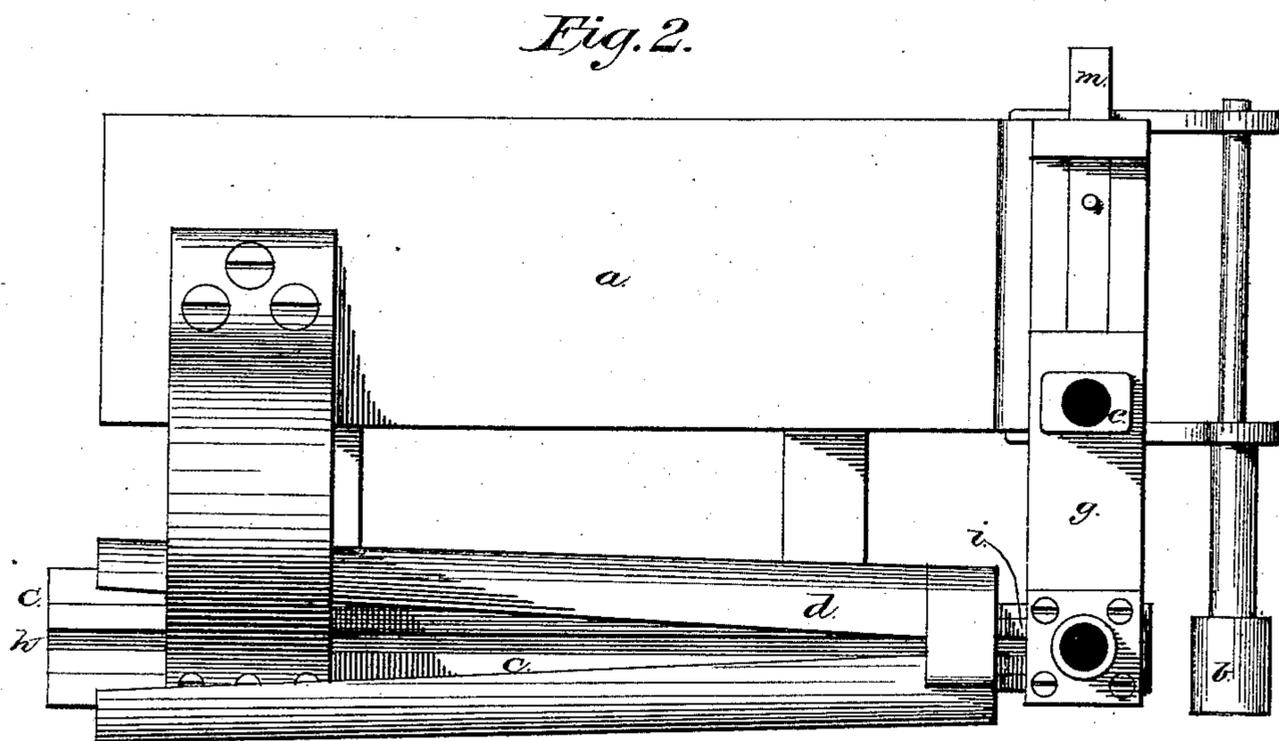
