(No Model.) 2 Sheets—Sheet 1.

W. H. SAWYER.

APPARATUS FOR THREADING WIRES OR CORDS THROUGH FLEXIBLE TUBES.

No. 380,054. Patented Mar. 27, 1888.

Fig. 1.

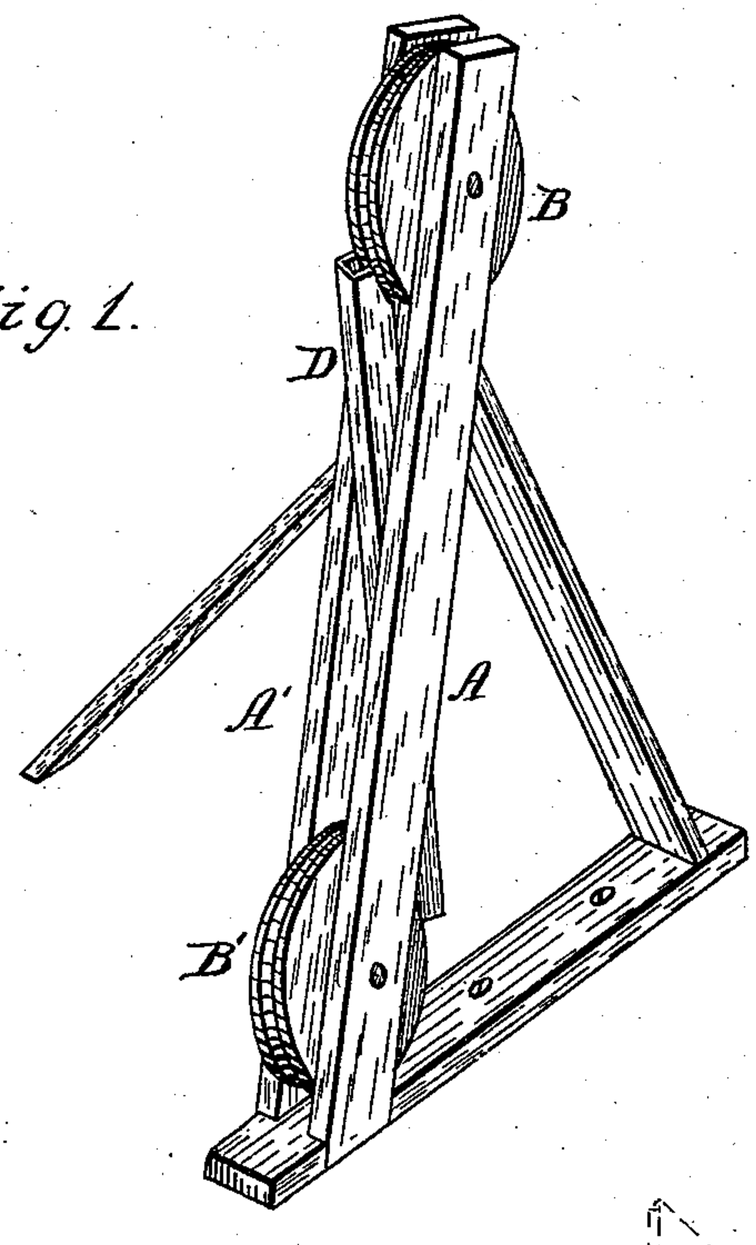
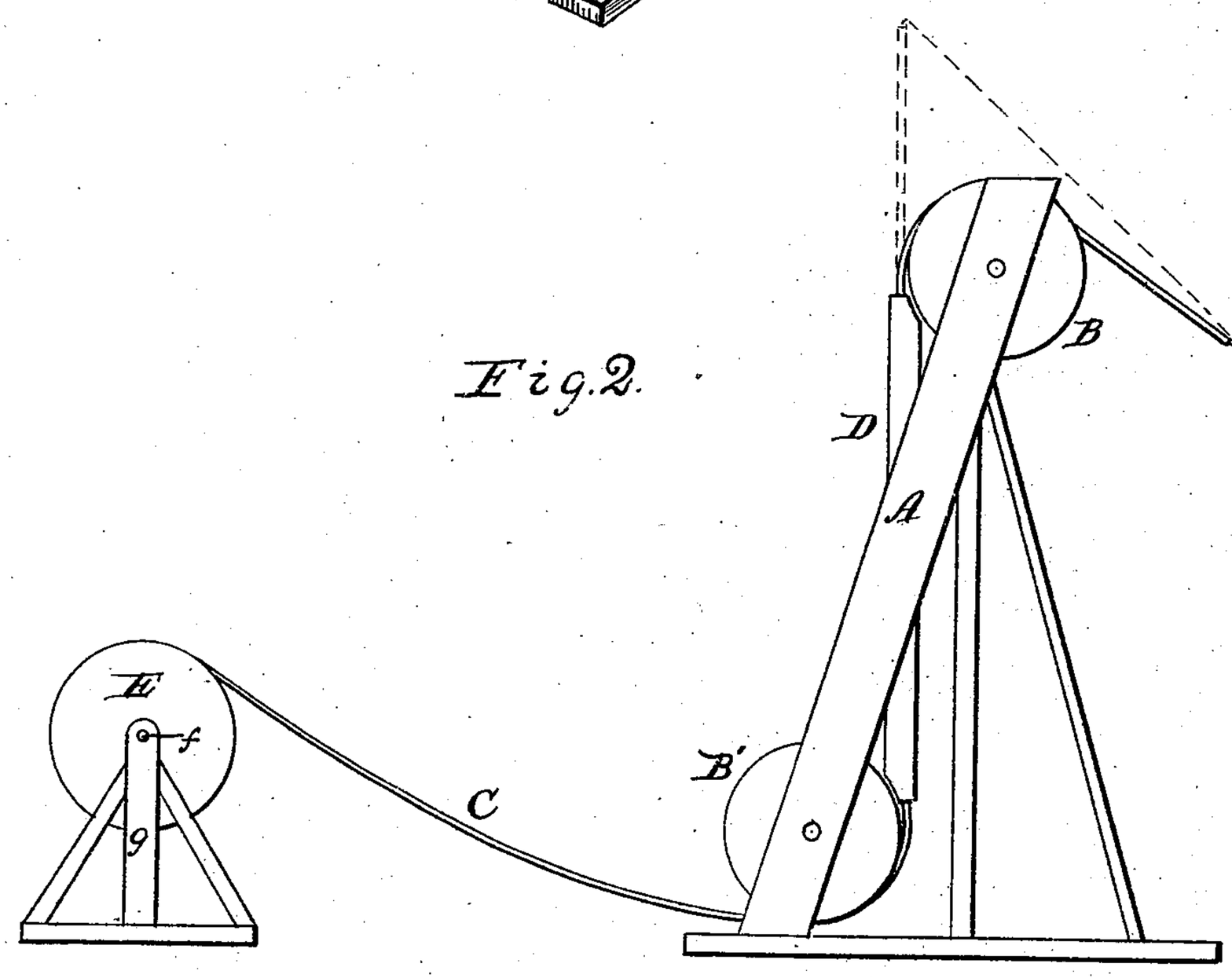


