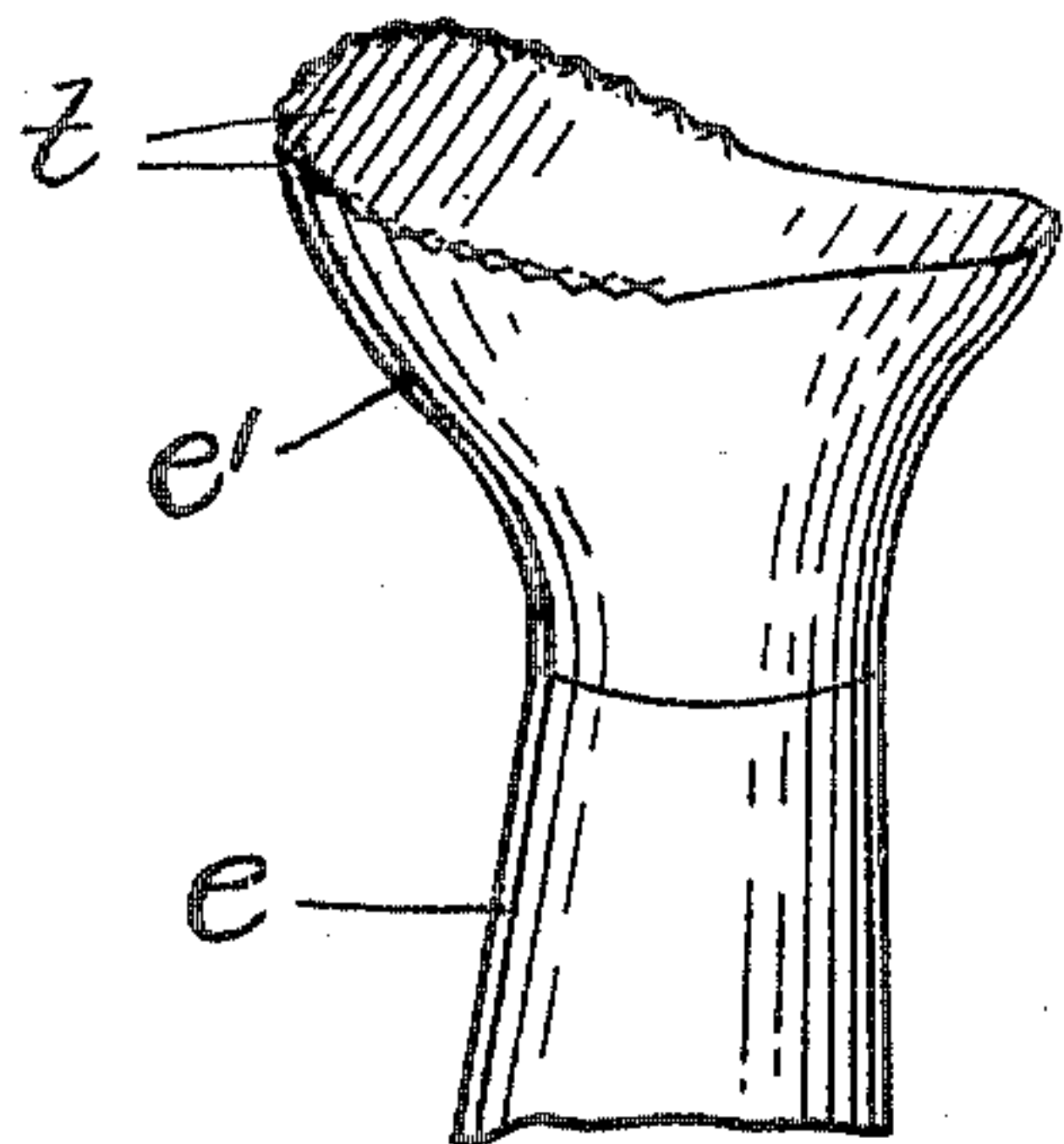


Fig. 10.

