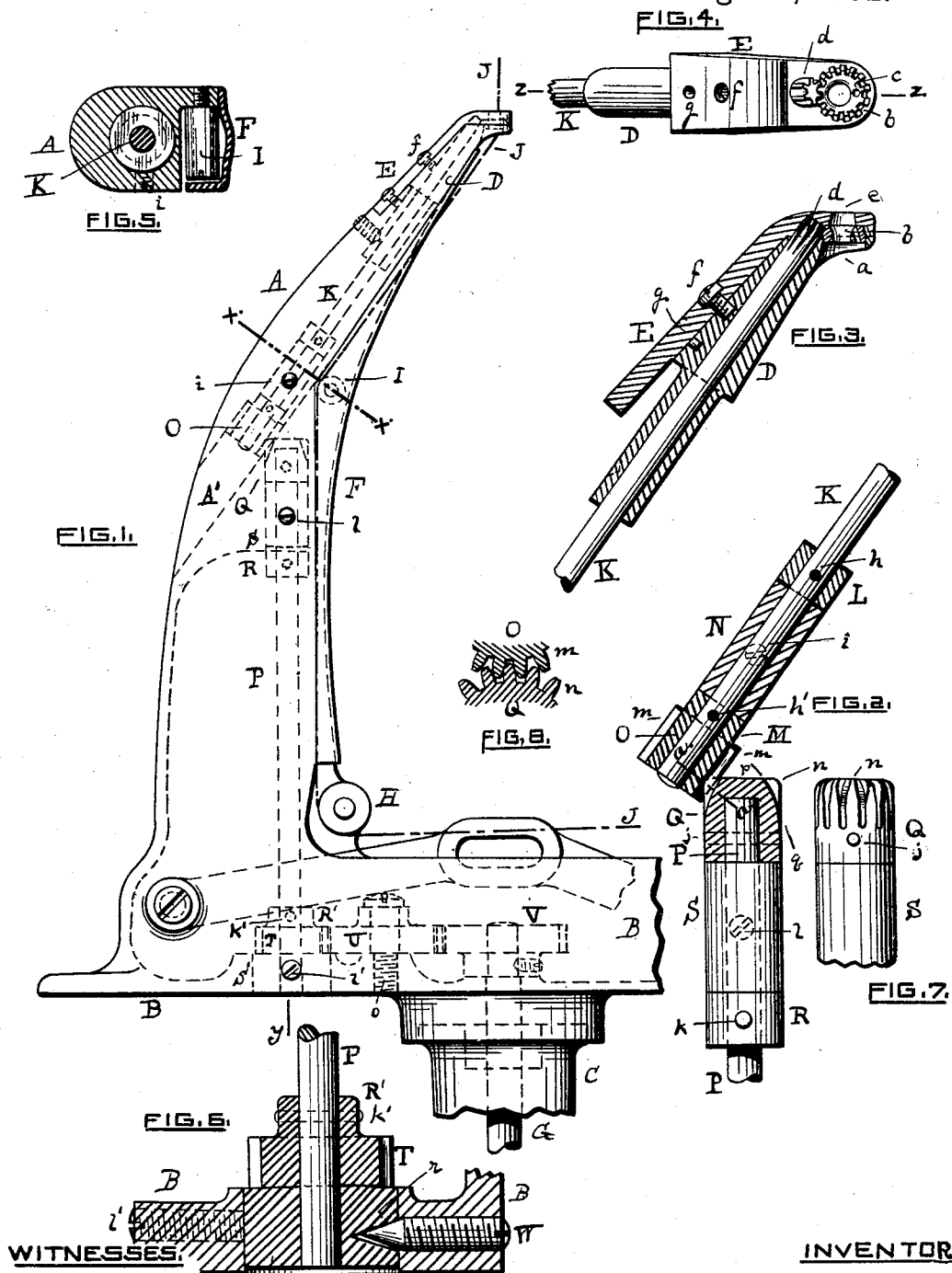


(No Model.)

J. A. TRUE.
SHOE SEWING MACHINE.

No. 480,882.

Patented Aug. 16, 1892.



WITNESSES:

Arthur Cushing
Warren R. Burr

INVENTOR

James A. True

UNITED STATES PATENT OFFICE.

JAMES A. TRUE, OF PAWTUCKET, RHODE ISLAND.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,882, dated August 16, 1892.

