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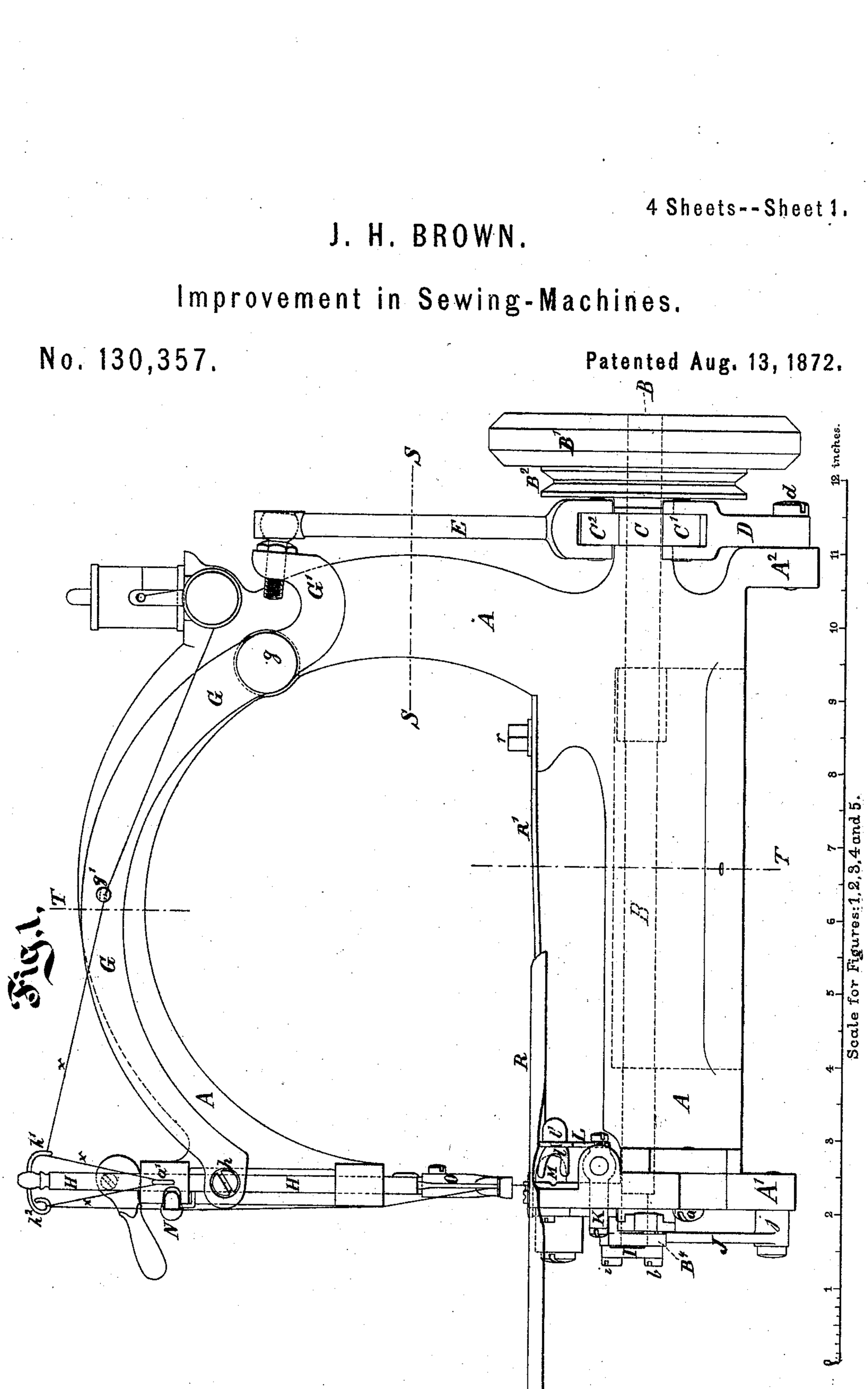
J. H. BROWN.

Improvement in Sewing-Machines.

No. 130,357. Patented Aug. 13, 1872.



Witnesses,

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Campbell & Livings

Inventor,

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by his attorney
P. S. Stetson

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J. H. BROWN.

