(No Model.) 2 Sheets—Sheet 1.

G. DOOLITTLE.

SEWING MACHINE ATTACHMENT.

No. 254,935. Patented Mar. 14, 1882.

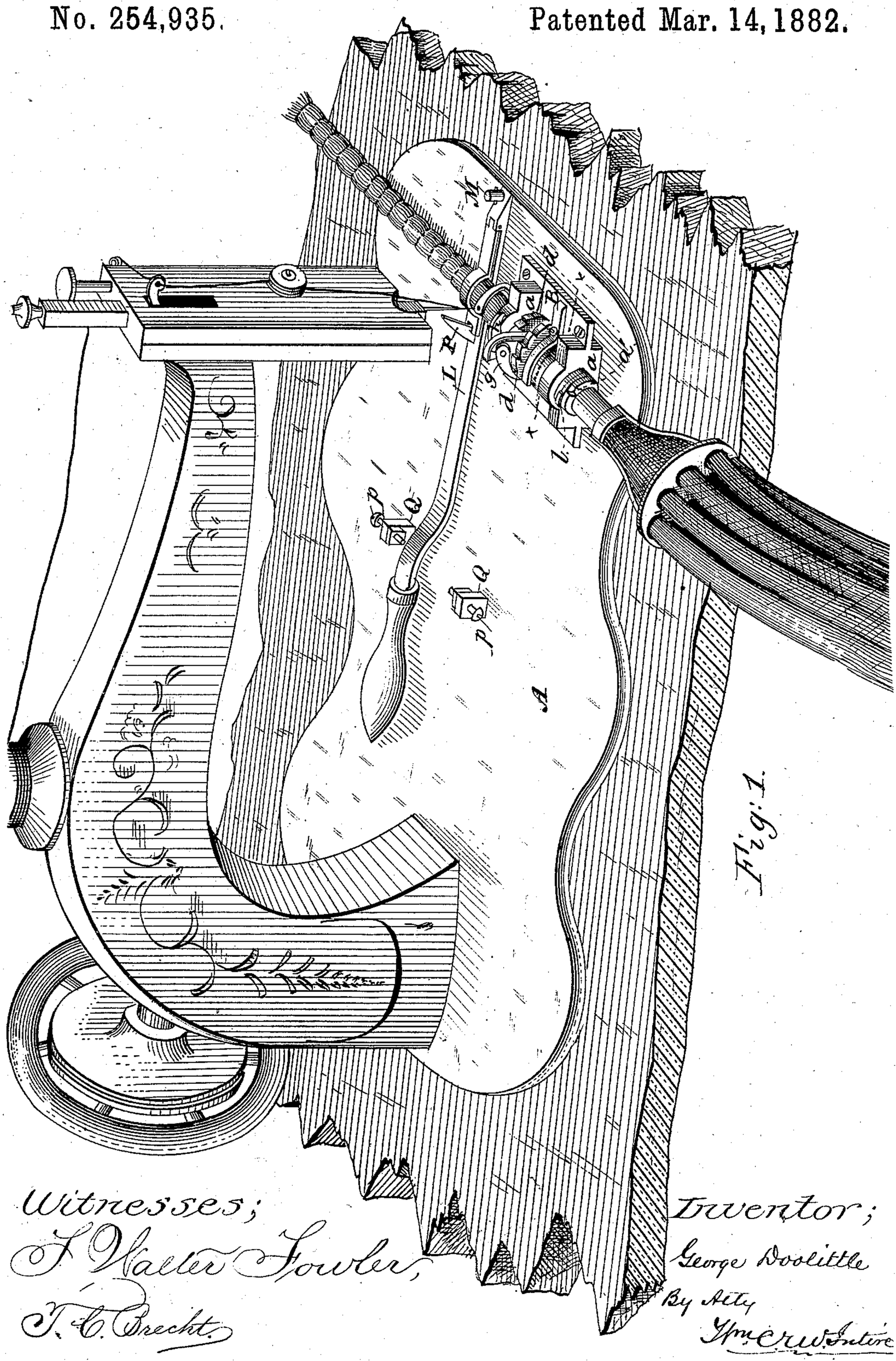

Fig. 1.

