(No Model.) 7 Sheets—Sheet 1.

J. B. M. SEGELHORST.

SEWING MACHINE.

No. 543,604. Patented July 30, 1895.

Fig.1.

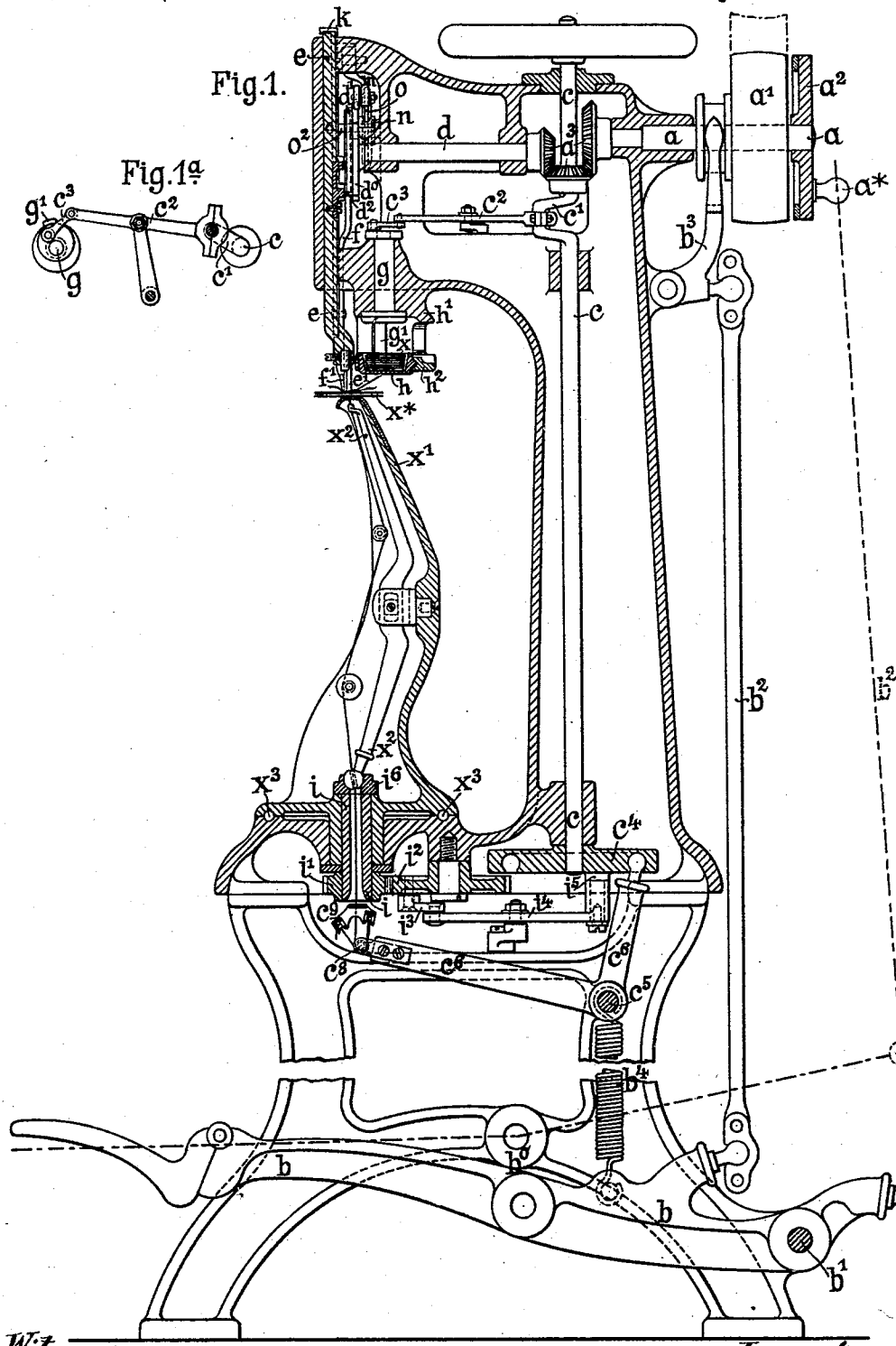

Fig.1a.

Witnesses:-
Thos Haynes
George Barry.

Inventor:-
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Howard.

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J. B. M. SEGELHORST.

