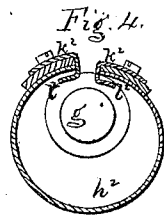
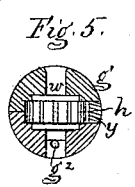
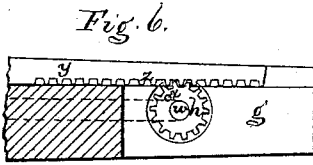
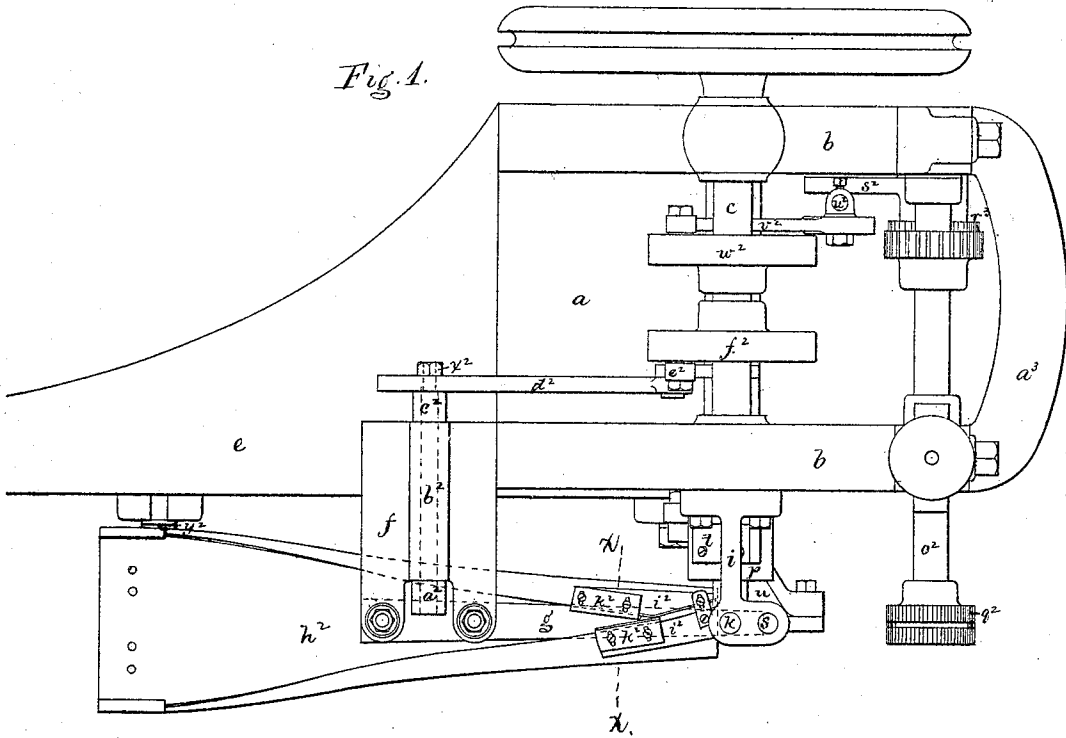


E. P. RICHARDSON.
Machines for Sewing Hose.

No. 146,948.

Patented Jan. 27, 1874.



Witnesses.
 W. Frothingham,
 C. L. Latimer,

Inventor
 Everett P. Richardson.
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 Crosby & Gould