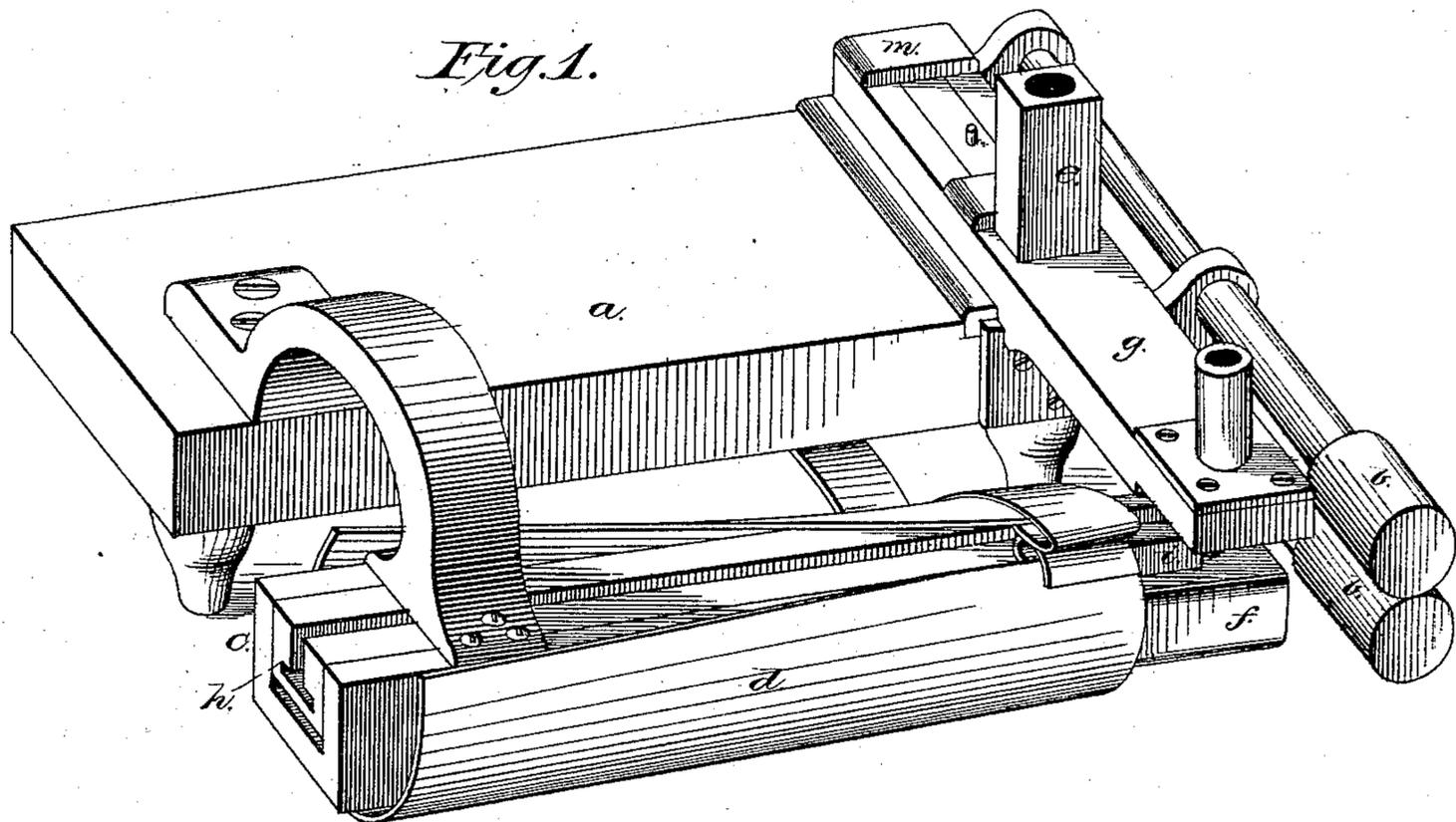


