(No Model.) 5 Sheets—Sheet 1.

# J. McDERMOTT.

## FLOSSING MACHINE.

No. 386,839. Patented July 31, 1888.

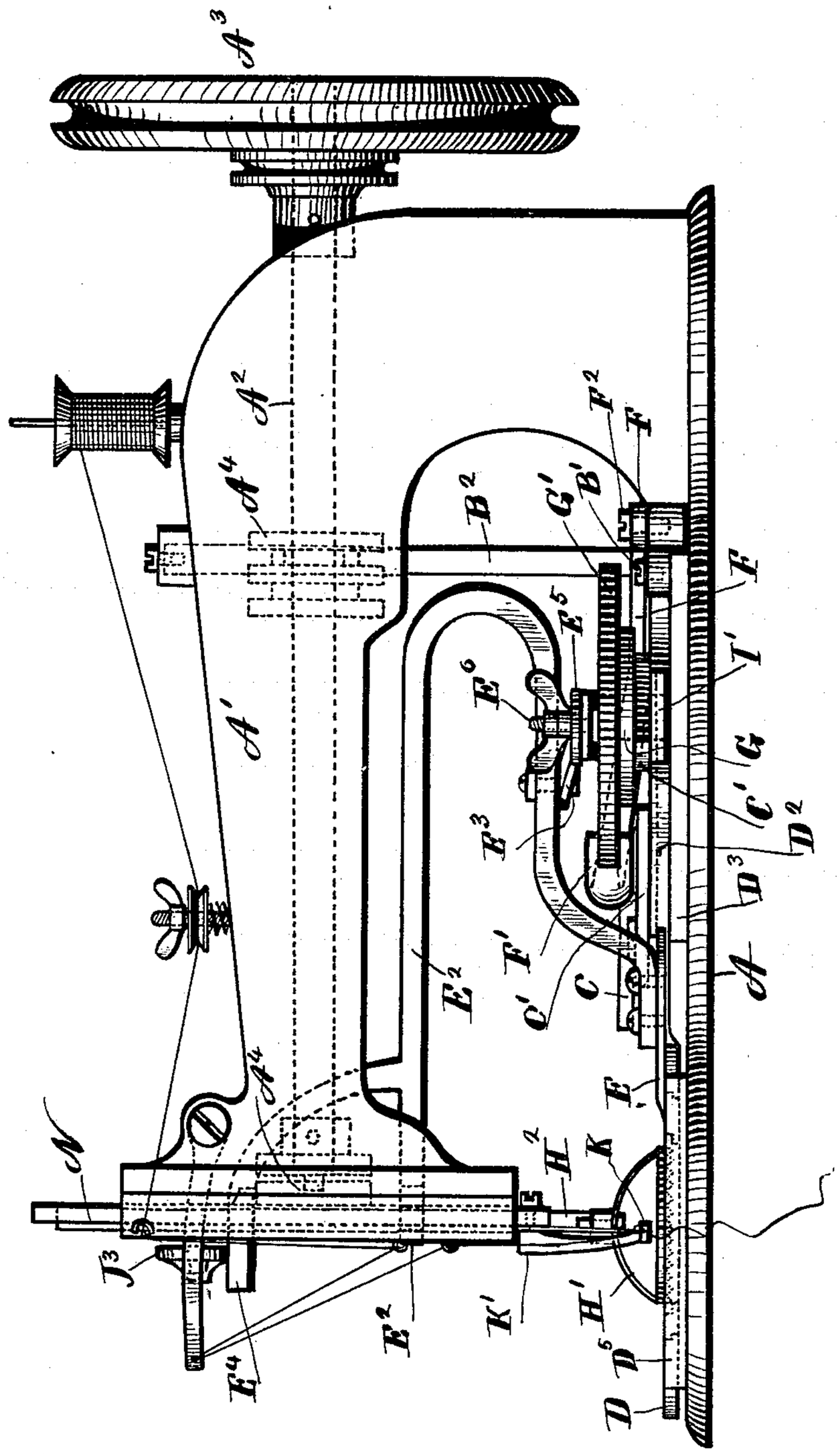


Fig. 1.

Witnesses:
Reinhardt Heller.
C. M. Hoeffler Jr.

Inventor.
John McDermott
by Geo. Mumford
Atty.

(No Model.) 5 Sheets—Sheet 2.

# J. McDERMOTT.

## FLOSSING MACHINE.

No. 386,839. Patented July 31, 1888.