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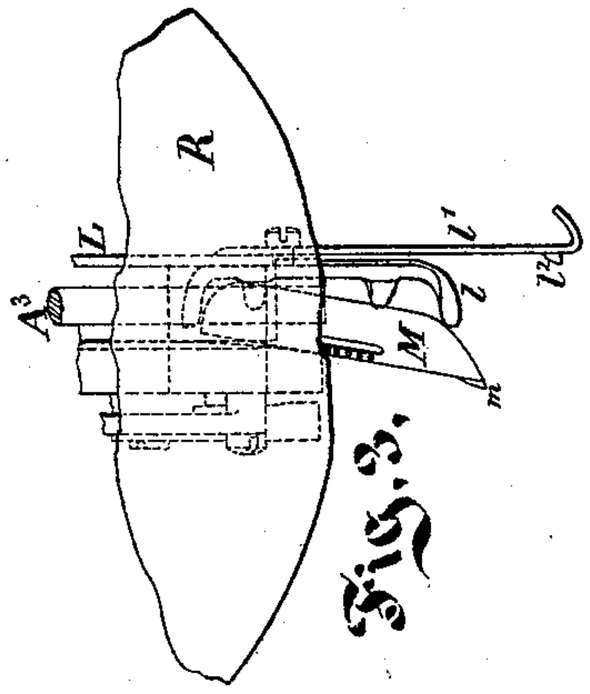

Fig. 3.

Fig. 2.

Fig. 2ª

Fig. 2ᵇ

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4 Sheets--Sheet 3.

J. H. BROWN.

Improvement in Sewing-Machines.

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Fig. 2.