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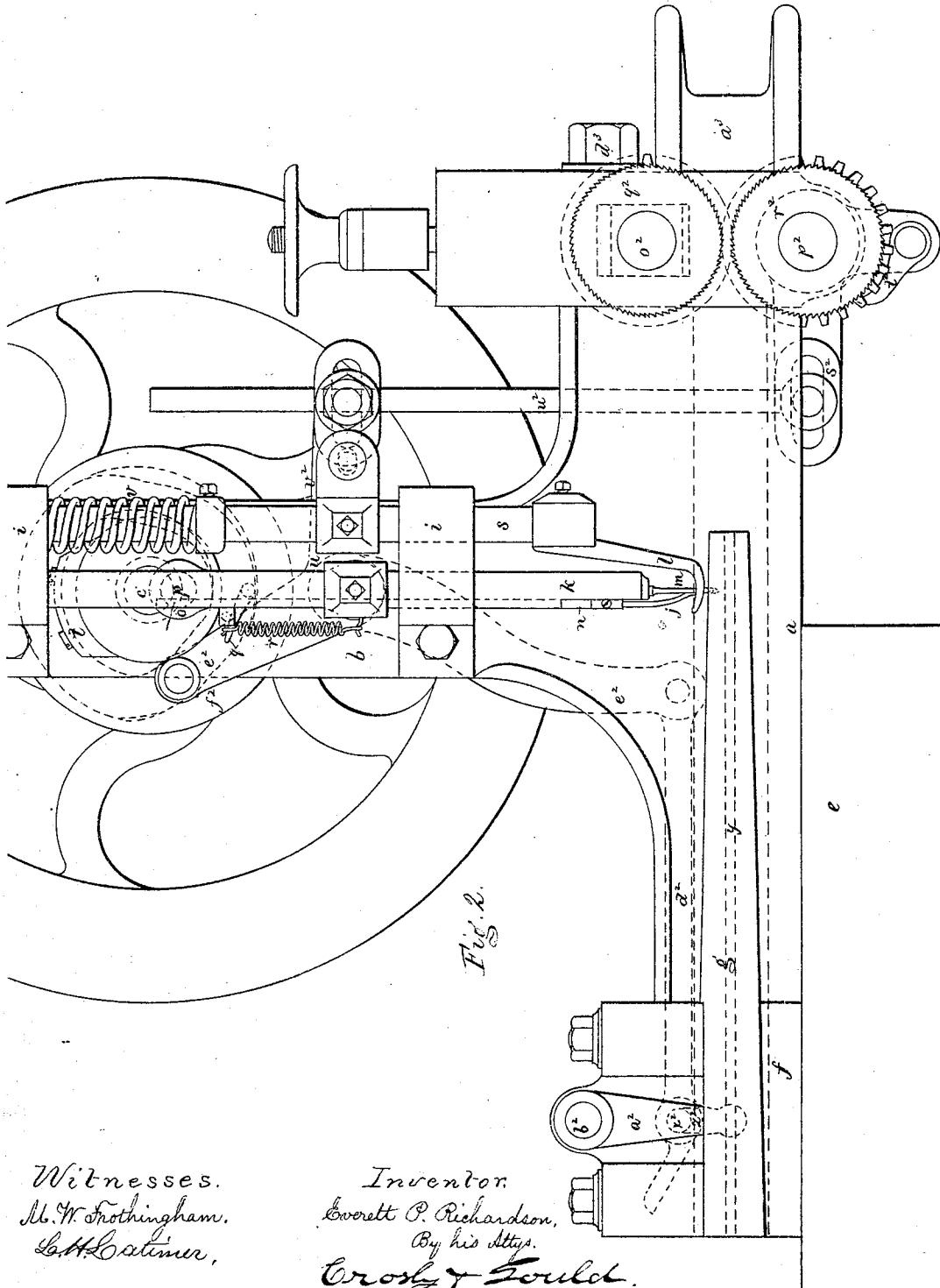


Fig. 2.