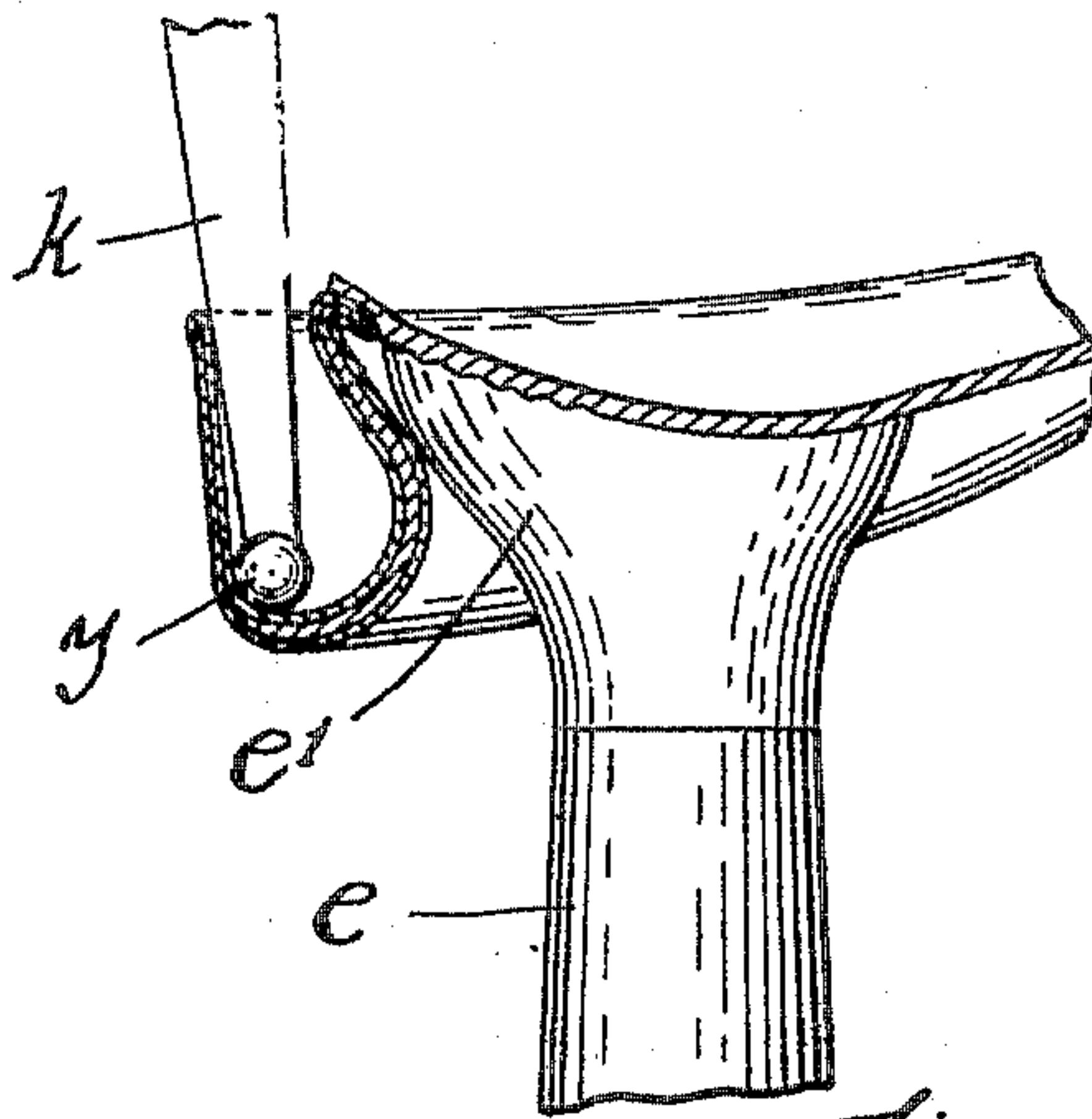


Fig. 11.

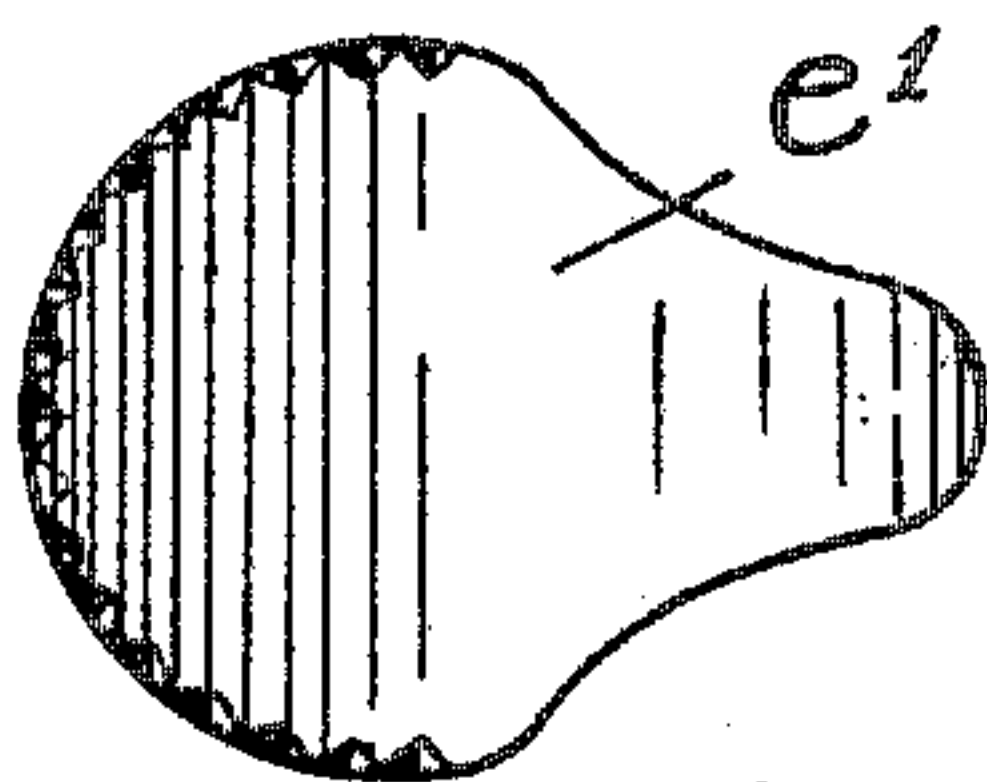


Fig. 12.