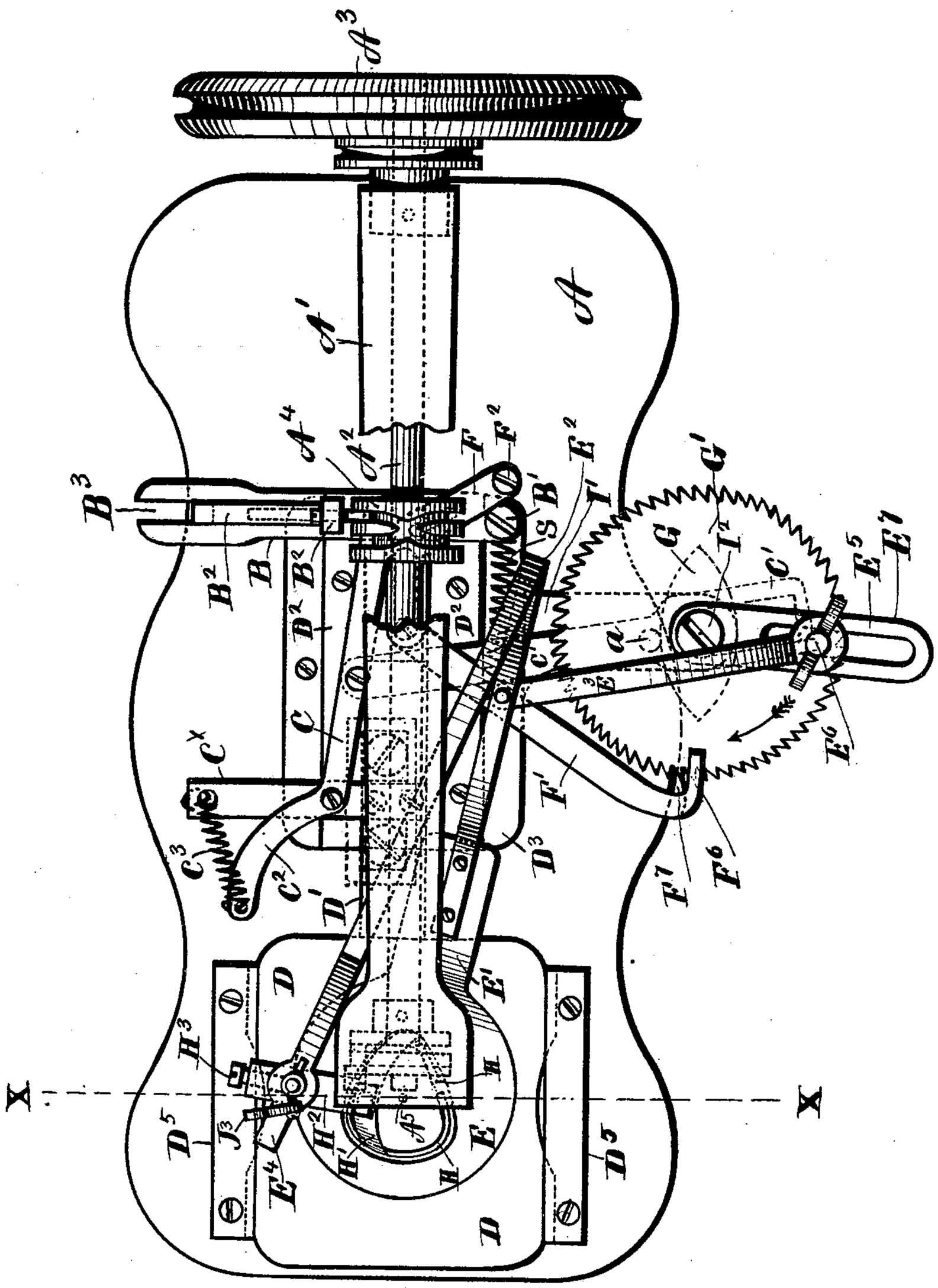


Fig. 2.

Witnesses:
Reinhardt Heller.
C. M. Wollister Jr

Inventor.
John McDermott
by Geo. Uhler
atty.

(No Model.) 5 Sheets—Sheet 3.

# J. McDERMOTT.

## FLOSSING MACHINE.

No. 386,839. Patented July 31, 1888.

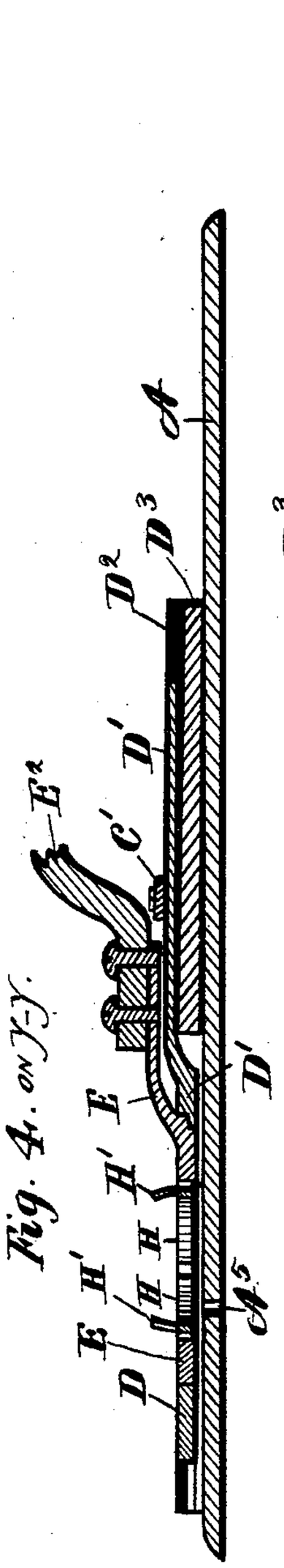


Fig. 4. on Y-Y.