Witnesses;
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Inventor;
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By Atty
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

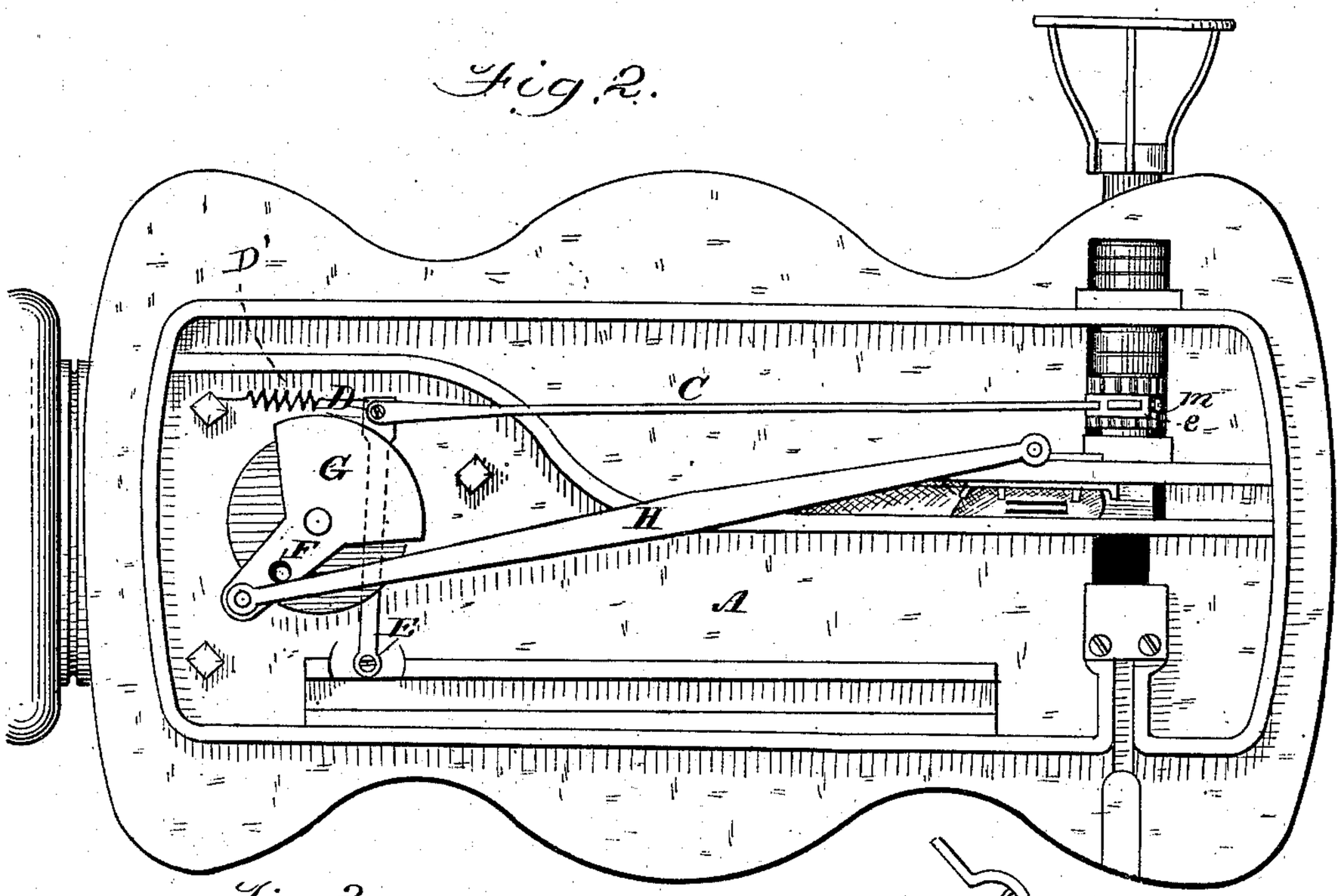

Fig. 3.