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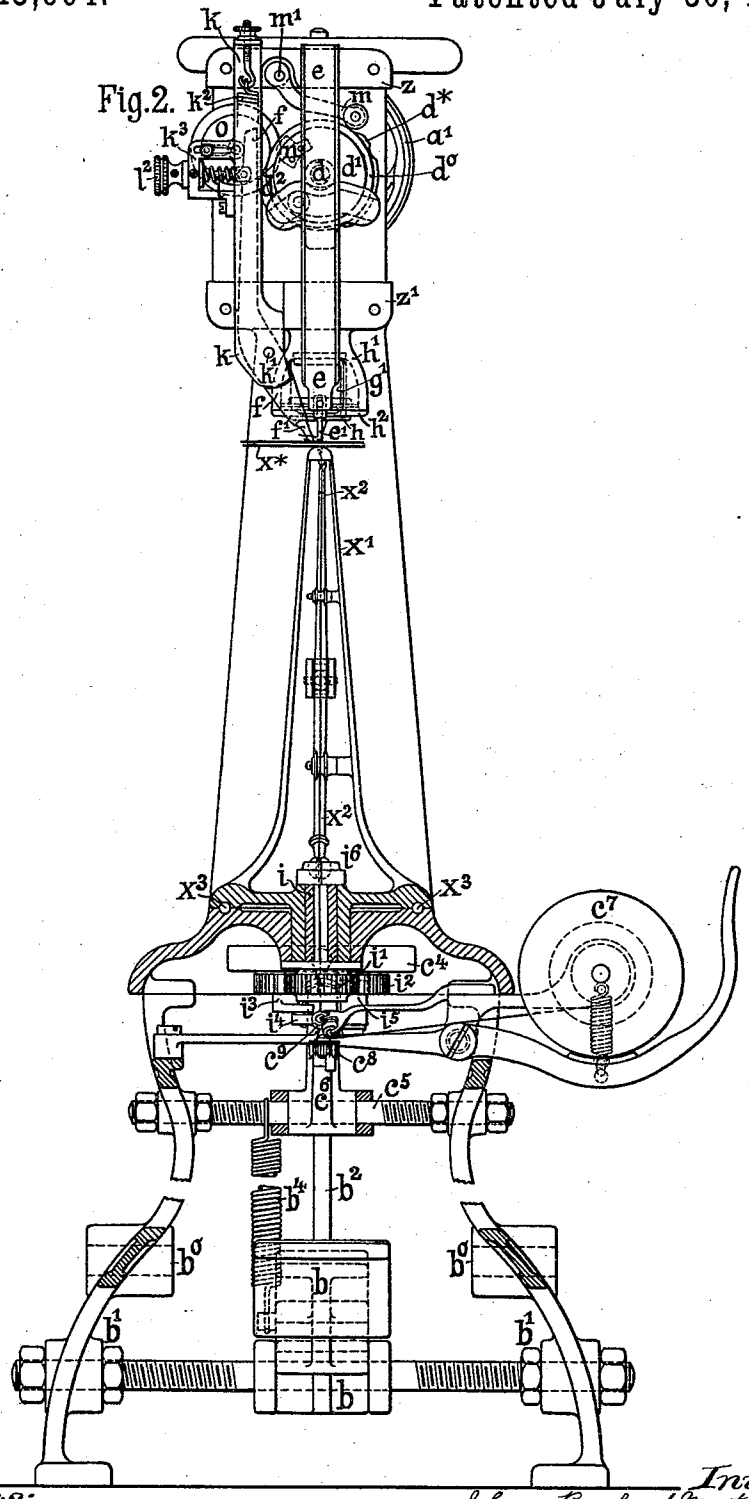
Fig. 2.



Witnesses:-
Fred Haynes
George Bary.

Inventor:-
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

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J. B. M. SEGELHORST.

SEWING MACHINE.

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Fig. 3.