Witnesses.
M. W. Frothingham,
S. H. Estimer,

Inventor,
E. P. Richardson,
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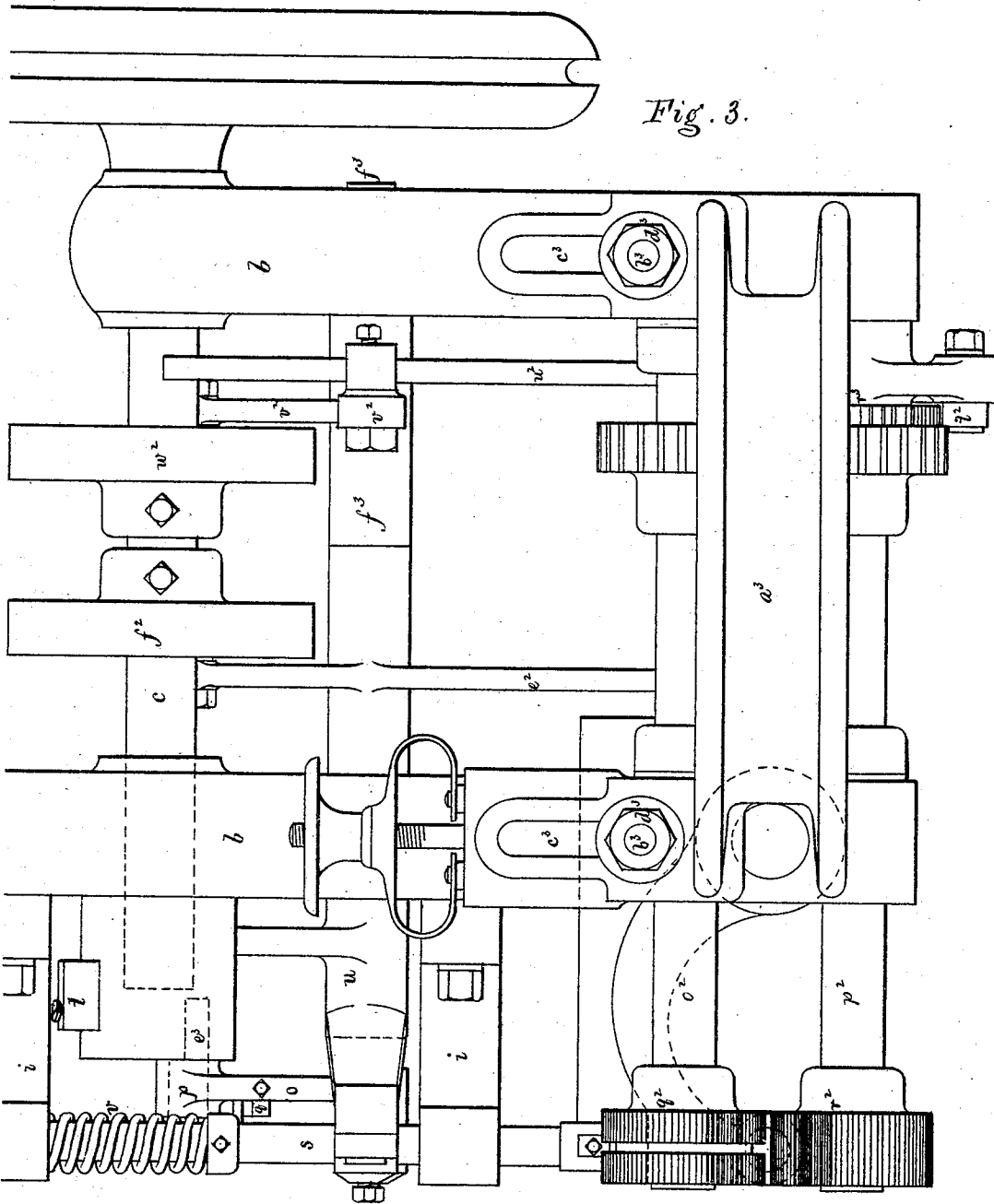


Fig. 3.

Witnesses.
M. W. Frothingham.
L. H. Crutcher.

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UNITED STATES PATENT OFFICE.

EVERETT P. RICHARDSON, OF LAWRENCE, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR SEWING HOSE.

Specification forming part of Letters Patent No. **146,948**, dated January 27, 1874; application filed December 19, 1873.

To all whom it may concern:

Be it known that I, EVERETT P. RICHARDSON, of Lawrence, in the county of Essex and State of Massachusetts, have invented an Improved Machine for Sewing Hose; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The invention relates particularly to the manufacture of hydraulic hose from woven material by taking a strip of duck, canvas, or other suitable cloth, and uniting its opposite edges by sewing to form a tube, the strip being changed from flat to tubular form as it passes into the machine for the action of the stitch-forming mechanism.

In the present invention, relating to such manufacture, the needle and presser-foot are placed above the work-support, the needle being preferably a hook or crochet-needle having a suitable cast-off. The work-support consists in a long horizontal arm, the front end of which is directly under or in vertical line with the needle, the end of the arm containing a rotary thread-guide, which, by suitable lever and link connections, is rotatively reciprocated from the driving-shaft, so as to lay the thread at proper times in the path of movement of the needle, to be caught by the hook thereof as the needle rises. Under and around this arm extends a guide, which, at its rear end, in rear of the arm, is flat or slightly concave, changing from this flat to tubular form as it passes under the arm and to the front end thereof, this device forming a guide for bringing the strip from flat into tubular form, with the edges lapped, presenting the edges in lapped position upon the front end of the arm and under the needle, and in position to be united by the stitch-forming mechanism. The arm and guide extend from the line of the needle in one direction, and on the opposite side from them are two feed-wheels, between which the sewed hose passes, the axes of the wheels being horizontal, and the tube passing between them in a flat or collapsed form. These wheels have a positive intermittent rotative movement, they being preferably geared

together, and one having attached to it, or upon the same shaft to which it is fixed, a ratchet-wheel, with the teeth of which engages a pawl, this pawl being jointed to a rocker-lever, which, by a suitable link and lever connection, is actuated from the driving-shaft.