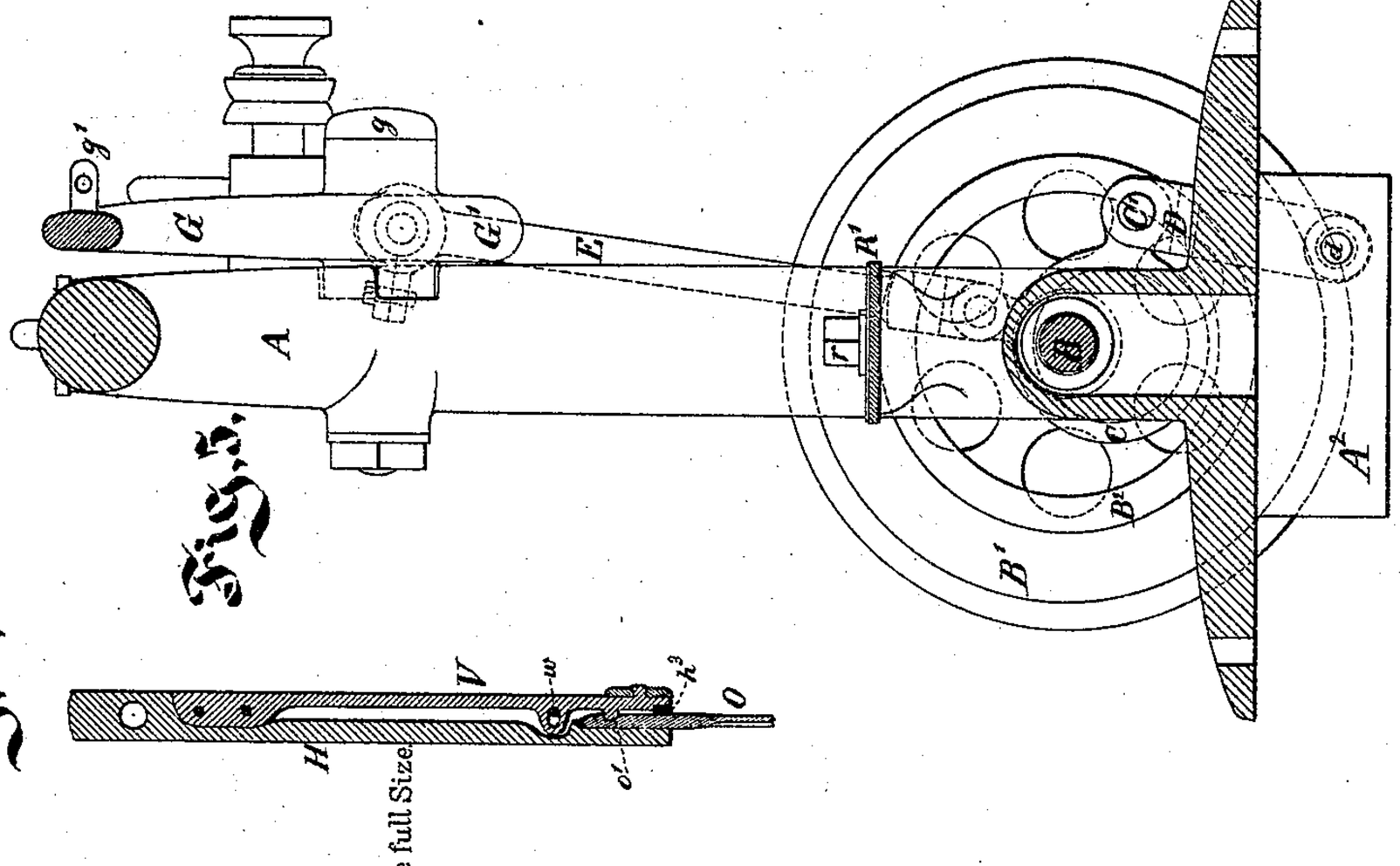


Fig. 1.

Scale full Size.

Fig. 6.

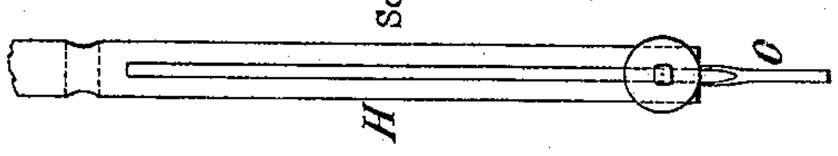


Fig. 4.

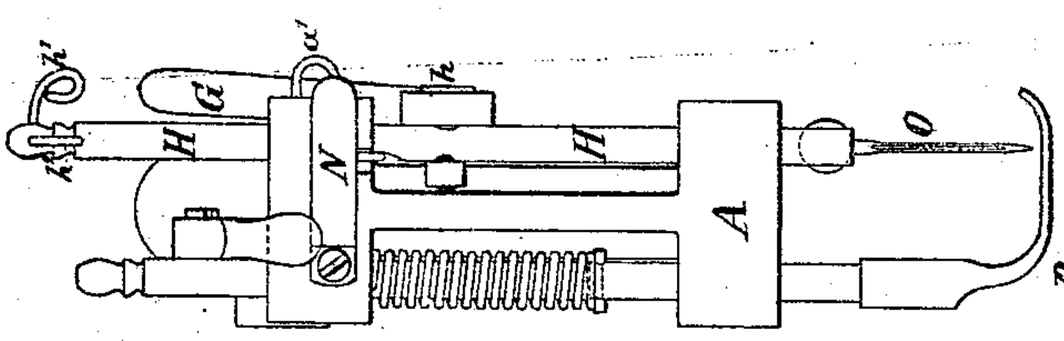
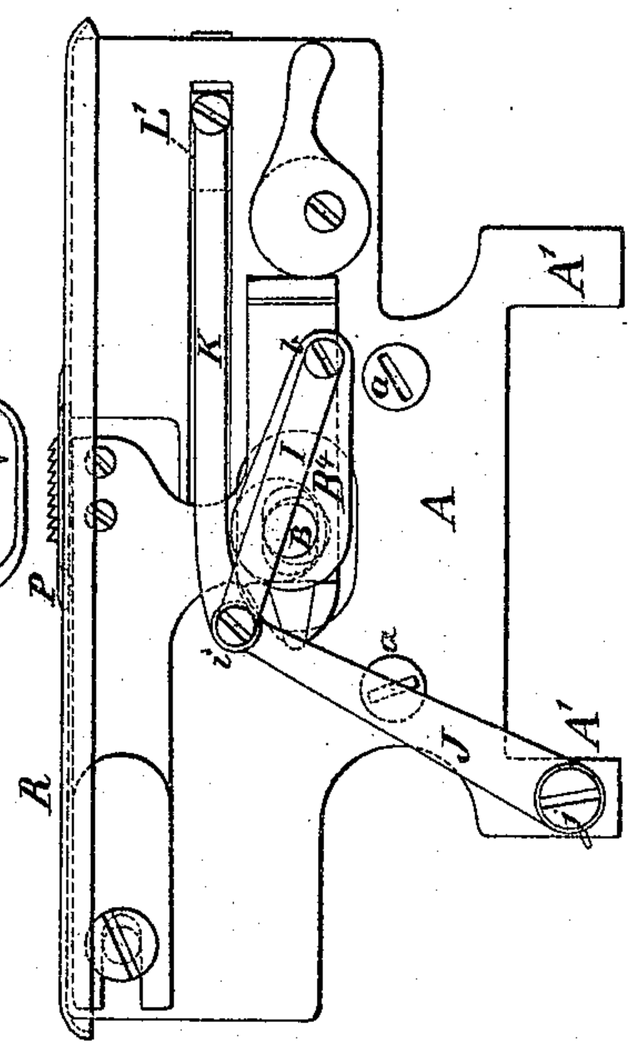