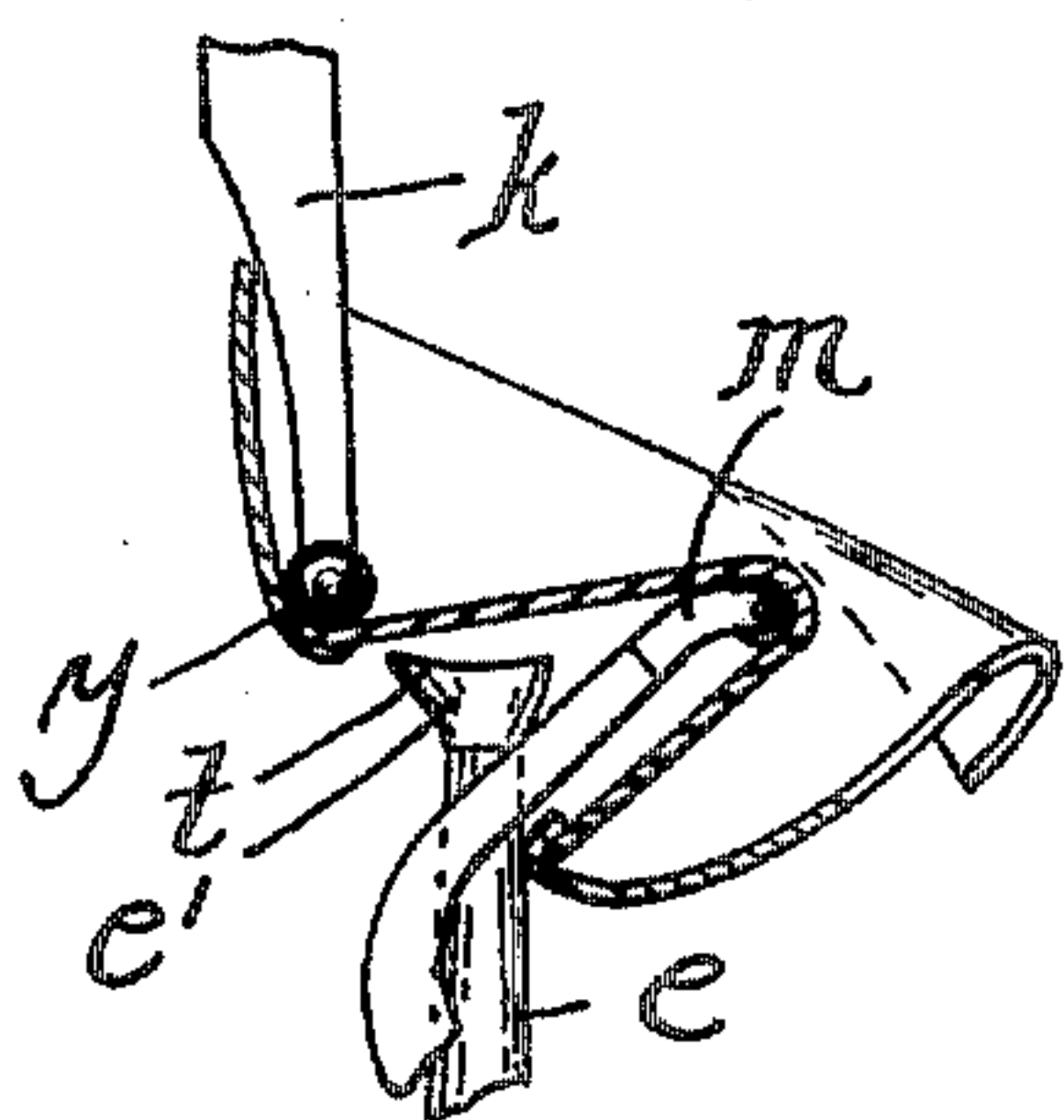


Fig. 13.