Application filed November 28, 1891. Serial No. 413,432. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. TRUE, of the city of Pawtucket, in the county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Shoe-Sewing Machines; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

10 Like letters indicate like parts.

Figure 1 is a side elevation of so much of a shoe-sewing machine as is necessary to show the location and relation of my improved gearing. Fig. 2 shows, partly in side elevation 15 and partly in central longitudinal section, the improvement in gearing which constitutes my invention. Fig. 3 shows in section, on line z of Fig. 4, the nose-piece or tip of the horn and the cap thereon, and in side elevation the shaft and pinion thereon, in engagement with the thread-carrying gear. Fig. 4 is a top plan of the parts shown in Fig. 3. Fig. 5 is a view as seen partly in section on line $x x$ of Fig. 1 and partly in elevation. Fig. 6 is a view in 25 section on line y of Fig. 1, and shows the means for vertically adjusting the perpendicular shaft of one of my improved gears. Fig. 7 is a side elevation of one of my said gears. Fig. 8 is an enlarged sectional view 30 on line $a a$ of Fig. 2, showing the engagement of my improved gearing.

My invention is an improvement in the gearing in horns of shoe-sewing machines. This gearing has for its purpose the oscillation of the thread-carrying pinion at the end of the horn, which pinion assists in the formation of the stitch, in the manner well known in machines of this class.

The usual form and location of this gearing 40 and the shafts supporting the same within the horn is shown in Fig. 1 in Letters Patent of the United States No. 250,689, granted to me December 13, 1881, where it is seen that the gears at the bend of the horn, and which are used to change the direction of the motion, are common bevel-gears.

The difficulty experienced in the use of bevel-gears in the horns of shoe-sewing machines, and which is overcome by my present 50 improvement, is that when the pinions or gearing near the tip of the horn are broken or injured, as sometimes happens from various

causes, it is necessary to remove the shaft, which extends upward from near the bend of the horn to the thread-carrying pinion, in order to repair or replace the same; but the engagement of the bevel-gears near the bend of the horn prevents the withdrawal of said shaft and its gears from the horn unless the horizontal shaft, with its gears, is first moved out 60 of position to allow the passage.

My invention consists of the combination, in a shoe-sewing machine, of a hollow horn having its upper portion bent and provided with an angular aperture near the bend of 65 the outer curve thereof, with a rotatable thread-carrier mounted at the tip of the horn, a detachable shaft mounted in the upper or bent portion of the horn, a perpendicular shaft mounted in the lower portion of the horn, said 70 upper and lower shafts being connected by a peculiarly-shaped gearing, as hereinafter particularly specified.

My invention also consists in means, as hereinafter set forth, for adjusting the said 75 perpendicular shaft in position relatively to the upper shaft.

To enable an understanding of the operation and advantages of this improvement, I give in the drawings illustrations of so much 80 of a shoe-sewing machine as is related to my improved device.

A represents the horn, B the base of the horn, and C the standard.

D is the tip or nose-piece of the horn, and 85 E is the cap-piece.

F is the shield, and G the main shaft.

H I are rollers to change the direction of the thread J, which is shown in dotted lines.

The tip D has an opening a , and a thread-carrier b , having a thread-hole c and beveled cogs, is mounted as seen in Figs. 3 and 4. The tip D is tubular, and through it passes the shaft K, rotatable therein, which shaft 90 terminates at its upper end with the pinion d , engaging with the carrier b . The cap-piece E, having an opening e , extends over the tip D and is secured thereto by the set-screw f and pin g . The horn A has a bore or opening, as seen at A', near its bend. Thus far 100 the parts described are common and well known.

A collar L is fastened to the shaft K by a pin h . A bushing or bearing N surrounds

the shaft K and is fastened to the horn A by the screw *i*. The shaft K has at its lower end the gear O, which has straight cogs *m*, somewhat extended in length, as seen in Fig. 2, and a hub M, fastened to the shaft K by a pin *h'*. The shaft K thus has bearings and support in the bushing N and in the tip D. By loosening the screw *i*, the shaft K may be removed from the horn through the opening A'.

At P, I show a vertical shaft, having at its top a gear Q, fastened to the shaft by a pin *j*. A collar R is fastened to said shaft by a pin *k*. Bushings S S' support the shaft P and are secured to the horn A by screws *l l'*. The shaft P has near its bottom a gear T, whose hub R' is fastened to said shaft by a pin *k'*. The gear T meshes with a gear U, mounted upon the stud *o*, and the gear U meshes with a gear V upon the main shaft G.