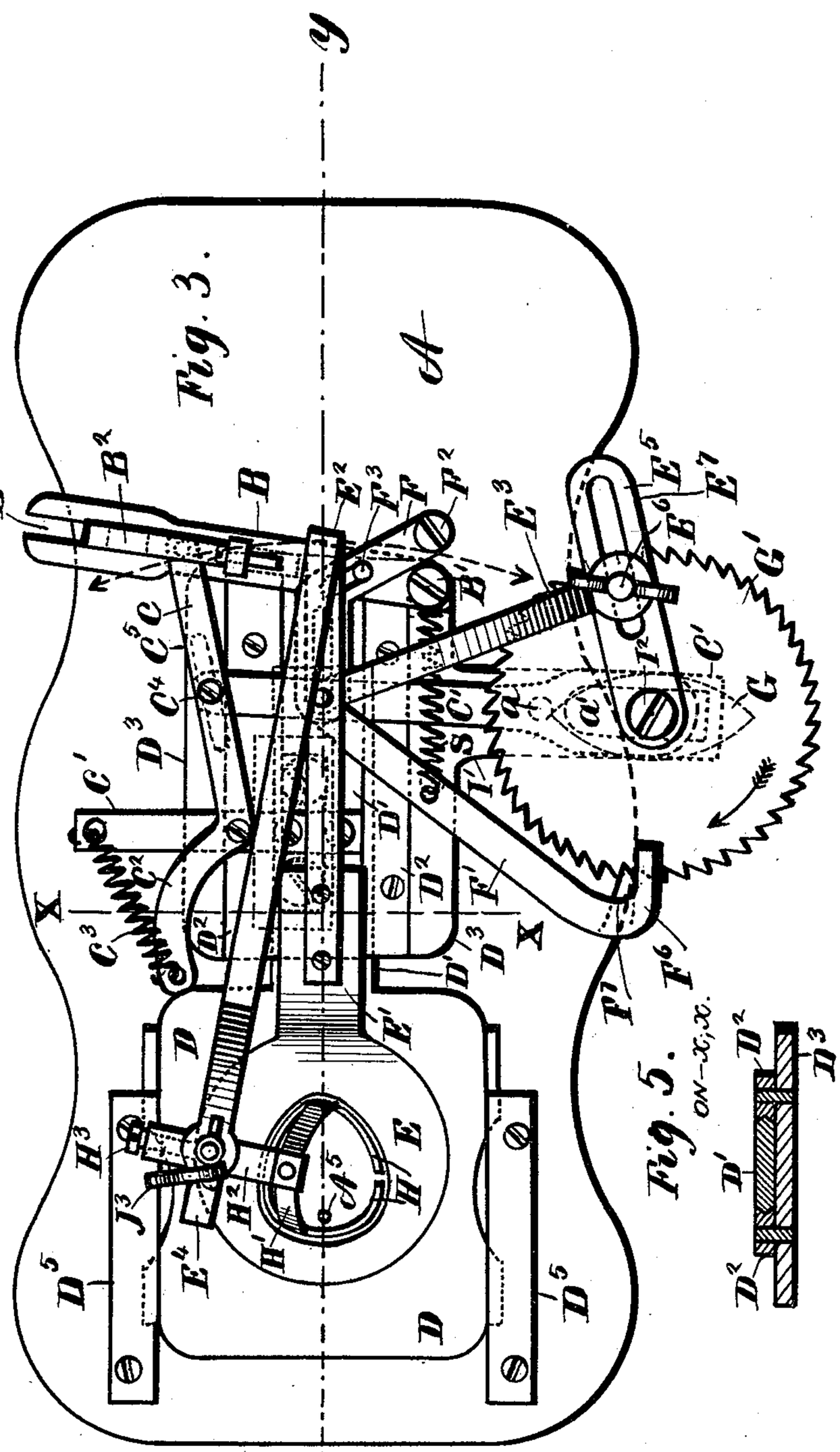


Fig. 3.



Fig. 5. on X-X.

Witnesses:
Reinhardt Heller.
C. F. Koester Jr.

Inventor:
John McDermott
by Geo. Dewosher
atty.

(No Model.) 5 Sheets—Sheet 4.

# J. McDERMOTT.

## FLOSSING MACHINE.

No. 386,839. Patented July 31, 1888.