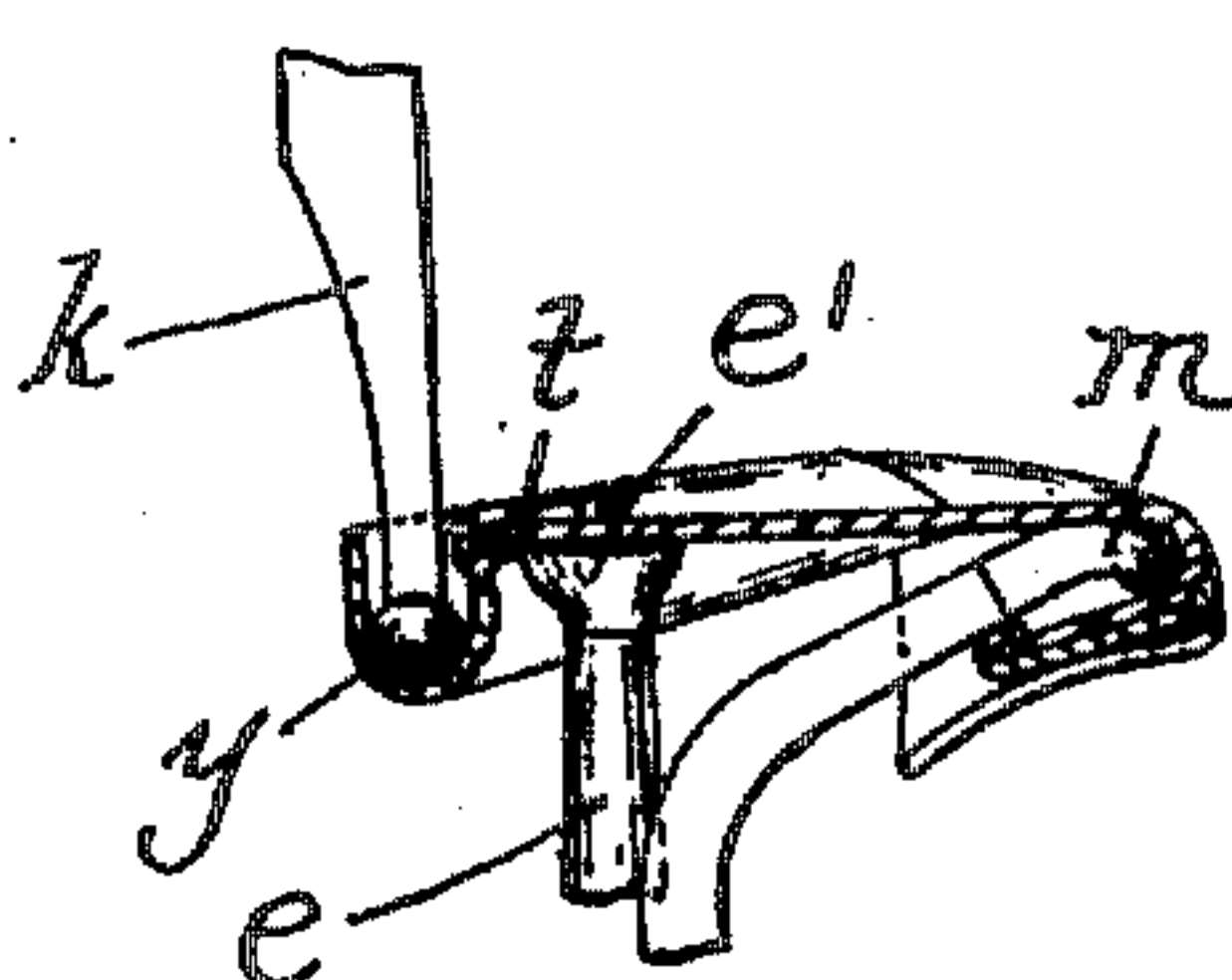


Fig. 14.