The simplest form of hose made by this machine is a tube formed from a uniformly-wide strip of woven material, having its edges lapped and united by a single row of stitches. Another form of the tube differs from this simply in having two or more rows of stitches, the machine being made with two sets of stitch-forming mechanism to make such tube. In another form the tube is made with a welt, the welt being first stitched to one edge of the strip by a common wax-thread sewing-machine, and the opposite edge being entered between the welt and the first edge, and the three edges being then united, to form the tube, upon the hose-machine. In another form of the tube the edges are lapped and united upon a common sewing-machine by making a fold at the lap, and running a line of stitches just far enough back to take the four thicknesses. Two or more such seams may be made; and in connection with such a seam there may be an additional seam made by the special mechanism described, or the strip may have its edges bent as they pass through the former, so that the edges will hook together; or the edges may be united upon a common sewing-machine, and the strip turned after such union is effected. The woven strips may be coated upon one surface with caoutchouc compound or other impervious composition, such surface being presented inwardly to form the tube; or the tube may be coated after it has been sewed.

The invention consists in the organization generally described, for forming a flat woven strip into a tube with the edges united by stitches.

The drawing represents, in Figures 1 to 6, inclusive, the mechanism for forming the sewed hose.

Figure 1 shows the machine in plan. Fig. 2 is a front elevation of it. Fig. 3 is an end elevation. Fig. 4 is a cross-section of the arm and guide on line *xx*. Fig. 5 is a cross-section

tion of the arm, showing the whirl in full size. Fig. 6 is a section of the end of the work-supporting arm, showing the whirl in plan.

a denotes a bed-plate, from which rise uprights *b*, in which is journaled the driving-shaft *c*. The bed-plate is mounted upon a suitable pillar or post, and upon one side of it it has an arm or extension, *e*, to which is attached a slide, *f*, that carries the work-supporting arm *g*, in the front end of which is the reciprocating or rotating whirl or thread-guide *h*. The object of slide *f* is to enable the arm *g* to be drawn back for access to the whirl, &c. From the front upright *b* extend arms *i*, in which are the bearings for the vertically-reciprocating needle-bar *k* and presser-foot *l*. The needle *m* is a hook-needle, and has, working in conjunction with it, the ordinary hook-needle cast-off *j* extending from a bar, *n*. The needle-bar is connected, by a link, *o*, to an eccentric crank-pin, *p*, on the shaft *c*, and the cast-off is operated by a finger, *q*, extending from the link *o*, and a spring, *r*. The bar *s* of the presser-foot *l* is operated by a cam, *t*, on the driving-shaft, through the intervention of a lever, *u*, and a spring, *v*, the cam *t* effecting the rise of the presser-foot, and the spring throwing it down, the presser-foot being at all times in contact with the work, except when raised by the cam projection, at which rise the feed of the work is effected. The needle cast-off, presser-foot, and thread-guide perform their functions in the formation of a stitch in the usual manner, the invention, so far as they are concerned, relating only to their arrangement. When the hook of the needle has passed through the work and entered the arm *g*, it passes through the eye or center *w* of the whirl, and then the whirl is moved rotatively to throw the thread, running through the thread-eye *x*, around, or partially around, the needle-shank, so that, as the needle rises, the thread will enter the hook, and be drawn up with the needle.

The movement of the whirl is effected as follows: Extending through the arm *g* is a slide-bar, *y*, having at one end gear-teeth *z*, meshing into teeth on the periphery of the whirl, this slide-bar being jointed to the foot of an arm, *a*², extending from one end of a rocker-shaft, *b*², at whose opposite end is an arm, *c*², connected by a hooked link, *d*², with a vertical lever, *e*², from whose upper arm a pin extends into the groove of a cam-wheel, *f*², on the driving-shaft. The link *d*² is so jointed to the lever-arm *e*² as to disconnect therefrom by raising the link, such disconnection enabling the arm *g* to be drawn back for inspection of the whirl or introduction of the thread, the thread running from the spool under the arm through a hole, *g*², and thence through the whirl and out through the top of the arm. The link *d*² and arm *e*² are held in connection by a spring, which spring yields for their disconnection when the link is raised, and permits the joint-pin *a*² to leave the slot *z*². Un-