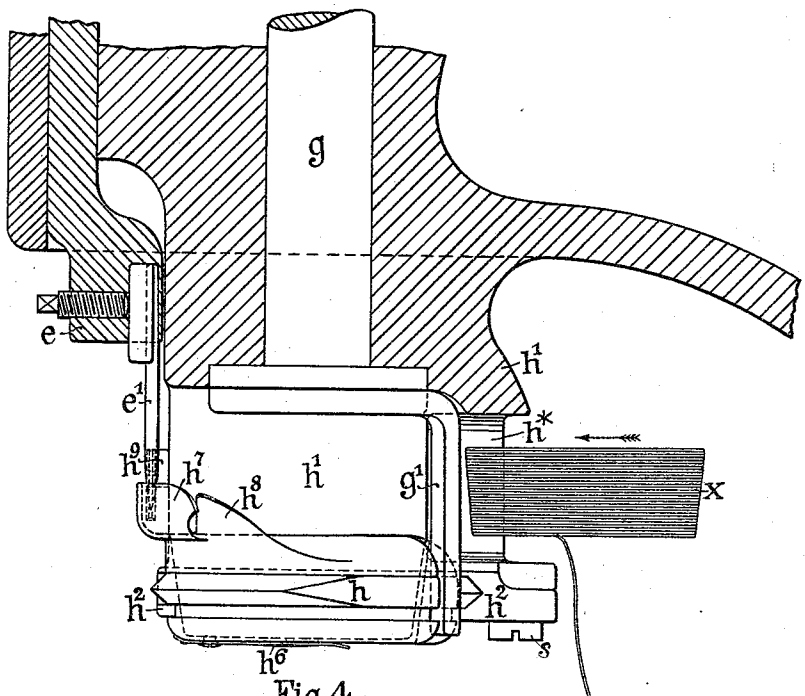
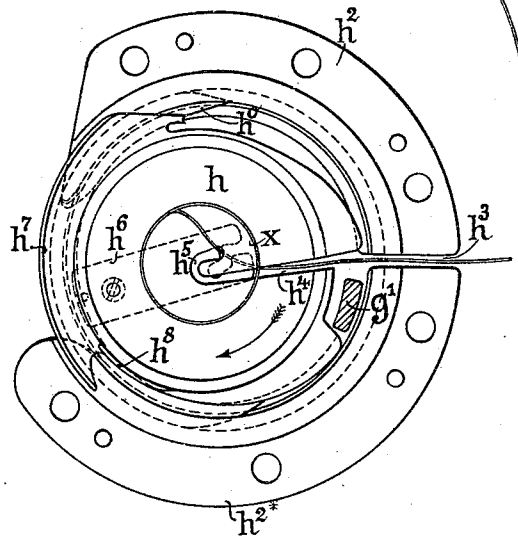


Fig. 4.



Witnesses:—
Fred't Haynes
George Barry.

Inventor:—
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

(No Model.) 7 Sheets—Sheet 4

J. B. M. SEGELHORST.

SEWING MACHINE.

No. 543,604. Patented July 30, 1895.

Fig. 5.

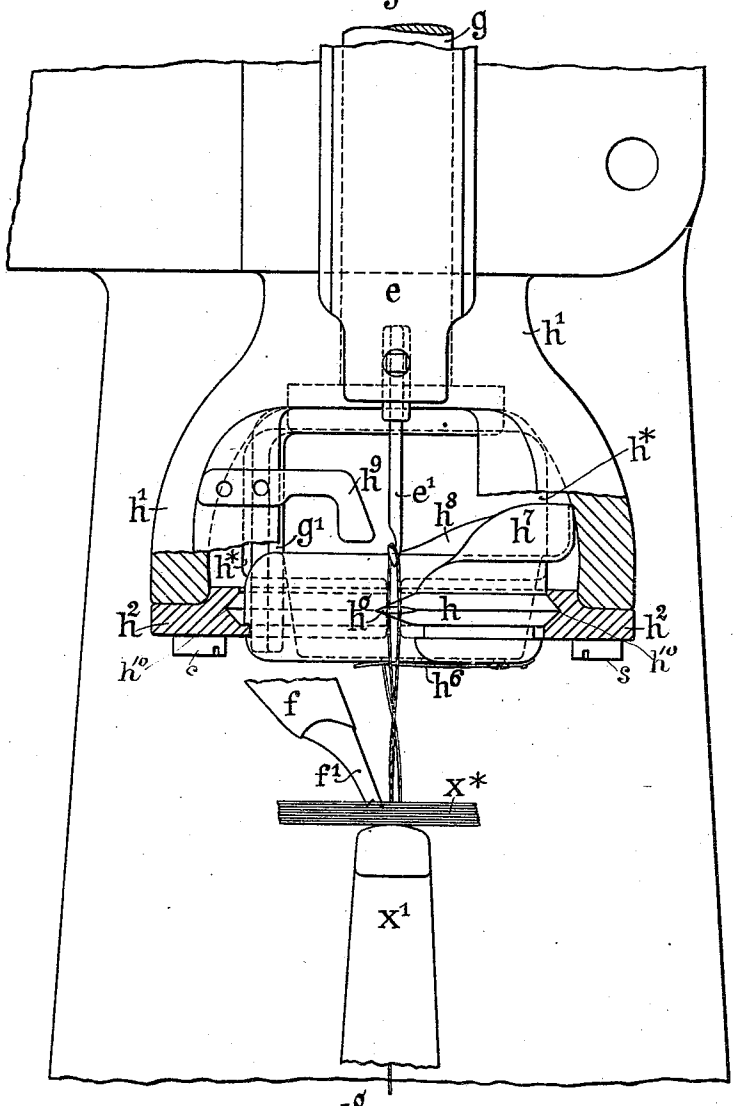
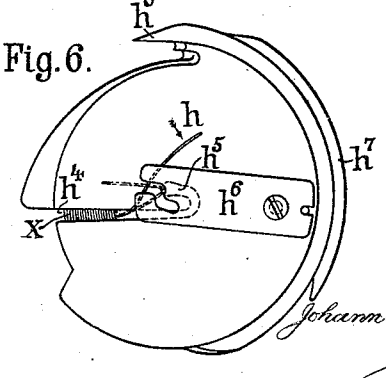


Fig. 6.