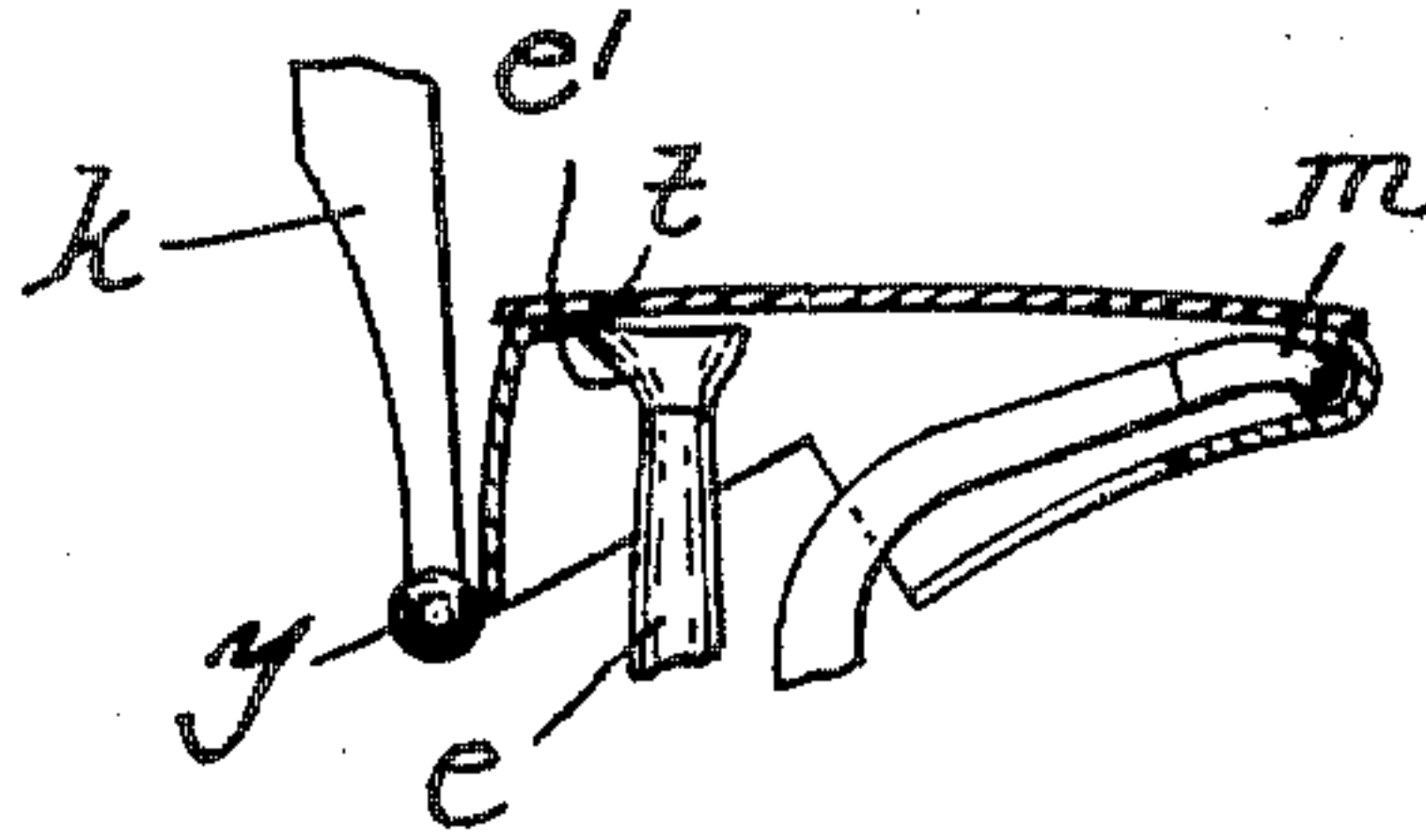


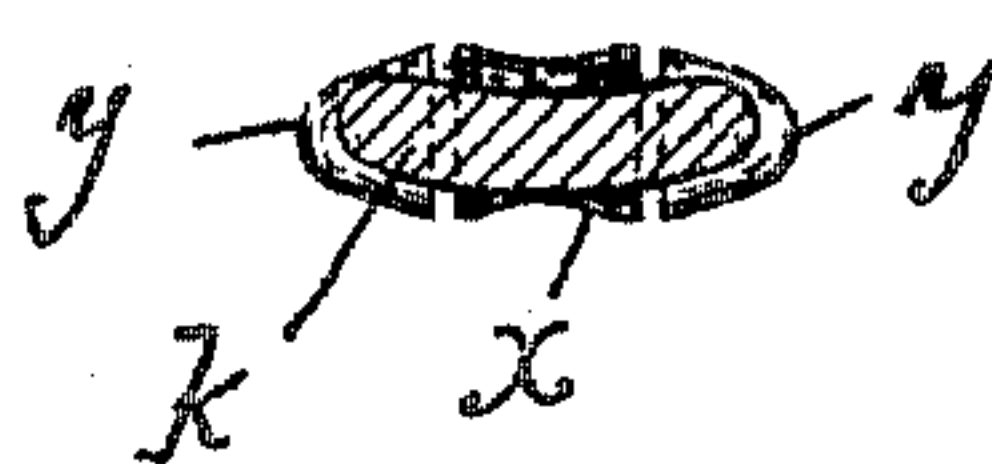
Fig. 15.

Witnesses:

H. B. Davis.

Maud M. Piper

Fig. 16.



Inventor:

Geo. B. Gardner
by *Koyne & Connors*
Attys.

UNITED STATES PATENT OFFICE.

GEORGE B. GARDNER, OF HAVERHILL, MASSACHUSETTS, ASSIGNOR OF
ONE-HALF TO FRED J. HASTINGS, OF HAVERHILL, MASSACHUSETTS.

SHOE-TURNING MACHINE.

No. 797,802.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed May 27, 1904. Serial No. 210,007.

To all whom it may concern:

Be it known that I, GEORGE B. GARDNER, of Haverhill, county of Essex, State of Massachusetts, have invented an Improvement in Shoe-Turning Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a form of shoe-turning machine which is especially designed to be used in turning shoes which are completely sewed about the sole before they are turned.

My invention has for its object to provide a machine for turning shoes which is adapted to be made to turn the heel and fore part of a shoe simultaneously or successively without removing the shoe from the machine.

Further objects of my invention are to improve prior devices for this purpose, so that the turning operation will be accomplished with less strain upon the upper and with less liability of damage thereto, and to produce a machine which is adapted to be adjusted readily, so that the same machine may be employed in turning shoes of widely-varying sizes.

In the drawings, Figure 1 is a front elevation of a shoe-turning machine made according to my invention, and Fig. 2 is a side sectional view on the line 2 2 of Fig. 1. Figs. 3, 4, 5, and 6 represent the parts in different positions during the turning operation when the heel and fore part are turned successively. Fig. 7 is a detail view of the turning-finger support. Figs. 8 and 9 are detail views of the lower end of one of the front heel-turning arms. Figs. 10, 11, and 12 are respectively detail perspective, side elevation, and plan views of the heel-post. Figs. 13, 14, and 15 represent different positions when the heel and fore part are turned simultaneously. Fig. 16 is a cross-section on line 16 16 of Fig. 8.

