(No Model.) 4 Sheets—Sheet 1.

H. MOORE.

SHUTTLE DRIVING MECHANISM FOR SEWING MACHINES.

No. 554,393. Patented Feb. 11, 1896.

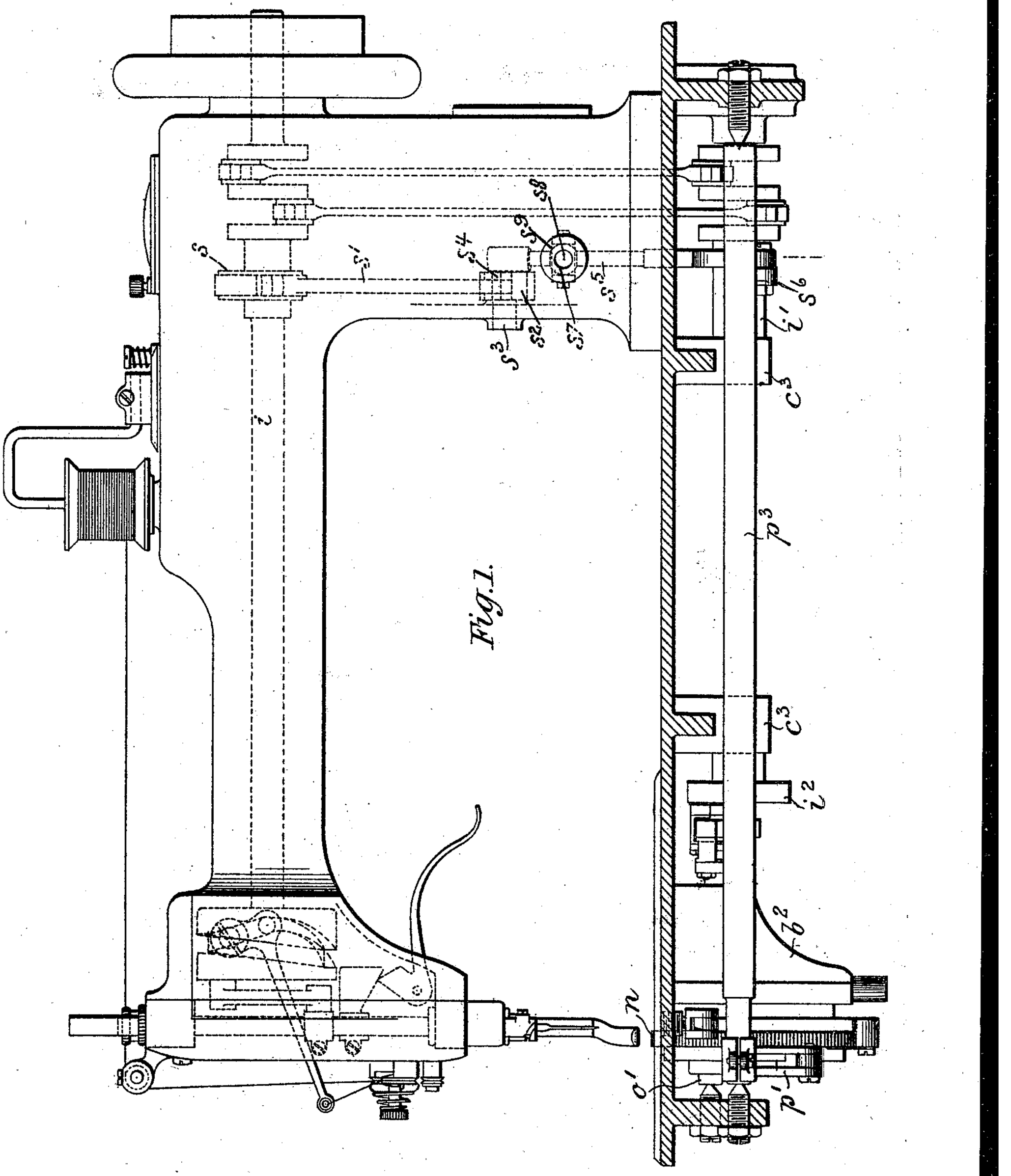

Fig. 1.