Witnesses:-
Fred Haynes
George Barry.

Inventor:
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

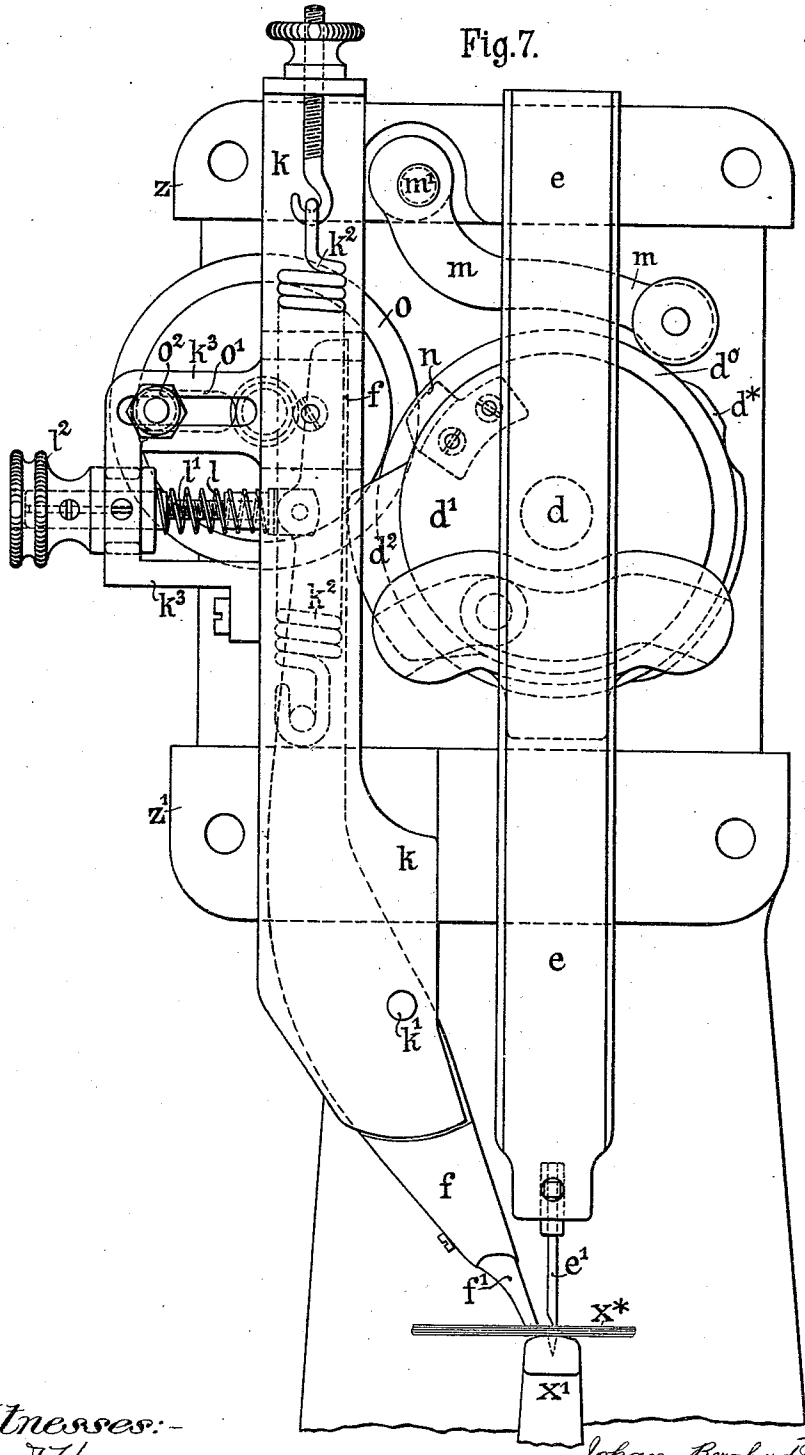
(No Model.) 7 Sheets—Sheet 5.

J. B. M. SEGELHORST.

SEWING MACHINE.

No. 543,604. Patented July 30, 1895.

Fig. 7.



Witnesses:-
Fred Hopper
George Barry.