The main frame of the machine comprises a table or bed *a*, which is rigidly supported upon legs *b*, and a cross-head *c*, which is rigidly supported by standards *c'* upon the table. A vertical rod *d* is reciprocally mounted in the table, said rod bearing a heel turning and retaining plunger *e* at its upper end. The upper end or head *e'* of the heel-plunger *e* is preferably removable and diverges from its point of connection, as most clearly shown

in Figs. 10 and 11, providing a reversely-curved recess at its front side. The front half of the top of said head is semicircular and its rear half is tapering and the whole top is made concave, thereby providing a raised semicircular front edge, which is corrugated or provided with teeth *t*. A foot-lever or treadle *f* is pivoted on a support at the bottom of the machine and is connected by a link *g* to the rear end of a lever *h*, which is pivoted to the under side of the table, the front end of said lever *h* being pivotally connected to the lower end of the rod *d* by an interposed link *i*. A spring *s* is connected to the front end of the lever *f* and to one of the legs *b* and acts to lift the treadle to the full-line position in Figs. 1 and 2. A rack *r* is also secured to one of the legs *b* and is adapted to hold the lever *h* in various positions.

Three depending turning-arms, comprising two converging side arms *j* and a front arm *k*, are rigidly secured to the under side of the cross-head *c* and are so arranged that the front portion of the semicircular edge of the head *e'* passes in the rear of and at a short distance from the middle of the arm *k* and midway between the arms *j* when it is raised to the dotted-line position of Fig. 2.

The lower ends of the arms *j* are made smooth and beveled at their lower rear corners, as shown, and the lower end of the arm *k* is provided with three rolls—one middle roll *x* and two conical-shaped end rolls *y*—as shown in detail in Figs. 8 and 9. Said rolls *x* and *y* together extend across the entire lower end of the arm *k*, and preferably the end rolls *y* extend a short distance beyond the edges thereof, the end rolls being conical and the middle roll having its surface slightly concaved to correspond with the curvature of the front edge of the heel-post. As shown in Fig. 16, the arm *k* is longitudinally concaved on its back side to correspond to the concavity of roll *x* and convex on its front side, the edges thereof being rounded. The diameters of the rolls *x* and *y* are greater than the thickness of the arm *k* at all points. As shown in Fig. 9, the end rolls *y* are rigidly connected by a spindle *y'*, which is journaled in lugs *k'*, formed on the lower end of arm *k* and on which roll *x* is journaled, said lugs being arranged between the ends of roll *x* and the inner ends of rolls *y*. A bifurcated arm or lever *l* is pivoted to rod *d* at its lower end, and a turning-

finger *m*, having a roll on its end, is removably connected to the upper end of said arm. The end of said finger is curved downward slightly, as shown. A link *n* is pivotally connected to the arm *l* at a short distance above the middle thereof at one end and at the other end to the rear end of the lever *h*, preferably at the same pivotal point as that at which the link *g* is connected to said lever. Both links *g* and *n* are made adjustable in length by means of turnbuckles *o* and *p* or any other suitable or convenient means. The arm *l* is reversely curved, so that it is concave with relation to the front from its lower end to a point about three-fourths of the distance to its upper end and is then oppositely curved through nearly ninety degrees.

With the above-described machine the heel and toe portions of a shoe may be turned successively or simultaneously, according to whether the fore part may be turned over the ball or not before the heel portion is turned. In turning a shoe the two portions of which must be turned successively and which has previously been sewed entirely about the sole the shoe is first placed on the depending arms *j* and *k* with said arms within the heel portion of the shoe, as indicated in dotted lines in Fig. 2 and full lines in Fig. 3. The operator then depresses the foot-lever *f* and forcing the heel-plunger upwardly and causing the teeth *t* to engage the inner side of the sole of the shoe closely adjacent its heel end and at the edge of the upper and counter, which are sewed thereto. (See Fig. 11.) As the edge portion of the head *e'* bearing the teeth *t* is inclined downward from the middle of the front thereof, the first action performed thereby will be to bend the heel end of the sole upward, as shown in Figs. 11 and 14, so that the turning operation will be started at the extreme heel end, as is necessary to enable the heel portion to be turned easily and with the least possible strain upon the upper. As the heel of the sole is lifted by the heel-plunger the upper and counter are drawn down and then up about the ends of the arms *j* and *k*, as in the machine of my prior patent, No. 702,196, until the heel is completely turned. In my said prior device the friction between the upper and the lower end of the front arm is so great, particularly at the corners of the arm, that the heel portion of the upper was often injured or the stitches were broken during this part of the turning operation. To overcome this difficulty, I have provided the lower end of the front arm *k* with the previously-described conical-shaped friction-roll *y* at each corner, and as the ends of said rolls *y* project beyond the side of said arm when the upper is drawn about the end and lower corners of said arm it will slide easily thereover. The concavity of the middle roll permits the ends of the roll to be held as closely to the front edge or teeth of the head *e'* as is desirable, while providing