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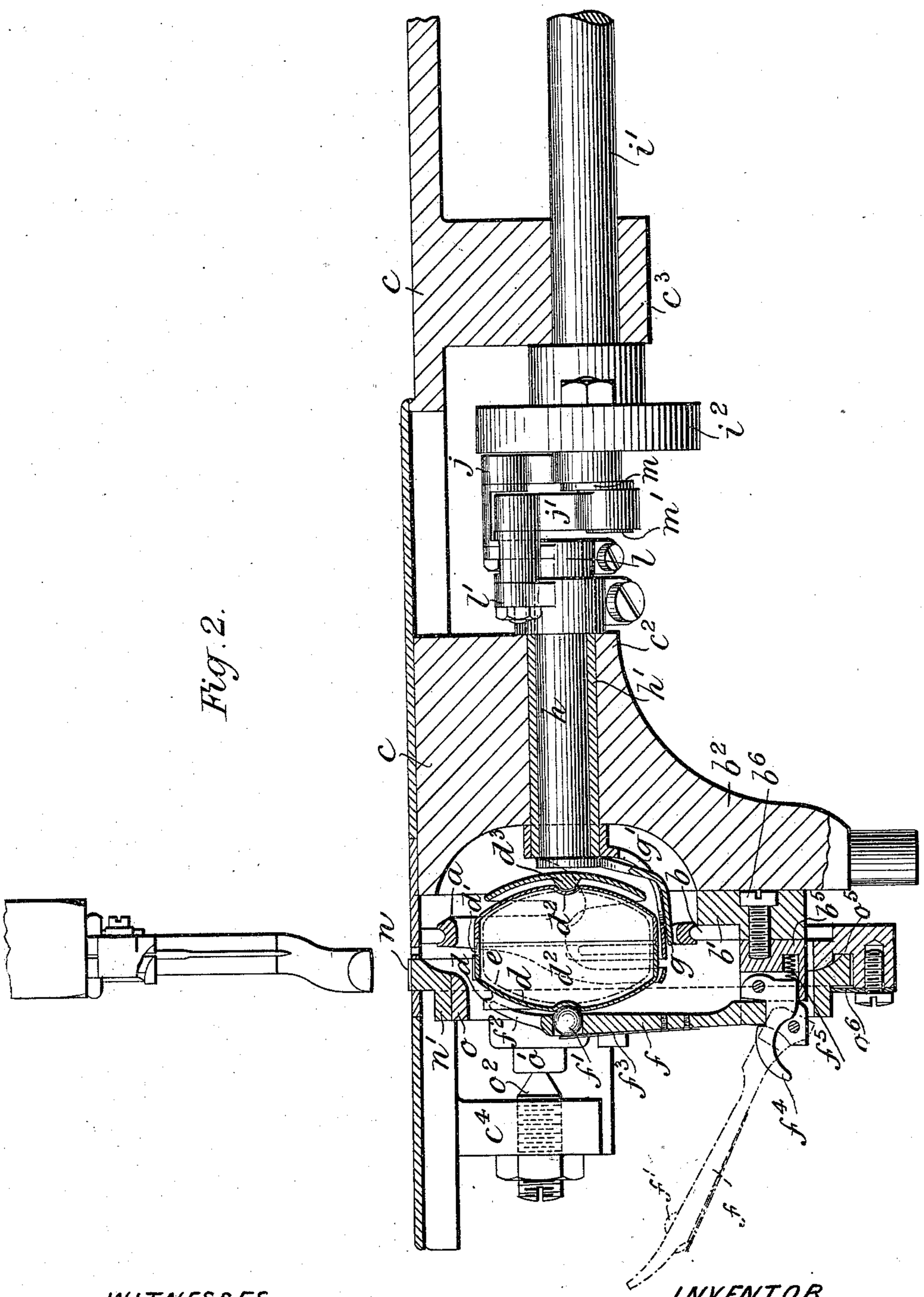

Fig. 2.