der and around the arm *g* extends the work-guide *h*². This guide is a long plate, curved transversely, and changing in form from a shallow convex upper surface at its outer end to a tubular form at its opposite end. Into its outer end enters the end of the strip to be formed into a hose, the strip passing under a guide, *i*². As the strip passes from this guide it is gradually and uniformly bent, and at the opposite end of the guide it emerges bent into tubular form, with one edge lapping the other, and the lapped edges, as they emerge, resting upon the arm *g*, the end of the guide being close to the eye or hole in the top of the arm through which the needle enters. Thus, as the lapped edges emerge from the guide they are united by the stitch-forming mechanism. At the end of the guide one edge of the strip may abut against a shoulder formed on the guide, the other edge lapping over it, and a short distance back the guide may have plates *k*² made with internal guide-lips *l*² for guiding the respective opposite edges of the strip.

The work is brought to the action of the stitch-forming mechanism as follows: At one end of the bed-plate are bearings for supporting two shafts, *o*² *p*², the bearings of the lower shaft *p*² being stationary, and those of the upper shaft movable. These shafts are geared together at their rear ends, and at their front ends are feed-wheels *q*² *r*². These wheels are made as ratchet-wheels, and the bottom wheel has direct intermittent rotative movement imparted to it as follows: Upon the shaft *p*² is hung a pawl-lever, *s*², having jointed to its vertical arm a pawl, *t*², which engages with the teeth of the ratchet and feed wheel *r*². The other and horizontal arm of the lever has jointed to it a vertical link, *u*², connected at its upper end to one arm of a lever, *v*², from whose other arm a pin extends into the groove of a cam-wheel, *w*², on the driving-shaft *c*, the intermittent outward movement of the lever-arm by the cam imparting through its connections with the pawl the intermittent forward or feed movements of the pawl and of the feed-wheel with which the pawl engages. As the shafts are geared together the rotative movement of the lower shaft drives the upper one, so that both feed-wheels move together. The sewed tube is drawn through or between these feed-rolls in a flat or collapsed form, and by their action they impart the requisite feed, such feed acting in conjunction with the needle, whirl, &c., to form the continuous succession of stitches to form the tube. As the stitches form a ridge upon the top of the sewed tube the upper roll may be grooved, as seen at Fig. 3, to receive such ridge. The respective movements of the various parts of the mechanism are timed, so that when the needle descends the work is at rest, held by the presser-foot, the feed-wheels being stationary; and, after the needle has risen, the presser-foot rises and releases the work, and the feed-wheels then rotate and effect the forward movement of the

work. The guide h^2 is attached to the machine by pivots y^2 , and for forming hose of various sizes series of guides adapted to such sizes are used interchangeably. The cams for effecting the feed of the work, the reciprocation of the whirl-bar, and the movement of the presser bar, and the crank for actuating the needle-bar, are all located on the same shaft c , and the feed-lever v^2 , whirl-lever e^2 , and presser-foot lever u all have their fulcrums upon one shaft, such arrangements of these devices compacting the mechanism and simplifying the construction.

In forming hose of varying diameter the position of the feed-wheels requires to be changed, and for this purpose I place the bearings of the feed-wheel shaft in a vertically-adjustable frame, a^3 , fastened to the frame a by screws b^3 passing through slots c^3 and nuts d^3 . By means of the slots, screws, and nuts, the frame may be positioned at any suitable height with reference to the work-support and the guide h^2 . The crank-pin p is made as an eccentric, or is fastened to the cam-wheel t by a pin, e^3 , extending eccentrically from the crank-pin, the throw of the needle being adjustably changed by turning the crank-pin p .

I claim—

1. In combination, with the stitch-forming mechanism, the horizontal work-supporting and whirl-containing arm g , fastened to the slide f , and the guide-plate h^2 , substantially as shown and described.

2. In combination, with the arm g and its whirl, the slide-bar y , reciprocated to actuate the whirl by means of the rocker-shaft b^2 and its arms a^2 c^2 , and the detachable hooked link d^2 , lever e^2 , and cam f^2 , substantially as described.

3. The guide-plate h^2 , formed as described, and pivoted at y^2 , substantially as shown and described, in combination with the arm g fastened to the slide.

4. In combination with the arm g , guide h^2 , and the stitch-forming mechanism, the feed-wheels q^2 r^2 , arranged and operated substantially as shown and described.

5. The vertically-adjustable frame a^3 , for supporting the feed-wheel shafts, and permitting adjustment of the feed-wheels with reference to the work-support.

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Witnesses:

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