*Fig. 6.*

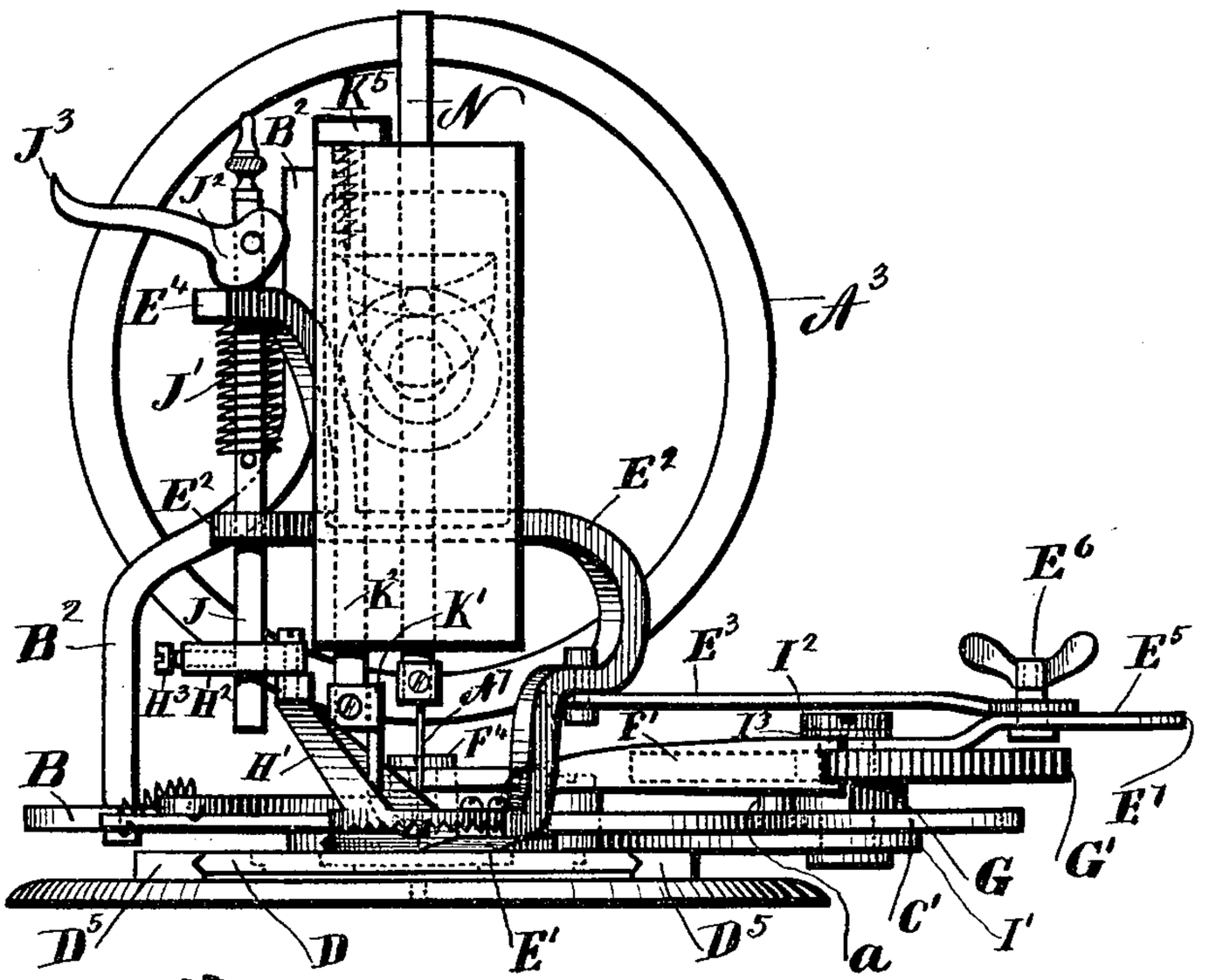



*Fig. 7.*

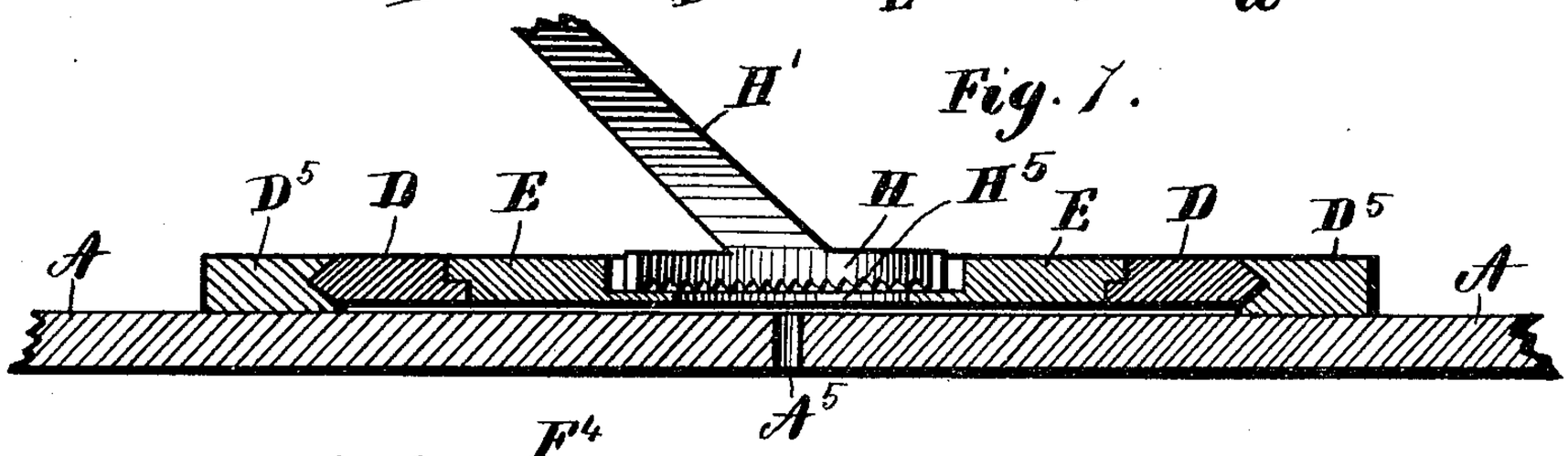



*Fig. 8.*

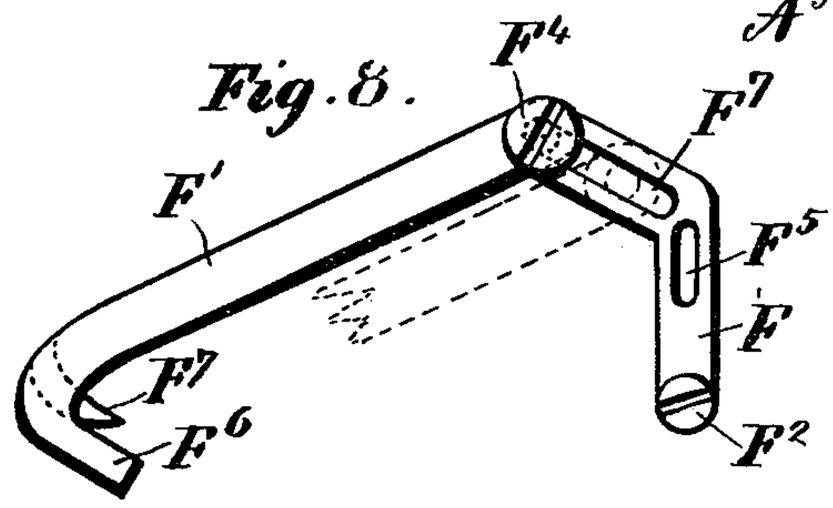
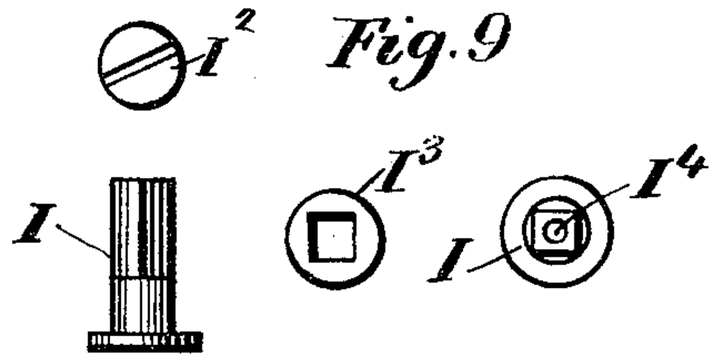



*Fig. 9*




*Witnesses:*
Reinhardt Heller.
C. M. Hollister Jr.

*Inventor:*
John McDermott
by Goepel & Goepel
atty.

(No Model.) 5 Sheets—Sheet 5.

# J. McDERMOTT.

## FLOSSING MACHINE.

No. 386,839. Patented July 31, 1888.