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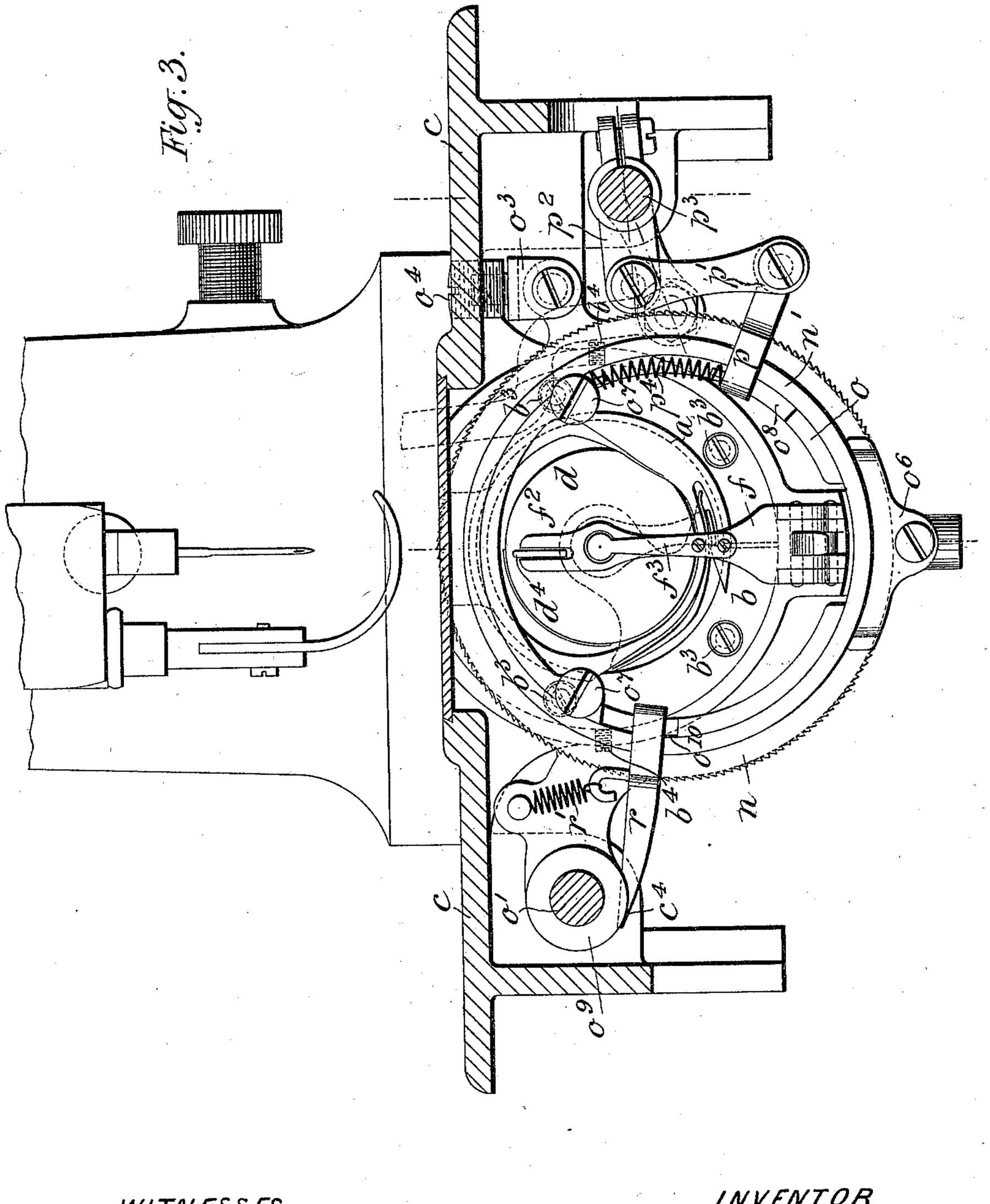
Fig. 3.