space for the increased thickness of material due to the usual back heel-seam. In turning the heel portion of a shoe with means similar to the means above described there is a tendency for the shoe to tip sidewise if one side of the shoe should happen to turn harder than another or if it should not be properly centered, and to overcome this difficulty I provided the heel-clamping plunger in the device of my said prior patent. With my present device I am enabled to dispense with said clamping-plunger for the reason that not only do the conical rolls *y* tend to keep the shoe perfectly centered, but the teeth *t* on the head *e'* firmly engage in the sole of the shoe and securely hold it from tipping sidewise on the head. The ends of the teeth are arranged in a curved line, the highest point of which is at the middle of the front edge of the head. By reason of this construction the sole is bent or concaved longitudinally, in which position the heel portion is more easily turned. When the heel portion of the shoe has been turned, it will be in the position of Fig. 4, and then the lever *f* is permitted to rise again, lowering the plunger *e*, and as the shoe is held on the head thereof it will be lowered therewith. The arm *l* is so constructed and arranged that its bifurcated portion may pass at opposite sides of the plunger *e* as it swings forward and rearward, so that the base end of the turning-finger may be carried back closely adjacent the heel-post *e*, as shown in Figs. 1, 2, and 5. When the heel-post is lowered with the shoe, the right-angularly bent upper portion of the arm *l* will pass into the heel portion of the shoe, as shown in Fig. 5. The operator then bends the fore part of the sole sharply down over the end of the finger *m*, as also shown in Fig. 5—that is, he “breaks” the sole. In this position the shoe is held so that the operator may use both hands simultaneously to turn the upper over or past the ball of the shoe, the shoe then being held in a position in which this operation may be most conveniently performed. The operator then presses his foot on the treadle again and forces the finger *m* forwardly, he at the same time taking hold of the tongue or front portion of the upper and holding it while the finger is forced forwardly, the end of the finger *m* passing to the toe of the shoe and completing the turning operation, as shown in Fig. 6. The arm *l* is pivoted at such a point and so shaped that the end of the finger *m* is carried in an arc which is with relation to the heel-plunger as nearly horizontal to the path of movement of the heel-plunger as possible, the fact that both the plunger and arm are lifted simultaneously causing them to maintain the same relative positions as if the plunger did not move vertically. The teeth *t* on the head *e'* also perform a very important function during the operation of turning the fore part of the shoe in that they firmly engage the sole close to its heel

end, so that they engage in the seam between the sole and the upper and counter and hold the heel portion of the shoe against the action of finger *m*, so that nearly the whole strain comes almost directly on the sole. The result is that the strain which would otherwise be placed on the heel portion of the upper is relieved to a very material extent, so that it will not be pulled out of shape or be unduly strained. By having the arm *l* bifurcated and arranged so that the finger *m* is equally supported on each side of the heel-plunger I am enabled to get the support for said finger as close to the plunger as possible and yet provide a rigid support for the finger. This construction enables me to bring the end of the finger so close to the plunger that the sole of a shoe of small size may be "broken" over the finger when the parts are in the initial position. If the end of the finger *m* is too close to the heel-plunger to break the sole of a shoe conveniently, the foot-lever will be depressed and the finger advanced the required distance, and then it will be held in this position by rack *r*. While the heel and toe portion of a shoe may be turned in rapid succession without removing the shoe from the machine in the manner above described, yet it is not necessary to turn the two portions of certain kinds of shoes successively; but they may be turned simultaneously with the above-described machine. To do this, the heel part is placed on the arms *j* *k*, as shown in dotted lines in Fig. 2, and then the sole is broken over the finger *m* and the upper is turned over the ball, as shown in Fig. 13. The treadle is then depressed and both portions of the shoe are turned simultaneously, as shown in Figs. 14 and 15. During the first part of the turning operation the heel portion will be held by the arms and principally by the front arm *k*, and then as the turning operation proceeds the entire strain upon the upper caused by finger *m* will be transferred gradually to the heel-plunger, said plunger and arms thereby simultaneously performing the double function of a heel-turning and heel-retaining device instead of performing them successively, as previously described.

With the above-described machine, therefore, the two portions of a shoe may be turned simultaneously or successively, as desired. If it is desired to use the machine to turn both portions of the shoe simultaneously, I prefer to have the lower ends of the turning-arms *j* and *k* extend nearly to the upper end of the head *e'* when in its initial position, as indicated in Figs. 13, 14, and 15; but this is not essential.

Various changes may be made in the above-described machine without departure from the spirit and scope of my invention; but the above-described form is the most desirable of any of which I am at present aware on account of its simplicity.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a shoe-turning machine, combined heel-part turning and retaining devices, a fore-part-turning finger, means for operating said turning and retaining devices and for moving said finger into the fore part of the shoe while held by said devices, substantially as described.

2. In a shoe-turning machine, combined heel-part turning and retaining devices, a fore-part-turning finger, means for simultaneously operating said turning and retaining devices and for moving said finger into the fore part of the shoe while held by said devices, substantially as described.

3. In a shoe-turning machine, coöperating heel-part turning and retaining members, one being movable in a predetermined path with relation to the other, a fore-part-turning finger movable in a path at an angle to the path of said movable member, and means for actuating said finger and said movable member, substantially as described.