*Fig. 10.*

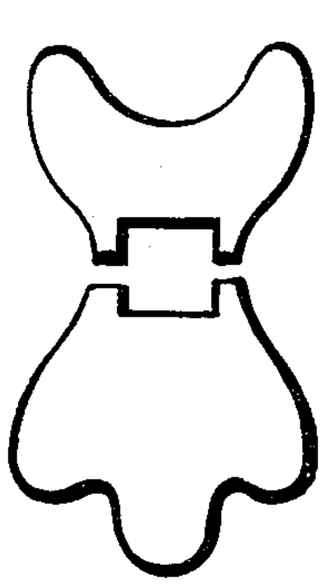


*Fig. 11.*

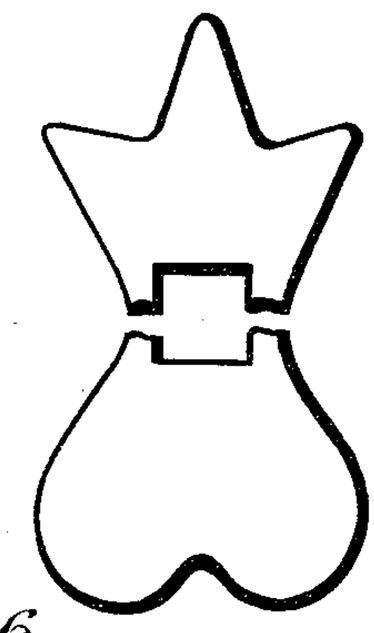


*Fig. 12.*

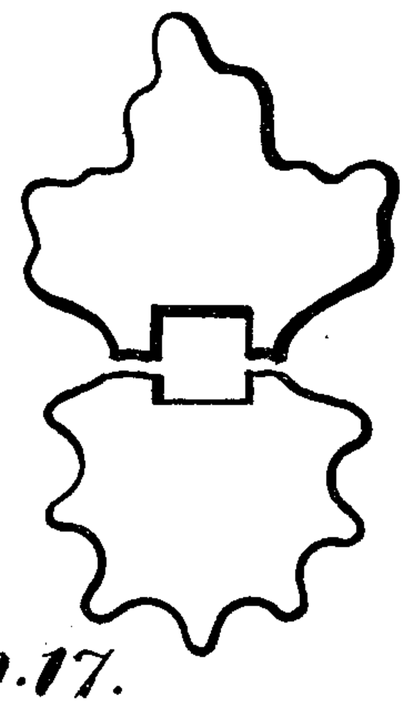


*Fig. 16.*

*Fig. 17.*

*Fig. 13.*

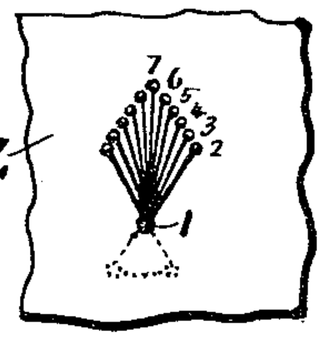



*Fig. 14.*

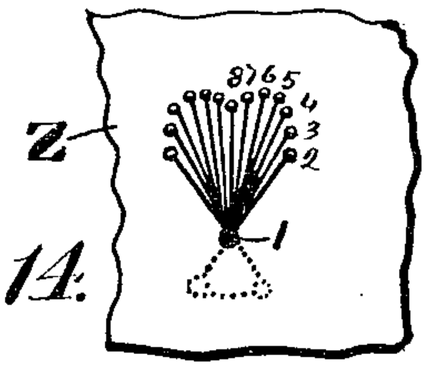
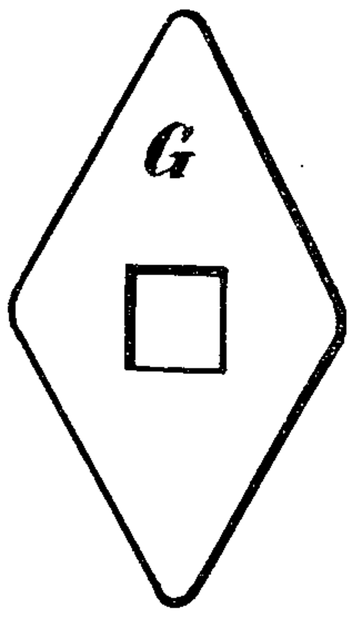
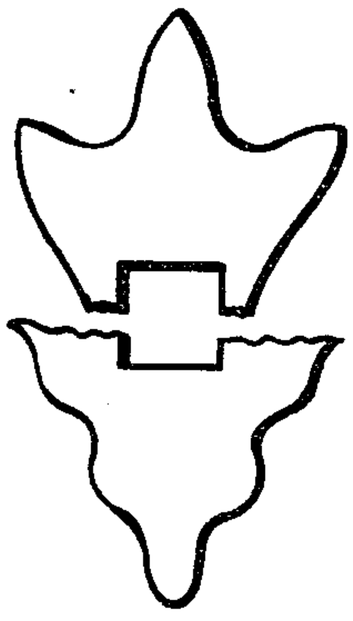
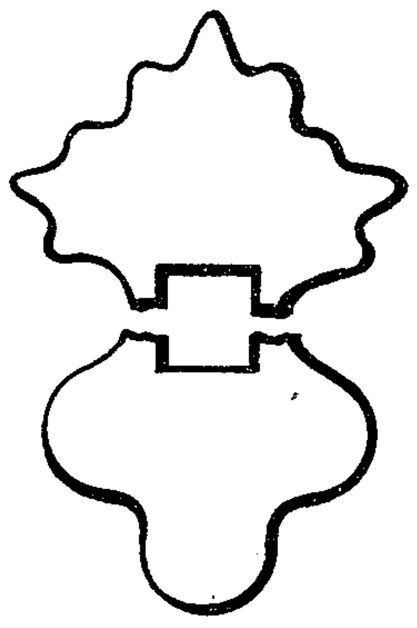



*Fig. 15.*





*Witnesses:*

*Reinhardt Heller.*

*C. M. Hoeusser Jr.*

*Inventor:*

*John McDermott*

*by Goodwin*

*atty.*

# UNITED STATES PATENT OFFICE.

JOHN McDERMOTT, OF TROY, NEW YORK, ASSIGNOR OF ONE-HALF TO THEODORE F. BARNUM, OF SAME PLACE.

## FLOSSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 386,839, dated July 31, 1888.

Application filed January 24, 1887. Serial No. 225,296. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN MCDERMOTT, a resident of the city of Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Flossing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

My invention relates to improvements in flossing-machines; and it consists of the novel construction and combination of parts hereinafter described, and pointed out in the claims.

It is customary in finishing various styles of under-garments, especially those designed for use by ladies, to ornament the same by inserting a few stitches of floss varying in length, the several stitches converging at one end and diverging at the other, whereby an ornamental fan-shaped figure of floss is formed upon the outer surface of the garment. The operation is called "flossing," and has heretofore been performed by hand with a common hand-needle.

The object of my invention, broadly stated, is to provide an ordinary sewing-machine with auxiliary mechanisms by which it is adapted to automatically insert in the garment flossing-stitches to produce said fan-shaped or other desired figures.

Figure 1 of the drawings is a side elevation of my improved device. Fig. 2 is a top plan view of same, with a portion of the bracket-arm broken away to show the driving-switch cam. Fig. 3 is a similar view with the arm entirely removed and the movable parts in a changed position. Fig. 4 is a longitudinal vertical section of some of the parts, taken on the broken line *y y* in Fig. 3. Fig. 5 is a transverse vertical section taken on broken line *x x* in Fig. 3. Fig. 6 is a front end elevation of the device. Fig. 7 is a vertical transverse section taken on broken line *x x* in Fig. 2. Fig. 8 is a plan view of the pawl which drives the cam and wheel G'. Fig. 9 is made up of a side elevation and plan view of the post which supports the cam G and wheel G' and plan views of the screw and washer which accompany the same. Figs. 10, 11, 12, 13, 14, and 15 represent modified forms of cam G. Figs. 16 and 17 represent modified forms of flossing-figures.