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SHUTTLE DRIVING MECHANISM FOR SEWING MACHINES.

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Fig 4

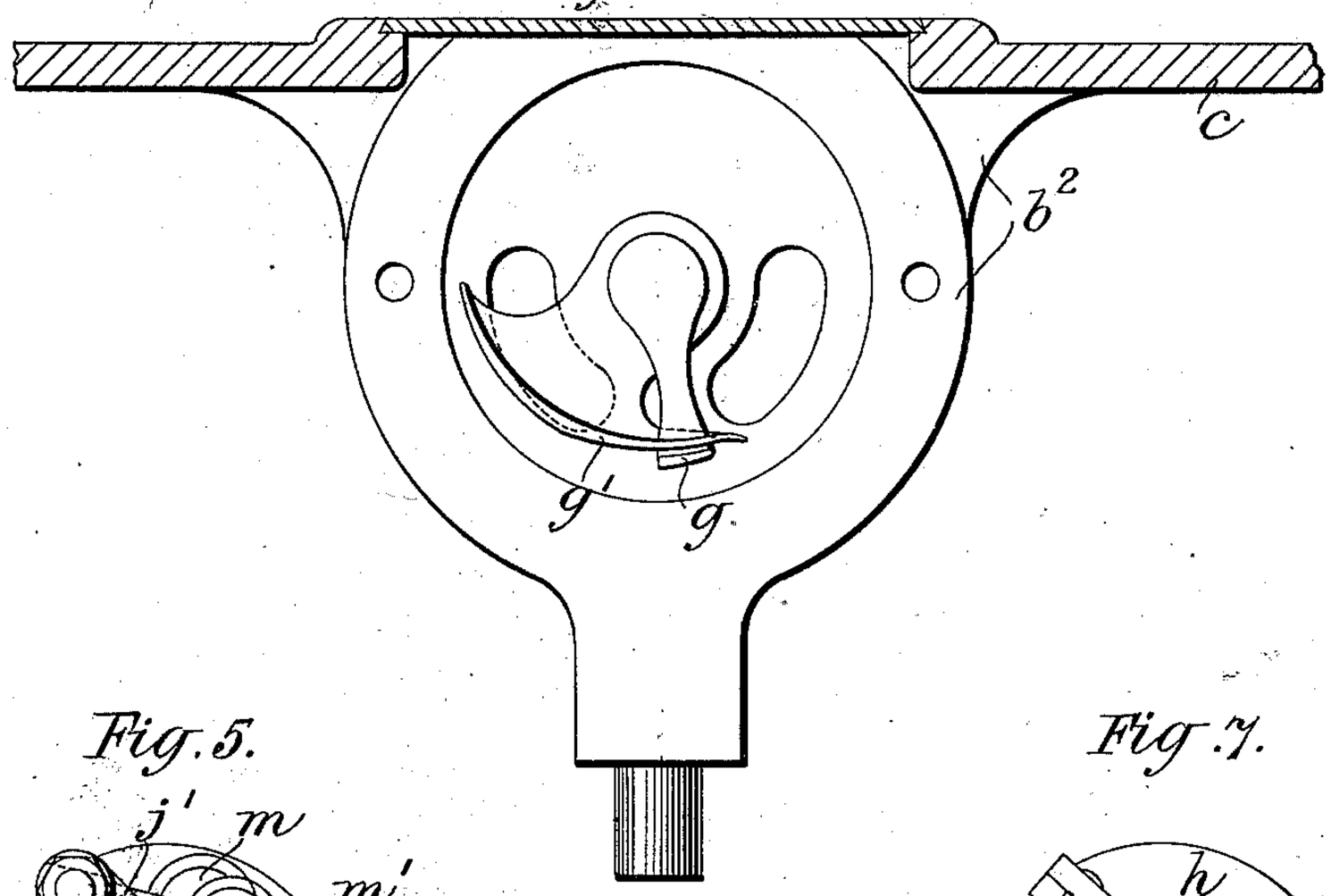


Fig. 5.