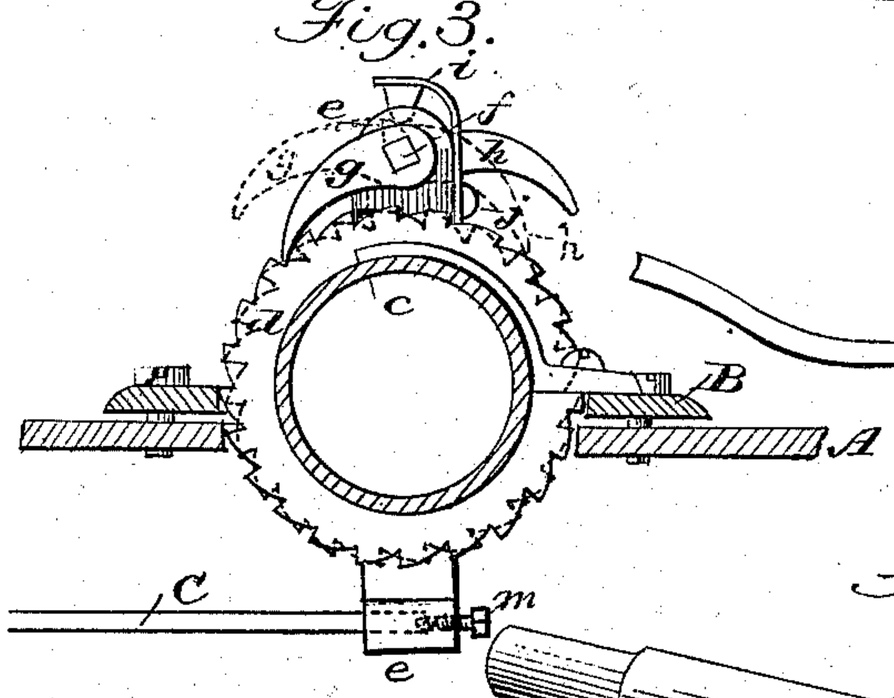

Fig. 4.

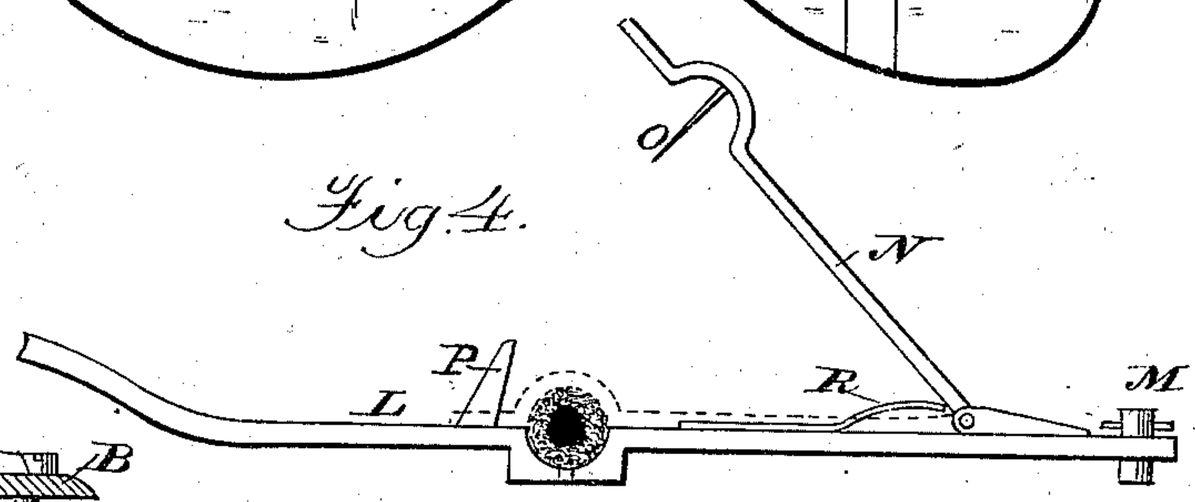

Fig. 5.