I have not shown all the sewing-machine parts, as they are well known and not essential to a full understanding of the operation of the auxiliary mechanisms.

The base-plate A is provided with the well-known bracket-arm A', which supports the driving-shaft $A^2$, provided with the driving-pulley $A^3$, and crank-pin $A^4$, (shown in dotted lines,) which operates the needle-bar N through the head N'. Secured to the top of the base-plate, on opposite sides of the needle-hole $A^5$, are two slideways, $D^5$, which support the slide-plate D vibratory therein. The slide-plate in turn supports the circular cloth-plate E rotary therein, and preferably countersunk as, shown in Fig. 8. The requisite movements of these plates will be better understood after an examination of Figs. 17 and 18, in which the numbered circles represent the needle-holes made in the piece of cloth or other fabric, Z, and the connecting-lines the stitches of floss or thread. To insert the stitch 1 to 2 the needle is first inserted at 1, then withdrawn and the fabric carried forward until the point at 2 comes under the needle, where it remains until the needle is inserted and withdrawn, when the fabric is carried back again and the needle inserted at 1, making the stitch of two threads from 1 to 2. The next stitch is to be inserted in a similar manner from 1 to 3, and the next from 1 to 4, and so on until all are inserted; but to insert the stitch from 1 to 3, not only must the fabric be carried a longer distance than required to insert the stitch 1 to 2, but it must be rotated to the right or in the direction of the hands of a watch in order to insert the needle at 3 instead of at 2. It is thus apparent that the fabric must be given a vibratory movement to and from the needle, and a rotary movement upon an axis in vertical line with the needle.

The vibratory movements should succeed

each upward thrust of the needle and vary in amplitude of vibration as required to produce the desired figure, while the rotary movements should be intermittant and coincident in time with the alternate vibratory movements.

I secure the fabric to the rotary cloth-plate E by means hereinafter explained, and secure the vibratory movements through the supporting slide-plate D, which is provided with a tongue, D′, adapted to slide in the slideways $D^2$, secured to the plate $D^3$. This tongue is provided with an arm, $C^6$, to which is pivoted one end of link C, the other end being secured to slide in a longitudinal slot in the lever B, pivoted at one end to the base-plate at B′.

The lever B is operated by lever $B^2$, pivoted upon the bracket-arm A′ and actuated by the switch-cam $A^4$, fixed upon the driving-shaft. The cam actuated lever is movable in the slot $B^3$ of the lever B, and is bent outward, as shown in Fig. 7, to reach near the end of lever B and permit of the free movement of arm $E^2$ thereunder as it swings to and fro. Acting through the connecting parts named, two revolutions of the switch-cam produce a complete vibration to and fro of the two plates D and E. The desired variation in amplitude of vibration is produced by means of the cam G, (shown by dotted lines in Figs. 2 and 3,) supported by a post, I, rotary in arm I′, projecting from the base-plate of the machine. The cam acts upon pin *a* in the bar $C^6$, pivoted upon the link C at $C^4$, to force the vibratory end of the link which slides in the slotted lever B in an outward direction away from the pivoted end of the latter, while the spring $C^3$ acts to force the link and bar back in an inward direction as the cam retreats from the pin *a*. The cam supporting post passes up through a slot in the bar, as shown by dotted lines in Figs. 2 and 3, and affords a slideway-guide for the bar, which slides to and fro thereon. The extreme outward movement of the bar and link is shown in Fig. 3, and the extreme inward movement in Fig. 2.

It will be readily understood that the amplitude of vibration of the cloth-plates is greatest when the outward movement of the bar and link is greatest, and varies with said movement. The movements of the cam are caused by means of the ratchet-wheel G′, supported by the same post which supports the cam and by the actuating-pawl F F′. The pawl is pivoted upon the base-plate at $F^2$, and is operated by a pin, $F^3$, secured to the lever B and projecting up through a slot, $F^5$, in the arm of the pawl, as shown. The pawl-arm is jointed at $F^4$, the section F′, which carries the wheel-engaging head $F^7$, being connected by spring S with a fixed support, as pivot B′, to keep the pawl-head in engagement with the ratchet-wheel. It is apparent, therefore, that each vibratory movement of the lever B toward the needle $A^7$ will cause the pawl-head to slip forward over the teeth of the ratchet-wheel, and each backward movement will produce a rotary movement of the ratchet-wheel. The ratchet-wheel and cam being fixed upon a common rotary post, the movements of the wheel, are imparted thereby to the cam. Every movement of the cam results in a movement of the bar C′ and link C to change the amplitude of vibration of the cloth-plates, as before explained, and consequently the length of the stitches. The degree of variation will depend upon the form given the periphery of the cam, which may be of any desired form, provided it is adapted to slide past the pin *a*.

I have shown a variety of forms in Figs. 11 to 16, both inclusive, wherein they are shown broken through the central part to represent eleven different forms when constructed with both ends alike. Only one end of the cam is required to produce a single figure like those shown in Figs. 17 and 18. When both ends of the cam are alike, the same figure will be continually repeated until another cam is substituted. When the opposite ends of the cam differ in form, the alternate figures only will be alike.