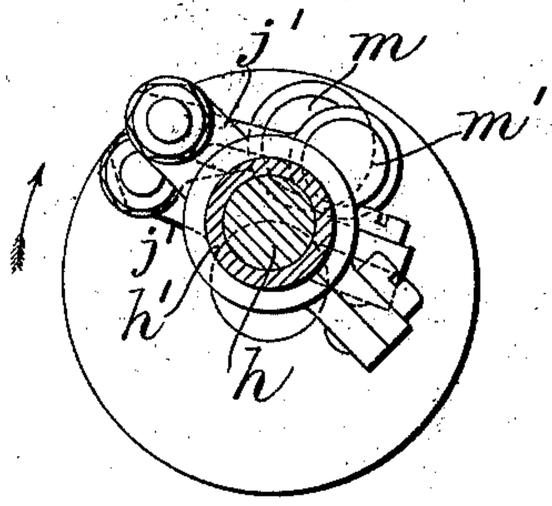


Fig. 7.

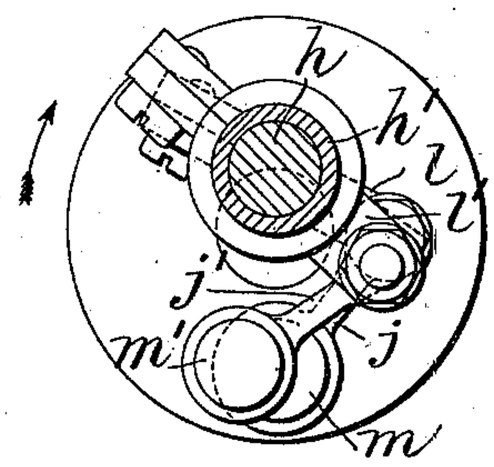


Fig. 6.

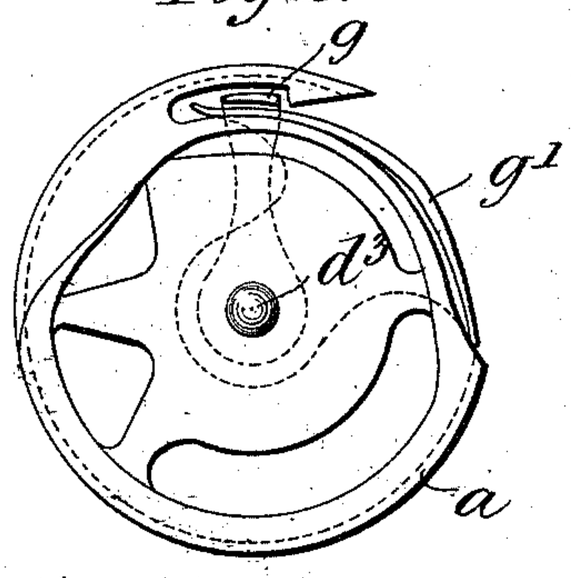
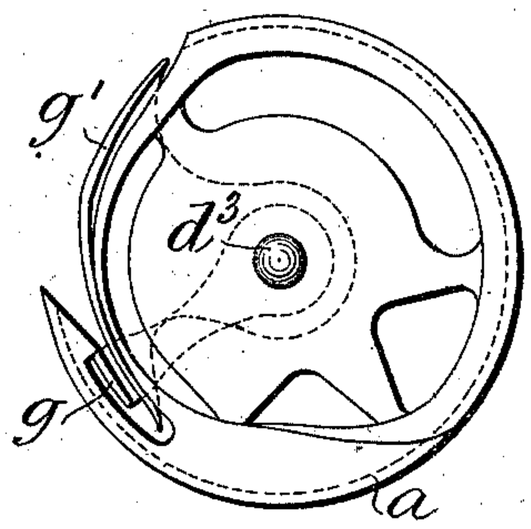


Fig. 8.



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UNITED STATES PATENT OFFICE.

HARREY MOORE, OF WELLINGBOROUGH, ENGLAND.