T. A. DODGE & Q. RICE
Machines for Manufacturing Hydraulic-Hose.
No. 157,741. Patented Dec. 15, 1874.



Attest:

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Inventors:

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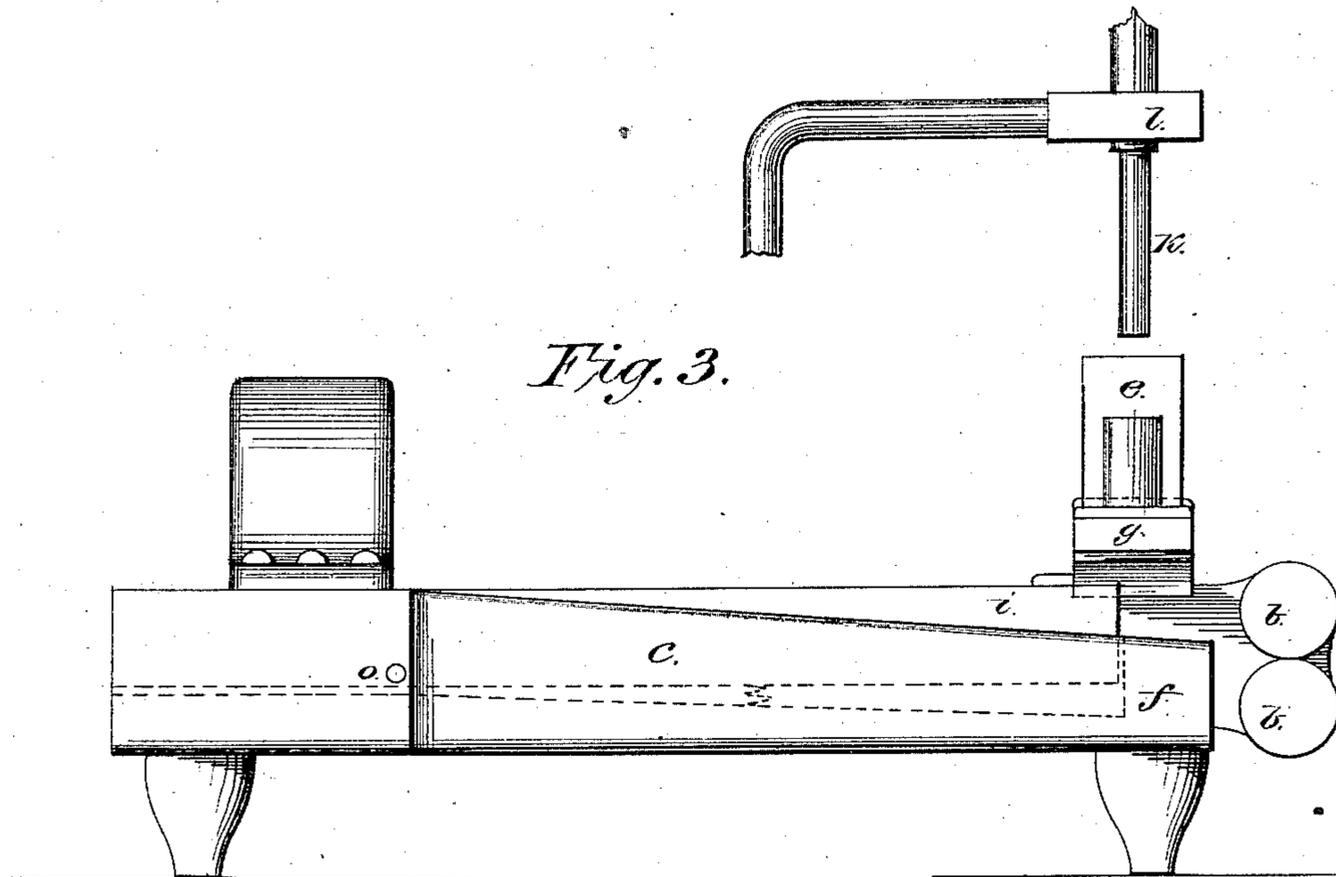
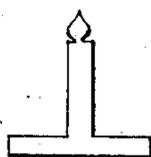


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

THEODORE A. DODGE, OF CAMBRIDGE, AND QUARTUS RICE, OF SOUTH BOSTON, ASSIGNORS TO THEODORE A. DODGE, TRUSTEE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR MANUFACTURING HYDRAULIC HOSE.

Specification forming part of Letters Patent No. **157,741**, dated December 15, 1874; application filed October 22, 1874.