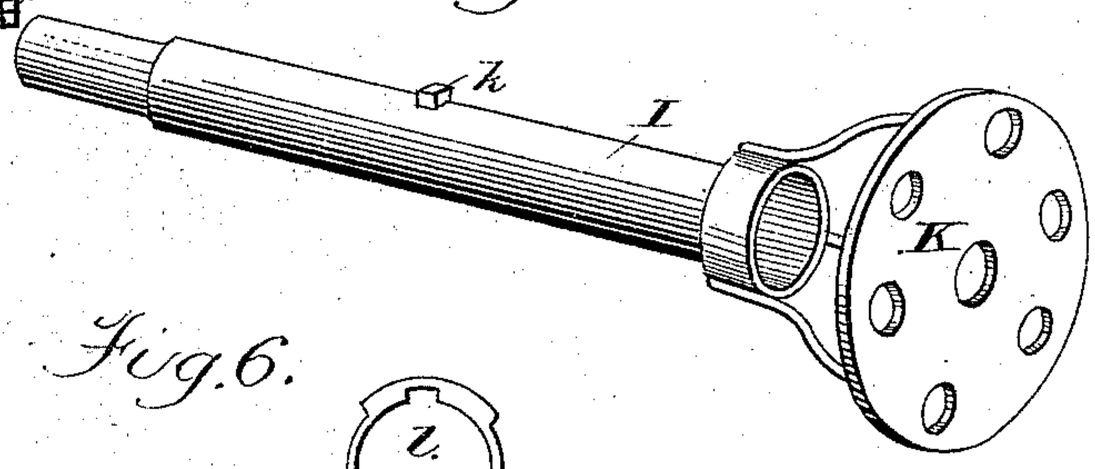

Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE DOOLITTLE, OF BRIDGEPORT, CONNECTICUT.

SEWING-MACHINE ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 254,935, dated March 14, 1882.

Application filed January 18, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE DOOLITTLE, a citizen of the United States, residing at Bridgeport, Connecticut, have invented new and useful Improvements in Sewing-Machine Attachments, of which the following is a specification.

My invention relates to certain improvements in sewing-machine attachments.

It has for its object to provide a means for successfully manufacturing furniture-tufts from strands of yarn or other suitable material, which peculiar form of tuft forms the subject-matter of an application for Letters Patent by me now pending before the United States Patent Office.

My invention consists first, of a condensing-tube arranged within bearings secured to the work-plate of a sewing-machine, said tube being adapted to rotate on an axis at right angles to the needle of the machine, as will be fully and in detail explained.

My invention consists, also, of the yarn-condensing tube mounted in bearings and adapted to rotate, in combination with suitable mechanism, intermediate between said tube and the driving-shaft of the machine, adapted to produce rotation of the tube, as will be hereinafter fully explained.

My invention consists, also, in the special instrumentalities hereinafter described for accomplishing the rotary feed of the yarn to the action of the needle.

My invention consists, also, in the peculiar manner of connecting the yarn-carrying and rotary tube within its bearings, so that it may readily be removed and replaced, as will be more fully explained hereinafter.

My invention consists, also, in the special devices hereinafter explained for feeding the yarn longitudinally through the condensing-tube.

In order that those skilled may know how to make and use my improvement, I will proceed to describe the construction and operation of the same, referring by letters to the accompanying drawings, in which—

Figure 1 is a perspective view of a sewing-machine with my invention applied thereto. Fig. 2 is a bottom view of a sewing-machine, showing the means by which motion is applied to the mechanism for giving rotary motion to the yarn-tube. Fig. 3 is a cross-section (enlarged scale) of the yarn-carrying tube, taken at the line *x x* of Fig. 1, and showing in elevation the double pawl and ratchet mechanism by which the tube is rotated at pleasure in either direction. Fig. 4 is a detail showing the mechanism for feeding the yarn longitudinally through the tube. Fig. 5 is a perspective view of the yarn-tube removed from its bearings and with temple-plate attached. Fig. 6 is a plan view of the locking-ring employed to secure the tube in position and against longitudinal movement, and Fig. 7 is a perspective view of a tuft produced by the machine.