SHUTTLE-DRIVING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 554,393, dated February 11, 1896.

Application filed December 16, 1893. Serial No. 493,857. (No model.) Patented in England July 15, 1893, No. 13,782.

To all whom it may concern:

Be it known that I, HARREY MOORE, a subject of the Queen of Great Britain and Ireland, residing at Wellingborough, in the county of Northampton, England, have invented certain new and useful Improvements in Sewing-Machines, (for which I have obtained a patent in Great Britain, No. 13,782, bearing date July 15, 1893;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention for improvements in sewing-machines relates to lock-stitch machines in which the bobbin or thread-case is supported within a continuously-rotating hook or shuttle.

This invention consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a sectional elevation of a sewing-machine constructed according to this invention, and Fig. 2 is a part central vertical section showing the shuttle and its driving mechanism, and Fig. 3 is a part sectional front end elevation of the same. Fig. 4 is a front sectional elevation showing the fixed shuttle-bracket and the shuttle-drivers. Fig. 5 is a cross-section through the shuttle-driving mechanism, showing the parts in the positions they occupy when the shuttle-hook is taking the loop from the needle, the shuttle being driven at its heel; and Fig. 6 is a front elevation of the same. Figs. 7 and 8 are corresponding views to Figs. 5 and 6, showing the shuttle driven at its hook after the loop has passed the hook.

The rotary hook or shuttle a rotates in the bearing-pieces b, supported by a ring b', secured by screws to the bracket b^2, depending from the cloth-plate c. As shown, the race of the bearing-pieces b is ∩ shape in cross-section, and a corresponding recess is formed in the periphery of the rotary shuttle. The bearing-pieces b are secured to the ring b' by means of screws b^3 passing through elongated holes in the bearing-pieces so that the position of the center of rotation of the rotary shuttle can be adjusted laterally and so that any wear between the bearing-surfaces of the race and shuttle can be readily taken up. The bearing-pieces b are adjusted by means of the screws b^4 passing through the fixed ring b'. The ring b' can also be adjusted on the bracket b^2.

The thread-case d for the under thread is formed in two halves adapted to be secured together by catches and to contain a ball of twine e without reel or other support, the thread being drawn from the center of the ball and passing through a hole d' in the top of the case through a suitable tension device.

The thread-case is formed with two spherical recesses d^2 opposite to one another and by which it is suspended centrally within the shuttle. The shuttle is provided at its center with a spherical projection d^3 taking into the inner recess d^2 of the case d, and a ball f', loosely carried in a latch-lever f, takes into the other recess d^2. The latch-lever f is pivoted to a projection b^5, secured to the ring b' by a screw b^6. The upper end f^2 of the latch-lever f is forked to engage the projection d^4 on the thread-case d to hold it stationary while the shuttle rotates.

It will be readily seen that as the shuttle-hook carries the loop from the needle round to inclose the locking-thread, the thread easily passes the lever f holding the thread-case d stationary as the ball f' is free to rotate on the passage of the thread. The ball f' is inserted from the back of the lever and is retained in place by the spring f^3. The latch-lever f is retained in the position shown by the latch f^4 controlled by the spring f^5.

The shuttle a is driven by means of two drivers $g\,g'$ fixed on the concentric shafts $h\,h'$, the shaft h being mounted within the shaft h' and the shaft h' being mounted in a bearing c^2 depending from the cloth-plate c. The shafts $h\,h'$ are driven from the counter-shaft i', itself driven from the main shaft i, as clearly shown. The axis of the shafts $h\,h'$ is eccentric to that of the counter-shaft i' and the shaft h is driven by means of the link j and arm l from the part m of a double eccentric-stud fixed to a disk i^2 on the end of the counter-shaft i' and the shaft h' is driven by means of the link j' and arm l' from the part m' of the double eccentric-stud, the part m' being slightly in advance of the part m, so that the shuttle is driven alternately by the two drivers $g\,g'$, as will be presently described.