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

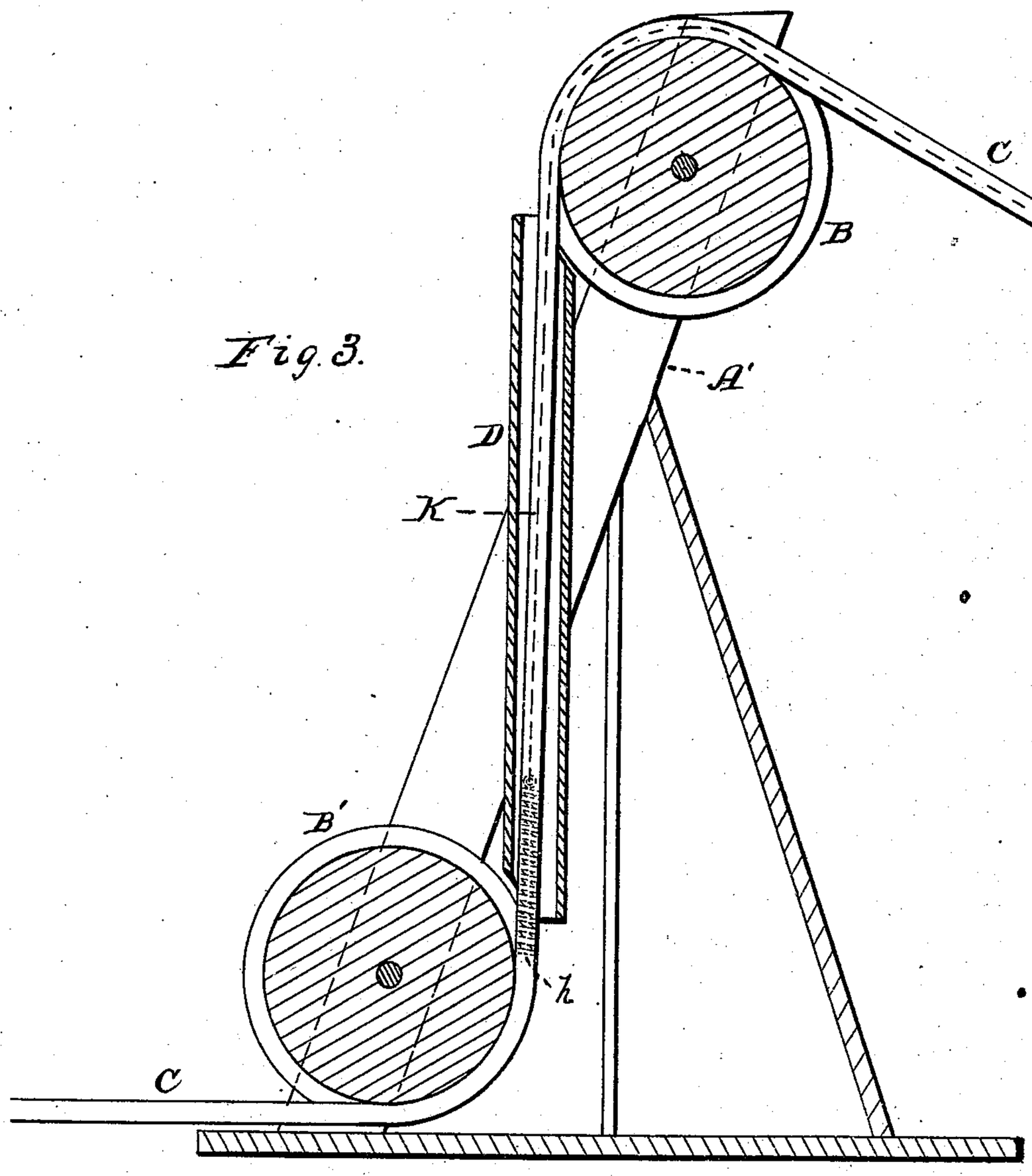
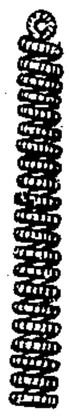


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. SAWYER, OF PROVIDENCE, RHODE ISLAND.

APPARATUS FOR THREADING WIRES OR CORDS THROUGH FLEXIBLE TUBES.

SPECIFICATION forming part of Letters Patent No. 380,054, dated March 27, 1888.

Application filed February 19, 1885. Serial No. 156,466. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SAWYER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a certain new and useful Improvement in Apparatus for Threading Wires through Flexible Tubes; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 and figures of reference marked thereon, which form a part of this specification.

My invention has for its special object the placing of wires lengthwise in lead or other flexible tubes for the purpose of forming incased electrical conductors for telegraphic and similar uses; but the apparatus may be used for threading wires, cords, or chains through tubes for any purpose.

In the manufacture of lead-incased conductors or cables of that class in which the conductors are drawn into pipes or tubes it is necessary to first pass through the tube a light wire or a cord, with which the conductor or conductors may be afterward pulled through. Various means have been employed heretofore for inserting the draft wire or cord. In some cases it has been pushed through the tube as a stiff wire; but this method is impracticable with tubes of any great length. Air-pressure on both the plenum and vacuum plans has been used for driving through the tubes a carrier having a thread or light wire attached thereto; and, again, there has been employed a mechanical creeper for laying the draft wire or cord in the tubes, as shown in Patent No. 273,295, granted to Henry B. Lytle, March 6, 1883. All of these means have been found objectionable, as involving very careful work and much loss of time, and to overcome such disadvantages of the old plans and devices I have invented the apparatus which I will now proceed to particularly describe in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of my improved apparatus. Fig. 2 is a side elevation thereof with a lead tube passing through it from a reel for the purpose of receiving a draft-cord. Fig. 3 is a similar view, partly in vertical section. Fig. 4 is a view of a preferred form of weight.