Fig. 3.



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4 Sheets--Sheet 4.

J. H. BROWN.

Improvement in Sewing-Machines.

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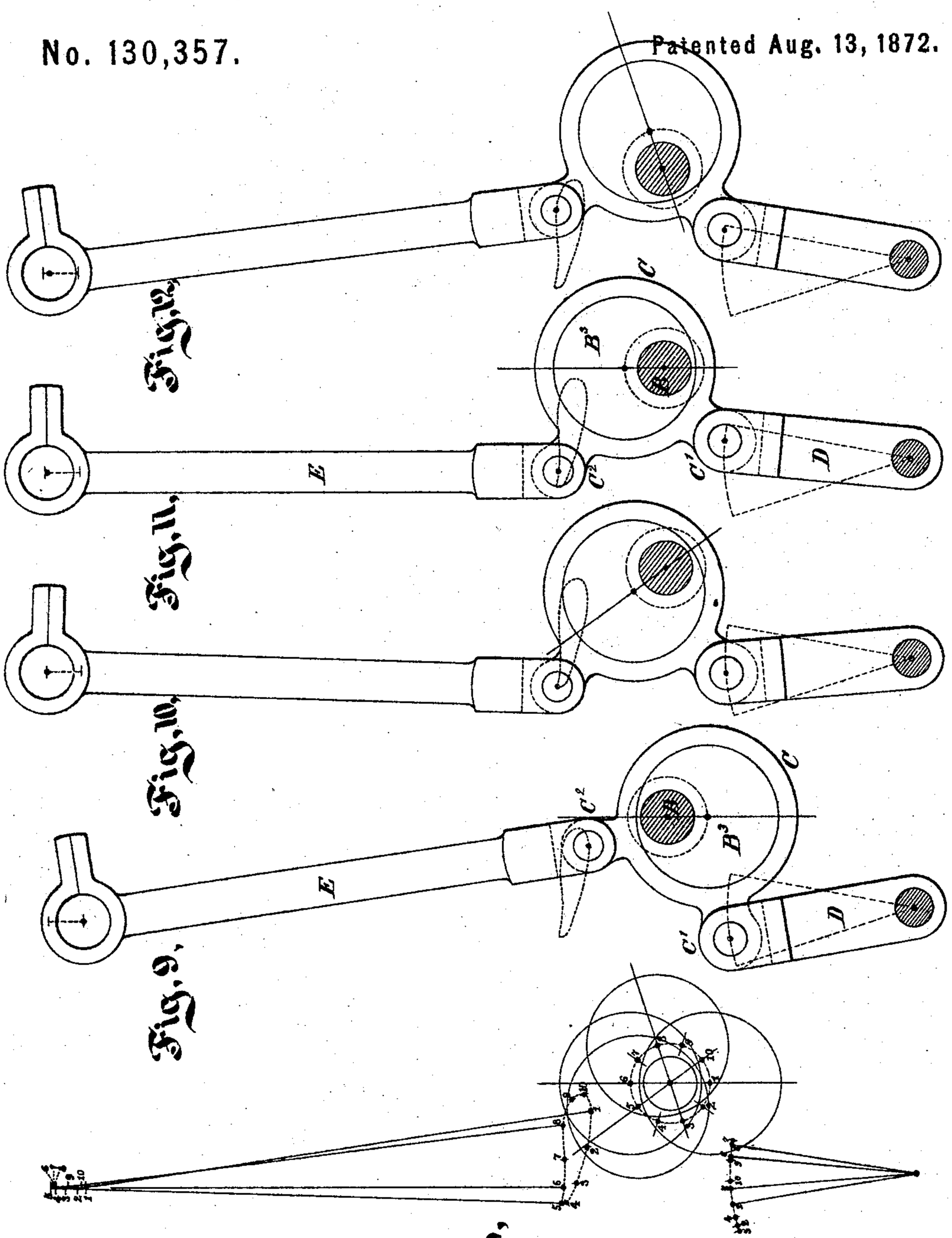