Inventor:
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

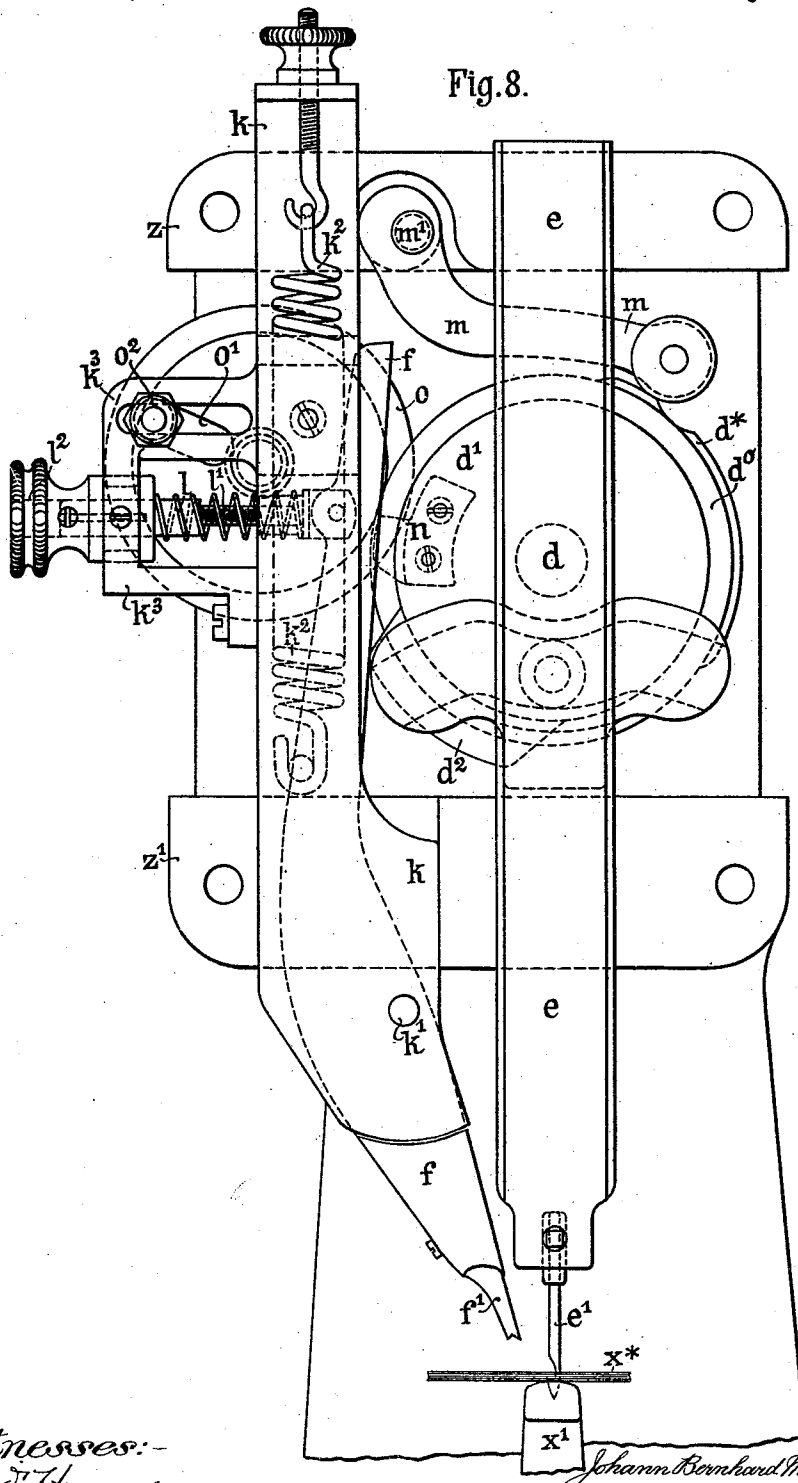
(No Model.) 7 Sheets—Sheet 6.

J. B. M. SEGELHORST.

SEWING MACHINE.

No. 543,604. Patented July 30, 1895.

Fig. 8.



Witnesses:-
Fred' Haynes
George Barry.

Inventor:
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

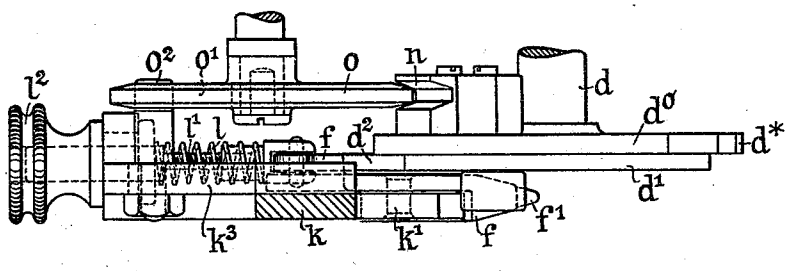
(No Model.) 7 Sheets—Sheet 7.