Similar letters indicate like parts in the several figures.

The tuft shown at Fig. 7, as fully described in the application hereinbefore referred to, is composed of a series of strands of yarn or other suitable material stitched diametrically or radially, and having short circumferential binding-stitches. The radial or diametric stitches result from the vertical penetration of the needle, and the circumferential stitches are produced by the rotary feed. The instrumentalities for producing the results I will now describe.

A is the bed-plate of an ordinary sewing-machine. To this plate is secured in any suitable manner a tube-supporting plate, B, provided with boxes *a a*, confining and supporting a short cylindrical or tubular box, *c*, (see particularly Fig. 3,) provided with two ring-ratchets, *d d*, between which rises a vibrating pawl carrier, *e*, through the upper end of which passes a shaft, *f*, to the squared ends of which are secured two pawls, *g h*, bearing such relation to each other that when one is in working relation to one of the ring-ratchets the other is held out of engagement with the other ring-ratchet. A spring-arm, *i*, is secured to the pawl-carrier *e* by a screw or bolt, *j*, and its free end is turned or bent over at right angles, as seen at Fig. 3, and provided with a short teat adapted to lie either side of a short projection on the pawl-shaft, as shown in dotted lines at Fig. 3, so that either pawl may be thrown into engagement with its own ring-ratchet by rotating the pawl-shaft *f* in an obvious manner. The teeth of ring-ratchets have their working-faces in opposite directions, in order that as the pawl-shaft is rotated the feed of the tube may be reversed, (the object of which is to

take out the twist in the yarn where it is fed from a reel.) The vibrating pawl-carrier *e* has its vibrating motion imparted through the medium of a pitman or rod, C, connected at its forward end to the lower end of the pawl-carrier, and its opposite or rear end pivoted to a short arm, D, pivoted at E to the under side of the bed-plate A. The arm D is automatically vibrated by contact of the stud F on the rotating plate G, by which, through the medium of the connecting-rod H, the shuttle-carrier is reciprocated. (See Fig. 2.) Any other means, however, may be used for vibrating the arm D. This arm may be returned by a spring, D′, or by any other suitable means. From this construction and arrangement it will be seen that the pawl-carrier is vibrated upon its shaft and a regular rotary feed motion imparted to the tubular box *c*.

I is the yarn-concentrating tube, to the front end of which is secured by a friction-ring connection a guide-plate, K, through which different-colored yarns may be passed, so that they may be associated in any given design when introduced into the tube I. The tube I is provided with a short feather, *k*, Fig. 5, which slides within a feather-groove, *a′*, in the outer end of the tubular box *c*, (see Fig. 1,) and is held against longitudinal retraction by a loose ring, *l*, Fig. 6, the feather-groove of which is carried out of alignment with the feather-groove in the box *c* by rotation after the tube I has been properly located. From this arrangement it will be seen that the tube I and its tubular box *c* are rigidly connected with each other, and that the rotary motion given to the latter is imparted to the former. After the hanks of yarn are passed through the guide-plate K the ends are bound together by a string and drawn into and through the tube I and slightly beyond the other end. In so doing the yarn is perfectly concentrated into a practically tight cylindrical or rope form. This is all done before the tube I is located in its bearings, and when done the tube I is connected with its box or holder *e*, as heretofore described, and the projected ends of yarn lie under the needle of the machine. The plate B is located on the bed-plate A with special relation to having a sufficient length of yarn projecting to form a tuft.