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UNITED STATES PATENT OFFICE.

JOHN H. BROWN, OF NEW YORK, ASSIGNOR TO HIMSELF, THOMAS E. GAYNOR, AND ALFRED P. REYNOLDS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **130,357**, dated August 13, 1872; antedated August 9, 1872.

Specification of an Improvement in Sewing-Machines, invented by JOHN H. BROWN, of New York city, in the State of New York.

The invention relates to the construction and arrangement of the cloth-plate, the means for inducing the proper motion of the needle, means for facilitating the removal and introduction of the shuttle to the carrier, and the means for securing and releasing the needle.

The following is a description of what I consider the best means of carrying out the invention. The accompanying drawing forms a part of this specification.

Figure 1 is a general side elevation with the parts in position for working. Fig. 2 is a plan view of the lower portion of the machine with the cloth-plate partially removed or swung to one side. This figure also shows a horizontal section through the rigid framing and through the link which operates the needle-arm. The section is on the line S S in Fig. 1. Fig. 3 is a plan view of a portion with the cloth-plate in position for working: It represents the shuttle in the act of being introduced to or removed from the shuttle-carrier. Fig. 4 is a front view of the principal parts in the front portion of the machine. Fig. 5 is a vertical section on the line T T in Fig. 1. Figs. 6 and 7 represent a portion of the needle-bar and needle upon a larger scale—Fig. 6 is an elevation, and Fig. 7 a central vertical section at right angles thereto.

The remaining figures illustrate the peculiar positions and relations of the parts which give motion to the needle-lever or needle-arm.

Fig. 8 is an outline diagram, showing many positions of the parts in a single view. It indicates ten equidistant positions of the centers of the eccentric, and supposes a complete revolution of the main shaft to be divided into ten equal parts. The several positions successively occupied by the center of the eccentric are marked from 1 to 10, and the corresponding positions of the ears or link-pins on the eccentric-strap which connect the one to the idle-link below, and the other to the link which gives motion to the needle-lever above, are marked with corresponding numbers. Fig. 9 is a full drawing, showing the position of these parts—to wit, the eccentric, the eccentric-strap, and the links pivoted thereto—when the needle is in its highest position. Fig. 10 shows the position of these parts when, by nearly a half rotation of the shaft, the needle has descended to its lowest position. Fig. 11 shows the position of these parts when, by the further rotation of the main shaft, the needle has ascended a little and then stopped. The mechanism provides for a considerable delay of the needle in this position to allow the shuttle time to pass through the loop of the thread. I can, by varying the proportions of the parts a little, make it descend again during this delay, but I do not consider it generally necessary. Fig. 12 shows the position of the parts at the end of this delaying period.

It will be seen that a straight line drawn through the center of the shaft and the center of the eccentric in all these last-described figures indicates plainly to the eye what part of a revolution is performed in changing from one position to another. During the "delay" in the ascending motion of the needle nearly a quarter of a complete revolution is performed. The long pear-shaped dotted figure, connected with the lower end of the needle-bar link, shows the motion of this part. It will be understood that the lateral motion, although greater than the vertical, is almost inappreciable in moving the needle. The vertical part of the motion is that which is effective.

Similar letters of reference indicate corresponding parts in all the figures.