J. B. M. SEGELHORST.

SEWING MACHINE.

No. 543,604 Patented July 30, 1895.

Fig. 9.



Witnesses:—
Fred'k Haynes
George Barry.

Inventor:—
Johann Bernhard Martin Segelhorst
by attorneys
Brown & Seward

UNITED STATES PATENT OFFICE.

JOHANN BERNHARD MARTIN SEGELHORST, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR TO THE KEATS MASCHINEN-GESELLSCHAFT, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,604, dated July 30, 1895.

Application filed August 1, 1894. Serial No. 519,158. (No model.)

To all whom it may concern:

Be it known that I, JOHANN BERNHARD MARTIN SEGELHORST, a subject of the Grand Duke of Oldenburg, and a resident of the city of Frankfort-on-the-Main, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates more particularly to sewing-machines for attaching soles to boots and shoes, and is applicable to such machines fitted with either a revolving swivel-horn or a flat work-plate.

In the accompanying drawings, the invention is shown applied to a machine with a swivel-horn and with a rotary circular shuttle above the swivel-horn or work-support.

Figure 1 represents a longitudinal vertical section of the machine. Fig. 1^a is a plan view of the mechanism for operating the shuttle-driver; Fig. 2, a front view of the machine partly in section. Fig. 3 represents a side view, partly in section, of the shuttle and needle and their immediate appurtenances; Fig. 4, a plan view of the shuttle and its supporting-ring. Fig. 5 is a front view, partly in section, of the shuttle and needle and their immediate appurtenances; Fig. 6, an inverted plan view of the shuttle. Figs. 7 and 8 are front views of the needle and the feeding device and their operating mechanism, showing the feeding device in different positions. Fig. 9 is a plan view, partly in section, of the feeding devices.

For power-driving there is mounted a belt-pulley a' loose upon the shaft a, which is journaled in the upper portion of the framing of the machine. This pulley a', on depressing the foot-lever b, pivotally mounted at b' in the lower frame of the machine, is by means of the connecting-rod b^2 and bell-crank lever b^3 pressed against the friction-disk a^2 fast on the shaft a. By contact of the rotating-pulley a' with the disk a^2 the shaft a is set in motion. On releasing the treadle b the spring b^4 draws it up, and the bell-crank lever b^3, by means of the rod b^2, draws the belt-pulley a' away from the friction-disk a^2, thus stopping the motion of the shaft a.

When it is desired to drive the machine by foot through the treadle b, the rod b^2 is disconnected therefrom and from the bell-crank lever b^3. The spring b^4 is also detached from the treadle. The treadle-axle b' is taken out and inserted at b^0 in the treadle and framing, and it is then coupled up with the disk a^2, one end of the rod b^2 being connected to the treadle-lever at the point b^*, and the other end to the crank-pin a^* on the disk a^2.

The motion of the driving-shaft a is transmitted through miter-wheels a^3 to the vertical shaft c and the horizontal shaft d. On the end of this shaft d there is mounted a disk d', provided with a bowl, which takes into a cam-groove in the needle-bar e, for the purpose of reciprocating the same. The disk d' also operates, by means of a cam which it carries, the feed-arm f, which, by means of its interchangeable-toothed foot f', operates upon the work x^*, either to feed it forward the length of a stitch or to hold it upon the horn during the operation of sewing, as will be hereinafter described.

The vertical shaft c is cranked at c', and from this crank motion is communicated through a rod c^2 and link c^3 to the shuttle-driver g', (see the detached plan view, Fig. 1^a,) a radius-controlling link, fulcrumed on a fixed point, being connected by a pivot-pin to the rod c^2, which carries upon its lower end the shuttle-driver g'. The link c^3 connects with an eccentric-pin on the upper end of the short shaft g^*. Through the rotary motion imparted to the shaft g by the link c^3 the driver g' sets the circular shuttle h in action. The shuttle is supported and guided by a horizontal divided ring $h^2\,h^{2*}$, secured to and supported by the fixed bracket h', which is pendent from the stationary head $z\,z'$ or upper part of the framing of the machine. In the central space of the shuttle the waxed thread-cop x, which serves itself as the spool, is loosely laid. The shuttle is constructed and arranged as will be hereinafter described.