To all whom it may concern:

Be it known that we, THEODORE A. DODGE, of Cambridge, State of Massachusetts, and QUARTUS RICE, of South Boston, State of Massachusetts, have invented a Machine for Manufacturing Hydraulic Hose, of which the following is a specification:

Hydraulic hose made of continuous strips of any material, the edges of which are lapped and united by suitable means, has long been a large article of consumption in the market. There have been various methods of uniting these edges. Adhesive material, stitches put in by hand or machine, nails, staples, and rivets have all been used, the latter, in many respects, being most reliable when very heavy hose is to be made. These rivets have uniformly been put in by hand. No machine for inserting rivets into hose has been made which has proved acceptable to the trade, and an easily-operated rivet-setting machine is a great desideratum.

The object of our invention is to set rivets by an automatic process into hose made of a continuous flat strip, the edges of which it is desired to rivet, or into other suitable materials. Our machine consists of a suitable bed-piece or table, *a*, which supports a hose-feeding apparatus, consisting of rollers *b b*, which have given to them an intermittent rotary movement, and may be provided with teeth or corrugations, to prevent slipping of the hose as it is fed along. The table *a* also supports a horn, *c*, through which the rivet is fed, a folder, *d*, surrounding the horn, a burr-feeding apparatus, and a riveting mechanism.

The feeding mechanism and folder are preferably made of the form and action shown in hose-sewing machine patented to E. P. Richardson in 1873, or they may be of any other suitable kind. The horn *c* has an inverted-T slideway, along which the rivets are fed from its base to its tip. The rivets may be made with broad edges, so as more readily to feed along by contact each with its neighbor, and may be fed into the slideway from an assemblage of rivets in a hopper down an inclined chute. This is a well-understood mechanism, and is shown in machines such as those for

feeding eyelets to eyelet-setting machines. When the rivets have reached the slideway they may be fed forward by a perpendicular finger having a motion similar to what is called the "form motion feed," which goes down from above through a slot in the horn, between each two rivets; then feeds along by a motion of suitable and easily-regulated length toward the end of the horn, and then rises away from between the rivets and resumes its place, ready for the succeeding movement.

The chute or rivet-feed is not shown in the drawings, as its specified mechanism may form the subject of future applications. Neither are the actuating devices of this machine shown, as they are simple movements, and can be added by any one familiar with mechanical designing.

The rivet-way in the horn is cut in a long box, which is made to dip forward from the rear of the horn, where it is pivoted, and which is held in place by a spring under its free end. At the end of the rivet-way, within the horn, is a table, upon which the rivets are, one by one, fed, and held in place by a circular ridge about the same. This table is in such a location that the material which is being fed forward to be formed into hose by having its edges united by the rivets shall have been folded by its passage through the folder, so that each rivet shall stand in the proper place for insertion through the same. The space between each two rivets will be determined by the amount of hose fed forward by the feed-rollers. The rivets may be of the usual flat form at the top, and holes may be punctured in the material for them to be thrust through, if desired; but in practice we prefer to have the rivets made pointed, so that they may pierce the material, merely separating instead of severing its strands. This leaves much greater strength in the hose when finished, as severing the strands greatly weakens the material. But as some prefer a broad head to the rivet, it is easy to introduce into the machine a cutting-instrument, like a punch, that shall puncture a hole in front of and at a uniform distance from the place where the rivet is to be thrust through, such distance being also determined by the amount of feed of the

rollers. In riveting leather hose this would be the preferable means, but when canvas hose is made the pointed rivet is better.

The burr-feeding device consists of an upright tube or box containing the burrs, and rod below the same, working in a way or slot, which thrusts each burr along the slot to a hole therein, directly above the position of the rivet when it has been fed upon the table in the end of the horn.

The riveting apparatus consists of a driving-rod having a depression in its end to fit the point of the rivet, and to hammer or press down the same as soon as the burr has been fed to its proper place upon the rivet-shank. This rod is made to travel up and down in a bearing supported by the frame directly over the table in the end of the horn, on which the rivet rests. The purpose of this rod is twofold: first, to press the burr and lapped hose-edges down upon the rivet; and, second, to press the end of the rivet-shank down upon the burr after this is in place. It may be made to work up and down by a positive movement, or, preferably, be raised by a cam and driven by a spring, like the driver in the common pegging-machine.