The drawing represents the novel parts with so much of the ordinary parts as is necessary to understand their relation thereto. Parts not represented—the supporting-table, driving-gear, &c.—may be made in any ordinary or suitable manner.

A is a fixed frame-work, of cast-iron. It is bolted or otherwise firmly fastened on a supporting-table, not represented, the table being cut out at proper points to allow the depressions A^1 A^2 at the front and back end of the frame-work A to be sunk therein. These arms or depressions, extending below the upper surface of the table, afford bearings for links at a lower level than would be otherwise available. B is the main shaft, and is, with the rigidly-attached parts B^1 B^2, &c., the only rotating member of the machine proper. It is mounted in a recess, cored, or other

wise produced in the main framing A, and is supported by bearings at each end, as will be readily understood. The shaft extends out or overhangs at each end. The back end carries a fly-wheel, B^1, one or more pulleys, B^2, and an eccentric, B^3. These parts, B^1 B^2 B^3, may, by preference, be cast together and mounted on the shaft B by means of a single set-screw, so that their position may be adjusted at will. C is a stout eccentric-strap, preferably made in one piece, sawed open on one side, with a clamp-screw to bring the parts together in opposition to the elasticity, so as to embrace the eccentric with just sufficient tightness. It is formed with two stout lugs or ears, which receive link-pins connecting each ear to a stout link. I have marked the lower ear and link-pin C^1. It connects to a link, D, which turns at its lower end upon a stout pin, *d*, fixed in the part A^2 of the fixed frame. I have marked the upper ear and link-pin C^2. It connects to a link, E, which gives motion to the needle-lever G, being connected by a ball-joint at the extremity G′ of the short arm thereof. The needle lever or arm G turns upon a fixed center, *g*, and may take hold of the needle-bar H by a pin, *h*, on its side, which, by preference, has a spherical bearing, and provides for the slight sweep of the needle-lever by causing the needle-bar H to partially turn or twist around at each descent. It will be understood that a round belt from a foot-wheel below, or from any suitable power, runs on the pulley B^2 and turns the shaft B and its connections with a uniformly rapid motion. The eccentric B^3 with its strap C, ears C^1 C^2, and links D and E, give the proper needle-motion with slight friction and wear, and with much less than the ordinary amount of noise. The front end of the shaft B carries a crank, B^4, the pin *b* of which describes a comparatively large circle; for the common-sized family-machines this may be one and one-quarter inch radius. The link I connects from this crank-pin *b* to the pin *i* on the end of an idle-lever, J, which is pivoted to the depression A^2 of the frame-work by the stout pin *j*. A link, K, connects the extremity of the lever J to the shuttle-carrier L, by means of a pin at each end of the link, as represented; and the result is a correspondingly unequal delay at the ends of the motion of the shuttle. The shuttle M is held, in a cradle formed in the shuttle-carrier L, by suitable prongs, as represented. This cradle is marked *l*, and may be of any ordinary or suitable form and arrangement, except that it is adapted to slide longitudinally in the shuttle-carrier L, and when in its proper position for use is locked by a spring-catch, so that it reciprocates with the shuttle-carrier in the ordinary manner. The spring of this spring-catch is marked l^1, and the catch itself is marked l^2. The spring and catch l^1 and l^2 are held firmly to the body of the cradle by a screw, l^3, and steady-pin l^4. The cradle *l* and its attachments are guided in the long horizontal slot represented in the shuttle-carrier L by this screw l^3 and steady-pin l^4, and also by a projection formed on the cradle *l*, which extends the whole length of the cradle and stands in the slot, as shown in Fig. 3. In the ordinary use of the shuttle the cradle and its connections perform as if fixed to and forming a part of the shuttle-carrier L; but when, for any reason, it is desired to remove the shuttle for changing the bobbin or for any other reason, it is not necessary to dismantle the machine, or even to remove the work from the top. Perfect access to the shuttle is obtained by simply acting with the thumb upon the spring l^1 and pressing it latterally sufficiently to disengage the catch l^2, and then drawing out the entire shuttle-carrier and its connections as far as they will come. This movement brings the shuttle-carrier into the position shown in Fig. 3, when the shuttle may be readily disengaged and removed. Fig. 3 shows the shuttle half removed from the shuttle-carrier. On simply pushing back the shuttle-carrier, in which the shuttle is again introduced, it locks itself in position in the shuttle-carrier, and all is again ready for work.