On the lower end of the vertical shaft c is mounted a face-cam c^4, by which the take-up lever c^6 for the needle-thread (mounted in bearings c^5) is operated. The needle-thread taken from spool c^7 passes on its way to the looper over a pair of pulleys c^8, mounted on the end of the take-up lever, and then over a

second pair c^9, situated at right angles to the first and mounted upon a rigid arm immediately below the swivel-horn. i is a tubular shaft, which passes through the journal of the swivel-horn and serves to actuate the looper x^2, to which it is connected by a ball-and-socket joint. This looper x^2 is pivotally mounted in the horn x', and receives the thread through the tubular shaft i and lays the thread in the hook of the needle e' by the following means: Upon the lower end of the tubular shaft i is mounted a toothed wheel i', which gears with another toothed wheel i^2, set in motion by the driving-gear i^3 i^4. This gear i^3 i^4 receives its motion from a crank-pin i^5 on the cam c^4. Rotary motion is thus imparted to the tubular shaft i, which thus through its ball-and-socket connection with the pivoted looper x^2 gives to the looper the necessary motion for laying the thread in the hook of the needle.

The horn x' is mounted upon a bearing-surface composed of a ring of balls x^3, thereby insuring its easy rotation.

The construction and arrangement of the circular shuttle h is clearly shown in Figs. 3, 4, 5, and 6, which are on a larger scale than Figs. 1 and 2. The said shuttle h, which, as hereinbefore mentioned, is mounted in the horizontal divided ring h^2 h^{2*}, and carries the cop of thread x, and is provided on its periphery with a nose h^0 to take the loop of thread and with a heel for the driver g' to act upon. The divided ring h^2 h^{2*} has in its rear a radial slot or gap h^3, (see Fig. 4,) and a corresponding gap h^4 is provided in the bottom and wall of the shuttle h, which gap terminates near the center of the shuttle in a curved or hook-shaped opening or slot h^5. This curved or hook-shaped termination of the slot is covered on the outer side of the shuttle by a forked spring h^6, for a purpose to be presently described.

The pendent bracket h' is provided at back with an opening h^* sufficiently large to admit of the insertion of the cop or spool x into the shuttle h, and for the purpose of threading up, the shuttle is turned so that the gap h^4 therein coincides with the gap h^3 in the supporting-ring h^2 h^{2*}. To thread up, it is only necessary to pass the loose end of the spool-thread through the gaps h^3 h^4, when the thread, on being pulled under the spring h^6, will of itself enter the hooked slot h^5 and become threaded, as shown in dotted lines in Fig. 6. The spring h^6 serves to prevent the thread from slipping out of place.

It will now be understood that for refilling the shuttle and threading it up it will no longer be necessary to remove the hot shuttle from the machine.

To facilitate the catching of the loop of thread on the hooked needle the shuttle is provided with a raised edge h^7 and a sloping edge h^8, between which a rigid finger h^9, carried by the pendent bracket h', acts on the rotation of the shuttle h, so that the needle-loop is compelled to rise onto the edge h^7, and finally falls onto the sloping edge h^8 and leaves the shuttle. The pendent bracket h' is likewise provided at front with an opening, so that the shuttle-thread can be inspected and the renewal thereof can be effected without any great delay when requisite.

The feed mechanism above mentioned is clearly illustrated in Figs. 7, 8, and 9, the covering-plate being omitted from the two front views to expose the mechanism. Fig. 7 shows the depressed position of the feed-bar, and Fig. 8 its raised position. The lever f, which is provided with a foot f', is pivoted at k' to a bar k, which slides vertically in the head z z' of the machine. This bar k is normally drawn downward by the spiral spring k^2, so that the toothed feeding and pressing foot f' is pressed down upon the work x^*.

To impart a forward motion to the work the lever f must be swung outward, which movement, as above described, is accomplished by the cam d^2, carried by the disk d' on the shaft d, pressing against the upper end of the lever. The rotation of the shaft d sets the disk d', with the cam d^2, in motion, with the result that the cam at the proper time operates upon the upper end of the lever f, so that its lower end with the foot f' is swung toward the front, and the work is thus moved forward. The return motion of the lever f is effected after having been lifted with the bar k from the work, as will be explained farther on, by the pressure of a spring l, mounted upon a screw-spindle l', one end of which has its bearing in a bracket k^3 attached to the bar k, while the other end is jointed to the lever f. The outer end of this screw is fitted with a nut, which is mounted in the bracket k^3. By turning this nut l^2 the amount of distance between the lever f and the cam d^2 can be adjusted, and thereby the amount of swing imparted to the lever f will be augmented or reduced, according to the length of stitch desired. Upon the shaft d is a second disk d^0, in one piece with the disk d'. On the periphery of this disk d^0 a clamping-lever m, carrying a bowl at its end, rests. This lever is fulcrumed at m' and is cam-shaped, for the purpose of acting upon the presser and feed bar. The periphery of the disk d^0 is provided with cam-like projections d^*, so that on the rise of the bowl of the lever m over the same the cam-shaped end of that lever will jam against the bar k and hold the same at the required moment in its raised position against the pull of the spring k^2. When the cam-projection has passed under the bowl, the lever m releases the lever k and the spring k^2 again comes into operation. To effect the necessary periodical lifting of the bar k and lever f, there is fixed at the back of the disk d^0 a friction-clip n, which is carried around by its disk and presses against a V-edged disk o, mounted in fixed bearings in the head of the machine. The disk o has a slot o' to receive an adjustable pin o^2, which enters a slot in the bar k. Dur-