The cam can be easily removed from the supporting-post by removing the screw $I^2$, which is threaded to fit a correspondingly-threaded aperture, $I^4$, in the end of the post, and the washer $I^3$ and a cam of different form substituted in its place. The required rotary movement is given the cloth-plate E by means of the arm $E^5$, fixed upon the same post which supports the cam and ratchet wheel. Pivoted to this arm is the link $E^3$, which connects it with the curved arm $E^2$, secured to the rotary cloth plate. As the post I is rotated by the pawl and ratchet-wheel, and the cam and arm E are both fixed upon the post and partake of its movements, it is evident that a rotary movement will be given plate E coincident in time with the change in the amplitude of the vibratory movements of the cloth-plates. As the arm $E^5$ is revolved about its support, the arm $E^2$ is moved back and forth, its swinging end traveling on the curved broken arrow-line, (shown in Fig. 3,) one revolution of arm $E^5$ producing a complete vibration back and forth of the arm $E^2$. It is apparent that the ratchet-wheel is in effect a crank-wheel, the arm $E^5$ being the equivalent of a crank and the link $E^3$ the equivalent of a pitman.

When the parts are in the position shown in Fig. 3, which shows that portion of the cam's periphery most remote from the center of its support in action, and the arm $E^5$ about at right angles to its connecting-link $E^3$, they are in position to impart to plate E the greatest amplitude of vibration and the greatest angle of rotation in the intermittent rotary movements of the plate. Conversely, when in the position shown in Fig. 2, the amplitude of vibration and angle of rotation are the least. The angle of rotation can be varied by adjusting the position of link-pin $E^6$ in the slot $E^7$.

Moving it outward toward the revolving end of the arm increases the angle of rotation.

A single figure of floss is produced by a semi-revolution of the cam G, and the number of stitches in a given figure can be varied by changing the travel of the pawl to vary the distance traveled by the cam and arm $E^5$ at each angular movement of cam and arm, while the frequency of the vibratory and intermitting rotary movements remain constant. The change is easily accomplished by adjusting the pivot $F^4$ in different positions in the slot $F'$. The nearer its location to the pivot $F^2$ the less the travel of the pawl. The amplitude of vibration can also be varied by changing the point of adjustment of link-pin $C^4$ in a slot shown by dotted lines $C^5$ in link C.

The arm $E^2$ is provided with a bracket, $E^4$, the ends of both arm and bracket being in about the same vertical line and perforated to receive the slide-bar J, actuated by the spring J' and controlled by the cam $J^2$, pivoted upon the bar and provided with an operating-handle, $J^3$. The bar is provided with a cross-bar, $H^2$, vertically adjustable thereon by set-screw $H^3$.

One end of the cross-bar supports the cloth-holder H H, composed of two metallic sections provided on their lower sides or edges with cloth-engaging teeth and connected with the cross-bar by the spring-arms H'. By pressing down upon the cam-handle $J^3$ the cloth-holder is lifted sufficiently to permit of easily inserting the fabric between it and the cloth-plate, and when the fabric has been properly adjusted the cam handle is lifted, whereupon the spring J' forces the sections H H down firmly upon the cloth-plate, whereby the fabric is made to partake of the vibratory movements of the plate.

By having the cloth-holder composed of sections H H, connected with the slide or cross bar by the inclined spring-arms, the force of spring J' is constantly exerted to spread the sections H H, which stretches the fabric and holds it in an even and smooth position to receive the stitches which produce the flossing-figures.

The aperture $H^5$ in the central portion of the rotary cloth-plate should be of sufficient size to receive the needle in every position assumed by the plate when vibrated.

An auxiliary presser-foot, K, secured to the presser bar or head by the leg K', may be employed when desired.

When desired, the parts can be so adjusted that the central part of the rotary cloth-plate, through which the axis of rotation passes, will travel past the needle from one side to the opposite, in which case the stitches will cross each other and diverge on opposite sides of the crossing-point, as shown in Figs. 17 and 18 by the dotted and solid lines.

The arm $C^6$ may be made adjustable longitudinally of the tongue D', as shown by dotted lines in Fig. 3, which gives the vibratory movement a different starting-point relatively to the needle.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a sewing-machine, a vibratory cloth-plate and plate-actuating lever connected by a link one end of which is movably secured in a slideway extending longitudinally of said lever, and means for operating said lever, in combination with a cam-operated arm pivoted to said link for the purpose of regulating the position of its movable end in said slideway, and means, substantially as described, for actuating said cam, as and for the purposes set forth.

2. In a sewing-machine, a vibratory cloth-plate, a plate-actuating lever, means for actuating the same, a link conected with the said lever, the point of connection being longitudinally adjustable on the lever, a cam and suitable connections for varying the position of the said point of connection, means for connecting the link to the vibratory cloth-plate, in combination with a secondary cloth-plate rotatory on the first-mentioned cloth-plate, an arm connected thereto, a crank, a suitable connection between the arm and the crank, and means for rotating the crank, all substantially as described, and for the purposes set forth.

In testimony whereof I have hereunto set my hand this 15th day of January, 1887.

JOHN McDERMOTT.

Witnesses:
GEO. A. MOSHER,
W. H. HOLLISTER, Jr.