4. In a shoe-turning machine, coöperating heel-part turning and retaining members, one being movable in a predetermined path with relation to the other, a fore-part-turning finger movable in a path at an angle to the path of said movable member, and means for actuating said finger and said movable member simultaneously, substantially as described.

5. In a shoe-turning machine, a depending, stationary upper-engaging device, a vertically-movable plunger adapted to coöperate therewith, to turn the heel portion of the shoe, a fore-part-turning finger, and means for simultaneously lifting said plunger and finger and moving said finger horizontally away from said plunger, substantially as described.

6. In a shoe-turning machine a stationary, upper-engaging arm, a movable plunger adapted to coöperate therewith to turn the heel portion of the shoe, a fore-part-turning finger connected to said plunger and means for moving said finger away from said plunger and for simultaneously moving the latter into operative relation with said arm, substantially as described.

7. In a shoe-turning machine, a depending, stationary, upper-engaging device, a vertically-movable plunger adapted to coöperate therewith to turn the heel portion of the shoe, a fore-part-turning finger, pivotally connected to said plunger and means for simultaneously lifting said plunger and for swinging said finger horizontally away from said plunger, substantially as described.

8. In a shoe-turning machine, a movable heel-part-turning plunger, an upper-engaging arm arranged in front of, and adjacent the path of said plunger, and coöperating therewith to turn the heel portion of the shoe, said plunger

having a sole-engaging head at its end, and said head having a raised edge portion at its front side arranged to engage the heel end of the sole, substantially as described.

9. In a shoe-turning machine, a heel-part-turning plunger and means for reciprocating the same, an upper-engaging arm arranged in front of and adjacent the path of said plunger, and cooperating therewith to turn the heel portion of the shoe, said plunger having a sole-engaging head at its end, and said head having a raised, convexly-curved edge portion at its front side arranged to engage the heel end of the sole, substantially as described.

10. In a shoe-turning machine, a vertically-movable plunger having upwardly-extending teeth, or corrugations on its upper end, and a depending upper-engaging device adapted to cooperate with said plunger to turn the heel portion of the shoe as the plunger is lifted, substantially as described.

11. In a shoe-turning machine, a heel-part-retaining head having a projecting edge portion adapted to engage in the seam between the upper and sole, a fore-part-turning finger and means for actuating said finger, substantially as described.

12. In a shoe-turning machine, a heel-part-retaining head having a projecting, toothed, or corrugated, edge portion adapted to engage in the seam between the upper and sole, a fore-part-turning finger and means for actuating said finger, substantially as described.

13. In a shoe-turning machine, a heel-part-retaining head having a projecting, obliquely-extending edge portion adapted to engage in the seam between the upper and sole, a fore-part-turning finger and means for actuating said finger, substantially as described.

14. In a shoe-turning machine, an upper-engaging arm, a pair of axially-arranged friction-rolls journaled between their adjacent ends to the end of said arm, and a heel-turning plunger movable longitudinally of said arm adjacent said rolls, substantially as described.

15. In a shoe-turning machine, an upper-engaging arm, a pair of axially-arranged friction-rolls journaled between their adjacent ends to the end of said arm, with their outer ends projecting beyond the adjacent sides thereof, and a heel-part-turning plunger movable longitudinally of said arm adjacent said rolls, substantially as described.

16. In a shoe-turning machine, an upper-

engaging arm, a pair of axially-arranged friction-rolls journaled between their adjacent ends to the end of said arm, the opposite ends of said rolls being tapered, and a heel-part-turning plunger movable longitudinally of said arm adjacent said rolls, substantially as described.

17. In a shoe-turning machine, an upper-engaging arm, a pair of axially-arranged friction-rolls journaled between their adjacent ends to the end of said arm, the outer ends of said rolls projecting beyond the sides of said arm, and a heel-part-turning plunger movable longitudinally of said arm adjacent said rolls, substantially as described.

18. In a shoe-turning machine, an upper-engaging arm having a pair of lugs at the end thereof, a pair of outer friction-rolls journaled in said lugs at the outer sides thereof, an intermediate roll journaled in and between said lugs, all of said rolls being axially arranged and a heel-part-turning plunger movable longitudinally of said arm opposite the middle of said intermediate roll, substantially as described.

19. In a shoe-turning machine, an upper-engaging arm having a pair of lugs at the end thereof, a pair of outer friction-rolls journaled in said lugs at the outer sides thereof, an intermediate roll journaled in and between said lugs, and being centrally concaved, all of said rolls being in axial alinement, and a heel-part-turning plunger movable longitudinally of said arm with its middle portion adjacent the middle of the concavity of said intermediate roll, substantially as described.

20. In a shoe-turning machine, a heel-part-retaining member adapted to enter the heel portion of the shoe, a movable arm supported at one end and bearing a fore-part-turning finger at its opposite end, means for actuating said arm to move said finger toward and away from said retaining member, said arm having a divided portion arranged to pass at each side of said retaining member to carry the base end of said finger into close proximity therewith, substantially as described.

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

GEO. B. GARDNER.

Witnesses:

L. H. HARRIMAN,
H. B. DAVIS.