ing the contact of the friction-clip n with the disk o the latter is partially rotated, with the result that the disk, being connected to the bar k, lifts this latter against the pull of the spring k^2. (See Fig. 8, which also shows the action of the lever m upon the bar k while in its raised position.) By adjusting the pin o^2 in the slot o' of the disk o the forward motion of the bar k and the feed-arm f can be regulated according to the quality of the work, the adjustment being so made that for materials with hard surfaces a less and for those with soft surfaces a greater travel is given.

On the cover-plate of the head of the machine (not shown) may be mounted in the usual way an ordinary hand-lever to lift the feed and presser foot f by hand as may be necessary.

The feed and presser foot is lowered from the raised position, Fig. 8, by the spring k^2 onto the work, and the disk o brought back to its normal position as soon as the action of the lever m ceases by its bowl falling over the cam-projection d^* on the disk d^0. By increasing or reducing the tension of the spring k^2 the descent of the lever k, or, rather, the pressure of the feed-foot f' upon the work, may be readily adjusted.

The operation of the feed is effected in the following manner: The spring k^2, through the bar k, presses the foot f' down upon the work, and it is pushed forward the length of a stitch by the cam d^2 acting on the feed-lever f. The bar k is then lifted by the friction-clip n o, and the feed-lever f is drawn back by the spring l to recommence the same series of movements.

The feed and presser foot can, it will be understood, be adjusted in its rising and falling motion independently of its backward and forward motion (which determines the length of stitch) by the adjustable friction driving-gear. This friction driving-gear n o provides, in consequence of the rolling motion thereby obtained, the greatest security for the correct and timely raising of the feed-foot.

The shuttle-supporting ring h^2 h^{2*} has been throughout this description referred to as a "divided" ring. The division is made across the center of the ring, or, in other words, the ring is composed of two separate parts h^2 h^{2*}, each of which is somewhat less than a semicircle, the two parts coming so near together in the rear as only to leave the gap h^3, herein-before described, for the passage of the thread, and being separated in front sufficiently to leave room for the operation of the needle. The two parts h^2 and h^{2*} are secured by screws s to the bottom of the pendent bracket h'. This division of the ring or its construction of two such separate pieces provides for the insertion of the shuttle, which is retained by a V-shaped groove h^{10} (see Fig. 5) formed around the interior of the ring, the shuttle being provided with a V-shaped surrounding projection to fit the said groove.

I claim—

1. In a sewing machine in which a rotary shuttle is arranged above the work support and the needle approaches the work from above said support, the combination with said work support, needle and shuttle, of a divided shuttle-supporting ring, the division of the said ring providing an opening for the operation of the needle and a second opening or gap for the passage of the thread in threading up the machine, substantially as herein described.

2. In a sewing machine in which a rotary shuttle is arranged above the work support and the needle approaches the work from above said support, the combination with the said needle and work support and a shuttle having in its bottom a curved slot h^5 and having in its side wall a gap h^4 communicating with said slot, of the divided shuttle-supporting ring h^2 h^{2*} having in it a radially arranged gap h^3 to correspond with the gap in the wall of the shuttle, and the pendent ring supporting bracket h' having in it the opening h^*, substantially as and for the purpose herein described.

3. The combination with the sliding bar k, a feed arm attached to said bar and a spring for producing pressure on said bar and arm, of a driving shaft d, a friction disk o and fixed bearings therefor, an adjustable connection between said friction disk and said bar k, and a rotating friction clip n carried by said driving shaft for producing the rotation of said friction disk o and the lifting of the said bar k and the feed arm; substantially as herein described.

4. The combination with the sliding bar k, a feed arm attached to said bar and a spring for producing pressure on said bar and arm, of a driving shaft d, a friction disk o and fixed bearings therefor, a connection between said friction disk and said bar k, a clamping lever m for clamping said bar k, a rotary friction clip n carried by said driving shaft d for producing the rotation of said friction disk o, and a cam d^* carried by said driving shaft d for producing the operation of said clamping lever; all substantially as herein set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHANN BERNHARD MARTIN SEGELHORST.

Witnesses:

ALVESTO S. HOGUE,

JEAN GRUND.