The letters A and A′ indicate two upright slightly-inclined bars, between which, near their upper and lower ends, respectively, are pivoted the grooved pulleys B and B′, the said pulleys being arranged edgewise on opposite sides of and close to the same vertical plane, so that a flexible lead tube, C, as shown in Figs. 2 and 3, may run in a vertical or nearly vertical direction in passing from one pulley to the other. Between the two bars A and A′, and also between the two pulleys, is arranged a vertical or nearly vertical tubular guide or trough, D, through which the tube passes. The position of the guide or trough D conforms to the direction in which the tube passes from pulley to pulley. It is large enough in cross-section to permit the tube being treated to pass freely, and should be so secured in position by bolts or other means that it may be easily removed and replaced by another of different size when desired, as the apparatus may be used with tubes of various sizes.

Lead pipe is usually furnished on wooden reels or large spools having hollow axes, and when a pipe is to have a draft wire or cord passed through it a reel, as at E, Fig. 2, is placed on a bar, as *f*, supported by standards, such as *g;* or the reel may be supported in any other manner, so that it will turn freely, and the pipe, as at C, is drawn therefrom under the lower pulley, B′, and thence upward through the guide D to the top thereof. The pipe is held temporarily in this position with its open end upward, and into it is dropped a loosely-fitting weight, as at *h*, Figs. 3 and 4, having attached thereto one end of the draft-cord K. The weight drops to the bottom of the vertical portion of the pipe, drawing the cord with it, and then the pipe is to be drawn away over the upper pulley, as shown in dotted lines, Fig. 2. The weight *h* should be heavy enough to hold down the end of the cord against the weight thereof and its friction upon the inner surface of the traveling tube, and thus the tube may be drawn over any desired length of cord or a thread or fine wire, which may afterward be used to draw into the tube or pipe one or more heavy wires to serve as conductors.

I usually thread the tubes or pipes in sections of about one hundred feet, and after

threading the desired length the pipe can be cut near the upper pulley, care being taken not to cut the thread within until after the pipe is severed, and the thread can be easily handled and secured. The thread must be secured at each end of the cut-off section of pipe and a fresh end of thread attached to the part projecting from the weight.

For the weight to hold the draft-cord in the traveling tube I prefer to use a closely-coiled helix of wire, such as shown in Figs. 3 and 4, as it is quite flexible and will not bind against the tube. A metal chain might also be used, or a bag or rubber tube weighted with sand, shot, mercury, or something similar. In order to make heavier a helical wire weight, one or two smaller helices might be suspended within it. While a long flexible weight is preferable, I do not limit myself to that form, as an iron or other metallic rod or a ball could be used with proper care.

I do not of course confine myself to the exact form of apparatus shown in my drawings, as it may obviously be varied without departing from the principle of my invention.

What I claim is—

1. In an apparatus for threading wires through flexible tubes, an upper and lower guide arranged to give a vertical position to a traveling flexible tube, a weight for holding the wire stationary in said vertical portion of the tube, and a vertical guide surrounding said tube, substantially as described.

2. In an apparatus for threading wires through flexible tubes, an upper and lower revolving guide arranged to give a flexible tube a vertical and horizontal movement, and a weight adapted to have a wire attached thereto placed in the vertical portion of the tube, substantially as described.

3. In a pipe-threading apparatus, upper and lower guides for giving a portion of traveling flexible pipe a vertical direction, and a weight for holding a wire or thread stationary in the portion of pipe so guided, substantially as described.

4. In an apparatus for threading wires through a flexible tube, a helically-formed weight adapted to be attached to the wire and retain it in the vertical portion of the tube, substantially as described.

5 In an apparatus for threading wires through flexible tubes, the combination of an upper and lower grooved revolving guide, one placed below the other, a vertical guide arranged between said upper and lower guides, and a weighted end of a wire placed in the tube between said revolving guides, substantially as described.

6. An apparatus for giving a vertical movement to a traveling flexible tube, in combination with a weighted wire or cord arranged in the vertical portion of the tube, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. SAWYER.

Witnesses:

GILMAN E. JOPP,

WM. A. HATHAWAY.