The eccentricity of the shaft i' causes the drivers to be driven at a variable speed so that when the hook is taking the thread from the needle the speed is slow. As the part m' is in advance of the part m of the eccentric-stud the speed of the drivers is also variable in relation to one another, the driver g' acting on the heel of the shuttle and driving the shuttle, as shown in Fig. 6, while the hook is taking the thread and until the loop has passed the driver g, and the driver g acting on the hook of the shuttle and taking up the driving, as shown in Fig. 8, when the loop passes the driver g' acting on the heel of the shuttle.

The feed plate or ring n is circular and works on a yoke o fixed at one side to a shaft o' supported by pivots o^2 screwing into lugs c^4 depending from the cloth-plate c. The other side of the yoke o is pivoted to a screwed lug o^3, on which screws a nut o^4, itself screwing into the cloth-plate c. The outer and inner threads of the nut o^4 are of different pitch, or one is right and the other left handed, so that by screwing or unscrewing the nut o^4 the height of the center of the sheave o is adjusted, and consequently the amount the feed plate or ring projects above the cloth-plate c. The feed plate or ring n is retained on the sheave by the flange o^5 of the sheave on one side and by the spring o^6 and headed screws o^7 secured on the other side of the sheave and can be removed therefrom by removing the spring o^6 and screws o^7.

The feed plate or ring n is rotated after each stitch has been made by means of a nipping-lever p having a square recess fitting loosely on the lip n' of the feed plate or ring. The lever p is pivoted at its outer end to the link p', itself pivoted to an arm p^2 on a counter-shaft p^3. A spring p^4 secured to the sheave o acts on the inner end of the lever p and tends to force this end backward—that is, in a direction opposite to the motion of the feed plate or ring. The sheave or yoke o is cut away at o^8 to allow of the motion of the nipping-lever. It will readily be seen that if the nipping-lever is moved forward by the link p' the lever p will be slightly twisted and will nip the lip n' of the feed plate or ring and force it forward to feed the plate, as shown in Fig. 3. On the return of the link p' the spring p^4 at the same time forces back the inner end of the lever p. Consequently it slides freely over the lip n'. The backward motion of the feed plate or ring is prevented by a nipping-lever r having a recess fitting loosely on the lip n' and having its outer end bearing against the boss o^9, by which the yoke o is fixed to the shaft o'. The lever r is pulled in the backward direction by the spring r'. The yoke o is suitably cut away at o^{10} to allow the lever r to act.

The counter-shaft p^3 is actuated from an eccentric s on the main shaft i, the eccentric-rod s' being jointed to one end of a lever s^2 pivoted at s^3 to the main frame of the machine. The other end of the lever s^2 is formed with a roller-race in which works a roller s^4 mounted on one end of a link s^5 connected to an arm s^6 on the counter-shaft p^3. A vibratory movement is thus given to the shaft p^3 and nipping-lever. In order to vary the amount of this movement the link s^5 slides freely in a sleeve s^7 pivoted to the head of a screw s^8 fitting in a nut s^9 screwing into the frame. The external and internal threads of the nut s^9 are right and left handed or of different pitch, so that the sleeve s^7 can be moved inward or outward to vary the distance of the roller s^4 from the fulcrum of the lever s^2 and consequently the motion of the counter-shaft p^3.

The feed mechanism herein shown and described but not claimed is described and claimed in a separate application, Serial No. 522,606, filed September 10, 1894.

What I claim is—

The combination, with a revoluble shuttle, and a thread-case suspended centrally within the shuttle; of the hollow shaft h' provided with the driver g' engaging the heel of the shuttle, and the arm l'; the shaft h journaled in the shaft h' and provided with the driver g, and the arm l; the counter-shaft i' provided with a disk; the double eccentric-stud $m\ m'$ projecting from the said disk; and the links j and j' operatively connecting the said stud with the said arms l and l' respectively, whereby the shuttle is driven with variable speed, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

HARREY MOORE.

Witnesses:

ALBERT JONES,

THOMAS LAKE.