The gear Q at the top of the shaft P has the peculiar form shown in Figs. 2 and 7. It is essentially cylindrical in shape, with its top plane and the edge rounded slightly. The bottom of each cog-space is slightly convex, so that it is substantially beveled; yet the side longitudinal faces of the cogs *n* are not coincident with the radii, but are conformed to the cog-spaces between the cogs *m* of the gear O. In practice I get this peculiar formation of the cogs *n* by first making two cuts in the directions indicated by lines *p q* in Fig. 2 in the piece Q before the metal is hardened, and then by working the cogs *m* of the gear O (which has been previously hardened) in the cuts *p q* the metal of the gear Q is worn down to conform to the cog-spaces of the gear O. The gear Q when so formed is then hardened.

It will be observed that the cogs *m* of the gear O are straight. If the cogs *n* of the gear Q were in the usual form of bevel-gearing, their faces would be coincident with their respective radii and so would converge toward the center or axis of the gear. In such a construction, if the gears O Q were placed in relatively angular positions, only the outer edges of such radial cogs could come in contact with the straight cogs of the gear O. These edges would soon wear off and the cogs would no longer fit snugly and their usefulness would be impaired and at last destroyed. By the peculiar formation of the cogs *n*, as I have described, they fit snugly and are always in operative contact with the cogs *m* of the gear O, (see Fig. 8,) and so are durable and effective. The cogs *m n* will engage with each other circumferentially, but can slide on each other longitudinally.

The bushing S' has a conical recess, as seen at *r*. A screw W, passing through one side of the base of the horn, has a conical point, which enters said conical recess, and by the movement of the screw W the bushing S', and consequently the shaft P, with its gears and collar, is vertically adjustable.

So far as I am aware I am the first to mount

a shaft at an angle with another shaft and to connect them by gearing other than two bevel-gears, one on each shaft, to communicate power and motion. This combination of a gear having straight cogs with a gear having beveled cogs is useful wherever it is desirable to have one shaft movable past another shaft which is permanently mounted at an angle thereto.

As usual in this kind of machines, the main shaft G is partially rotated alternately in opposite directions, and this alternate movement is accomplished by a gear upon said shaft meshing with a rack-gear which has a reciprocating motion. This mechanism, being well known and understood and constituting no part of my invention, is not shown in the drawings. This reciprocating movement is communicated by the various gears and shafts, above described, to the thread-carrier, which oscillates back and forth to assist in the formation of the stitch.

Another important advantage results from my improved construction. Some adjustability of the shaft K is desirable to bring or keep the pinion *d* in proper operative engagement with the carrier *b*. In the construction heretofore common such adjustment is possible only by proper movement of both the shafts, as the bevel-gearing connecting said shafts must be always in engagement and the movement of either shaft will separate the bevel-gears; but in my device the shaft K can be easily adjusted without any movement of the perpendicular shaft whatever, because the shaft K in moving longitudinally does not interfere with the gear Q of the shaft P, as is evident by an examination of Fig. 2.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a shoe-sewing machine having a main shaft, the combination of a hollow horn having its upper portion bent and provided with an angular aperture near the bend on the outer curve thereof, a thread-carrier rotatably mounted at the top of the horn, a shaft detachably mounted in the upper or bent portion of the horn and having at its top a pinion to engage and operate the thread-carrier and at its bottom a cylindrical gear with straight longitudinal cogs, and a shaft mounted in the lower portion of the horn at an angle with the shaft last aforesaid and deriving motion from the main shaft by a train of gearing and having at its top a gear adapted to engage in an angular direction with the lower gear of the upper shaft, such engagement being on that side of said upper gear of the lower shaft which is nearest the outer curve of the horn, so as to allow the disengagement of said gears of the upper and lower shafts from each other and the outward withdrawal of the upper shaft and its gears from the horn through said aperture, substantially as specified.

2. In a shoe-sewing machine having a horn and a thread-carrier mounted at the tip there-

on, the combination of the perpendicular shaft P, having the gears Q T, the bushing S', in which said shaft is mounted and which has the conical recess *r*, the conical pointed screw 5 W, passing through the side of the horn and adapted to enter and engage with said recess, and the shaft K, having the gears and pinion O *d*, all arranged and operating substantially as and for the purpose specified.

10 3. In a shoe-sewing machine, the combination of the horn A, having the aperture A', the tubular tip D, having the thread-carrier *b*, the cap-piece E, secured to the tip and horn by screws or pins, the shaft K, mounted in

the tubular tip D and having at its upper 15 end the pinion *d*, engageable with the carrier *b*, and also having at its lower end the gear O, with straight cogs *m*, and the shaft P, having the bevel-gear Q *n*, upon which said gear O *m* can slide while the shaft K is moved lon- 20 gitudinally in the tip D for the purpose of adjusting the pinion *d* to the carrier *b*, substantially as specified.

JAMES A. TRUE.

Witnesses:

ARTHUR CUSHING,
WARREN R. PERCE.