We have found that better results follow a blow from a spring-driver than from one driven by a gradual movement; but either may be used.

Another riveting apparatus may be made of a hollow tube, with a rod working up and down in the same, both supported perpendicularly over the rivet-table and burr-hole in suitable bearings. The tube may be of proper size to force the burr through the burr-hole, down upon the hose, and the latter down upon the rivet. The inner rod may be made with a corrugated lower end, and may have a rapid and sufficiently-rigid motion given to it to insure its heading down the shank of the rivet upon the burr after the latter has been forced into place upon the same.

Rivets are generally made of soft enough material to allow of their being sufficiently headed by pressure, and a rod will generally suffice for this purpose, though it is advisable, with some rivets, to use the hammering motion or spring-driver.

The shape of the rivet has often much to do with the ease of heading the same. If the shank is made with a shoulder for the burr to rest upon, such shoulder being placed on the same according to the thickness of the material through which it is to be used, and above the shoulder the shank be made considerably smaller, so as to have a neck more or less slender, as shown in Fig. 6, the heading is quite readily accomplished by pressure; but any kind of rivet may be used.

In the drawings, Figure 1 is a perspective view of our device with the driver removed. Fig. 2 is a plan view. Fig. 3 is a side elevation with folder removed from the horn, and the driver in place. Fig. 4 represents the style of rivet we prefer.

The letters of reference show similar parts in each of the figures, whereof—

a is the bed or frame of the machine. *b b* are the rollers which feed the hose. *c* is the horn, over which the strip is lapped, and its edges brought together by the folder *d*, ready to be united by the riveting mechanism. *e* is the tube from which the rivet-burrs are fed upon the slideway. *f* is the table in the end of the horn, on which the rivet is fed from the rivet-way. *g* is the slideway, down which the burrs are fed. *h* is the rivet-way in the horn. *i* is the pivoted box in which the rivet-way is cut, and is pivoted at *o*. *k* is the driver or heading device. *l* is the bearing for the driver. *m* is the rod that moves the burrs to the opening *n*, where the same are held until thrust into place by the driver upon the rivet-shank.

The operation of our machine is substantially as follows: The hose-forming material is introduced into the folder, and, having been fed forward to a position where a rivet is to be set, a rivet is forced from the rivet-way upon the table in the end of the horn, just below the spot where it is to puncture the hose. A burr is then fed into the aperture in the burr-way, directly over this spot on the surface of the hose, being held in place in the aperture into which it has been thrust. The driver then descends and forces the burr and hose down upon the rivet, which, if sharp, will puncture the hose and receive the burr around its shank; or, if a hole has previously been punched, the shank of the rivet will be thrust through the same.

The yielding rivet-way is depressed by this forcing of the hose down upon the rivet, so as not to interfere therewith. The burr being held in proper place by the tubular rod, the hammer-rod inside the same descends and rivets the shank firmly upon the burr; or, if the rivet is to be headed by the other device, the single descent of the cam or spring-driven rod will in itself accomplish this end. The apparatus then rises sufficiently to allow the hose to be fed along for the insertion of a new rivet, when the same operation is repeated.

Having thus described our invention, what we claim, and desire to have secured to us by Letters Patent, is—

1. In a machine for forming hose of flat strips of suitable material, the combination of a folding mechanism, a feeding mechanism, and a mechanism for supplying burrs and inserting rivets, substantially as described.

2. In a machine for inserting rivets into hose or other materials, the combination of a horn, in which the rivets are fed, with a burr-delivering mechanism and a heading mechanism, substantially as described.

3. The pivoted slideway in the horn, arranged and acting substantially as described.

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QUARTUS RICE.

Witnesses:

JONATHAN HOWE,
H. F. TAPLEY.