When the parts are all properly adjusted power is applied to the machine, the needle with its thread descends and passes vertically through the center of the yarn, the loop of the thread is caught by the shuttle-thread in the usual way, and the knot on the ascent of the needle and through the action of the tension device and take-up mechanism is drawn toward the center of the yarn before the needle descends again. The pawl-carrier *e* is automatically rocked and a rotary feed motion imparted to the tube I and contained yarn, thus making a short circumferential binding-stitch, terminating by the next descent of the needle in a diametric drawing-stitch. This action is continued until one or more complete rotations of the tube and yarn have been made. The needle is then lifted from the material, and the yarn is drawn longitudinally through the tube a sufficient distance to produce another sewing at the proper point to form a second tuft. This is accomplished by the following devices: A vibrating lever, L, (see Figs. 1 and 4,) is pivoted at M to the bed-plate A of the sewing-machine. Near the pivoted end of said lever is hinged a vertically-movable arm, N, the free end of which is curved to accommodate itself to the yarn. Extending downwardly from the curved portion of the arm N is a spear or needle, O, which will, when the arm is brought down into the position shown at Fig. 1, penetrate the yarn. The free end of the arm N is bifurcated and straddles a short spur, P, rising from the lever L. After the arm N has been brought down so that the spear O has penetrated the yarn the lever L is swung upon its pivot M, which drags or pulls the yarn through the tube I. The movement of the lever L is limited in either direction by stop-screws *p p*, working through posts Q Q, so that by the adjustment of the screws the movement of the lever L may be varied, if desired. After the yarn has been drawn out the lever remains as shown at Fig. 1, and the sewing operation is renewed as before, and when a second stitching has been completed the arm N is thrown up (which movement is assisted by the spring R) and the lever L drawn back against the other stop-screw, when the arm N is again closed down against the yarn and the lever returned to the position seen at Fig. 1.

The feed of the tube I may be regulated by a set-screw, *m*, (see Fig. 2,) which passes through the lower portion of the pawl-carrier *e* and connects with the end of the rod C, and lengthens or shortens the distance between the point D and the axis of motion of the pawl-carrier, thus producing a greater or less vibration of the said carrier, or in any other suitable manner.

A continuation of the operations of sewing and feeding longitudinally, as above described, will produce a stitched body substantially as seen in Fig. 1; and in order to make complete a tuft such as seen at Fig. 7 this stitched body of yarn is cut by a knife or other suitable instrument just behind each line of stitching. The free ends of the yarn on the opposite side of the line of stitches will expand or distend themselves into the form shown; but under the line of stitches the strands will be thoroughly bound and stitched together with no liability whatever of liberation.

I do not wish to confine myself to the exact details of construction shown, as they may be considerably varied without departing from the spirit of my invention.

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

1. A sewing-machine attachment consisting of a tubular box or work-holder adapted to contain a rope or congregation of strands of yarn or other suitable material mounted in boxes or bearings arranged upon a securing-plate,

said box or work-holder adapted to rotate in its bearings upon an axis at right angles to the needle, in combination with suitable intermediate mechanism between the work-holder and the driving mechanism of the machine, whereby a rotary feed is given to the rope or yarn contained in the tubular work-holder and short circumferential and intersecting diametric stitches are made, substantially as hereinbefore set forth.

2. In a sewing-machine attachment for the manufacture of yarn tufts, the combination, with the plate B, of the tubular box *c*, mounted in said plate, and means, substantially as described, for rotating the box, as hereinbefore set forth.

3. In combination with the tubular box *c*, provided with ratchets *d*, the plate B, pawl-carrier *e*, pawls *g h*, and suitable mechanism for vibrating the carrier *e*, substantially as hereinbefore set forth.

4. In combination with the plate B, box *c*, and the ratchets and pawls for giving rotary motion to the box *c*, the condensing-tube I, adapted to be secured within the box *c* and to rotate therewith, substantially as described.

5. The box *c*, having a feather-groove at its outer end, and the tube I, with a short feather, *k*, in combination with the loose ring *l*, whereby the tube I and box *c* are rigidly connected, substantially as described.

6. In combination with the box *c* and tube I and mechanism for producing rotary feed, as described, the vibrating lever L, provided with the hinged arm N, having spear O, substantially as described.

7. The box *c*, provided with two ring-ratchets, *d*, having their working-faces in opposite directions, the pawls *g h*, arranged upon a common shaft in relation to each other, as described, in combination with the spring-arm *i*, provided with teat for holding either pawl in working contact, substantially as and for the purpose set forth.

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

GEORGE DOOLITTLE.

Witnesses:
M. M. ROHRER,
WM. C. MCINTIRE.