I have represented the feed as an ordinary four-motion feed, governed by a cam-lever, and operated up and down by a small eccentric, represented in dotted lines in Fig. 4, formed in the proper position on the main shaft B. The forward and backward motion of the feed is effected by means of a cam or eccentric, B^5, on the boss or hub of the crank B^4. This acts on the lever which carries the feed and drives it backward with a positive motion, while the forward motion is induced by a concealed spring, as usual.

My needle O has a shank, which is flattened on one side and fits in a hole of corresponding D-form, so that it can be introduced only in the right position. The upper end of the shank is beveled, and a notch, *o*′, is formed in the flat side at the level represented, which engages a spring-catch, V, provided in the needle-bar. The spring-catch V may be drawn aside by the action of the thumb to allow the needle to be withdrawn. The construction of all these parts is shown pretty clearly in Figs. 6 and 7. The lower end of the spring-catch V matches to the cross-bar h^3, forms one side of the D-shaped hole referred to. A pin, *w*, passed through the needle-bar and standing in a slot in the spring-catch V, as represented, allows the spring-catch to yield to a proper extent to admit the needle, while guarding it against ever moving too far, so as to break or permanently set the spring. The bevel at the upper end of the needle allows it to displace the spring-catch by a simple upward thrust in introducing the needle. The upper end of the needle abuts against a fixed bearing in the needle-bar, and in finishing the needles they are carefully gaged, so as to just tightly fill the space and leave no slack and allow no rattling.

A common mode of constructing the upper

surface on which the work lies is to have a small portion of the surface immediately around the feed in a separate piece from the main upper surface or cloth-plate. I have adopted that construction, and have marked the inner portion, sometimes termed the needle-plate, by the letter P, and the outer and main surface to support the work by the letter R. The needle-plate may be detached, when required, by removing the screws represented, which hold it firmly upon the fixed frame-work and make it in effect a part of the same. But this is rarely if ever necessary in practice. It is much more frequently necessary to remove the main body R exterior thereto, and which I will term the cloth-plate. I have provided for removing this and replacing it with extraordinary facility. The cloth-plate R is formed with a flat elastic arm, R′, extending backward therefrom, and turns upon a pivot-screw, *r*, which holds it, with liberty to turn upon a step provided therefor on the framing. The arm R′ is of tempered steel, and exerts a considerable force, pressing downward on the cloth-plate R, which is cut out in the center so as to exactly match around the needle-plate P and make a close fit thereto. When it is desired to remove the cloth-plate to obtain access to the machinery below it is simply necessary to turn the shaft B in the position to raise the needle to the highest point, and, of course, to elevate the presser-foot by the ordinary means, and then, applying the hand to the outer edge of the cloth-plate R, to raise it bodily and swing it around on the pivot-screw *r*. The arm R′ may be No. 14, Birmingham gage, and about an inch and a quarter wide, with a rounded end. I find no difficulty in giving this such a strength as will hold the cloth-plate firmly down in its proper position for use, and also allow, by its elasticity, for the lifting of the cloth-plate to swing around and remove and replace it when necessary. To remove and replace the cloth-plate when secured by screws requires a screw-driver and a considerable time, with a risk of the loss of the screws.

I claim as my invention—

1. The elastic cloth-plate R R, matching around the needle-plate P, so as to be removed and replaced by lifting and swinging, as specified.

2. I claim the horizontal driving-shaft B carrying the feed-cam B^5 on its forward portion, and connected with and operating the shuttle-carrier by means substantially as described, when also provided with the eccentric B^3 operating the eccentric strap C, having ears C^1 C^2, the link D connecting ear C^1 to the fixed framing, and the link E connecting ear C^2 to the needle-operating means G, all constructed, combined, and arranged to operate together substantially as herein set forth, and for the purposes specified.

3. The shuttle-carrier L with the adjustable cradle and locking device, arranged substantially as described, for conveniently drawing out, replacing, and securing the shuttle, as herein set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

JOHN H. BROWN.

Witnesses:

THOMAS D. STETSON,

CAMPBELL C. LIVINGS.