(No Model.) 2 Sheets—Sheet 1.

A. K. EATON.

MACHINE FOR COVERING INSULATED WIRES WITH LEAD.

No. 345,956. Patented July 20, 1886.

Fig. 1.

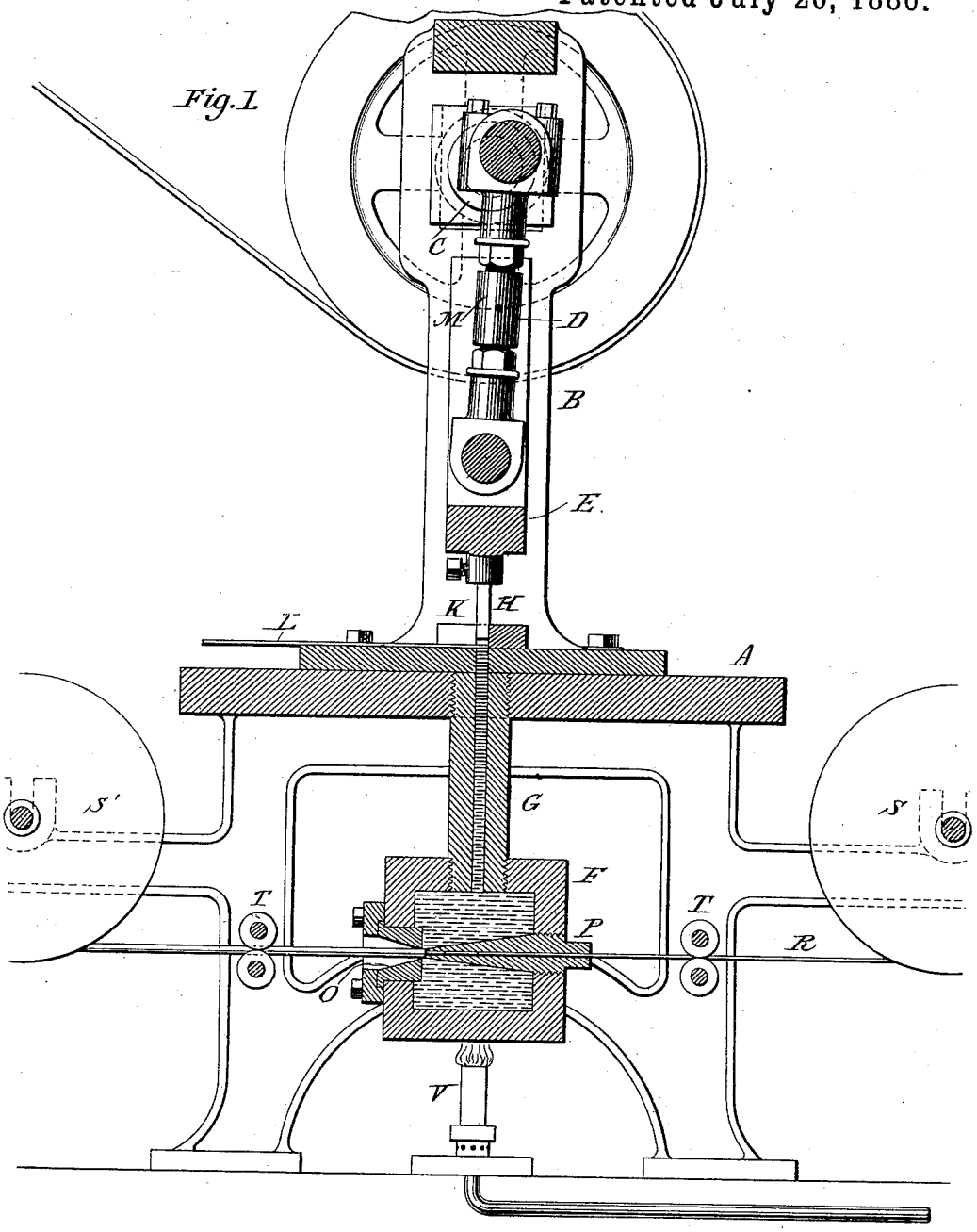

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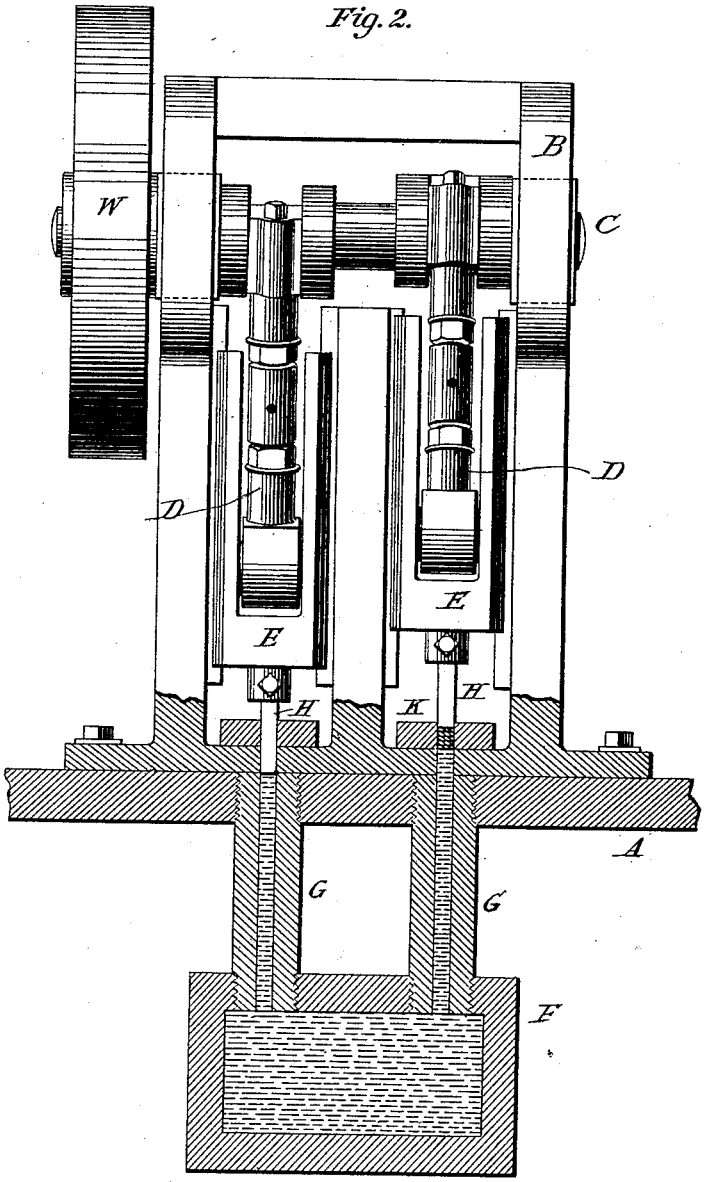
Fig. 2.



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MACHINE FOR COVERING INSULATED WIRES WITH LEAD.

SPECIFICATION forming part of Letters Patent No. 345,956, dated July 20, 1886.

Application filed March 24, 1886. Serial No. 196,349. (No model.)

To all whom it may concern:

Be it known that I, ASAHEL K. EATON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Covering Insulated Wires with Lead, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

There is a certain class of machines which may be designated generally as "lead-presses," which are employed in the manufacture of lead tubing in covering conductors, insulated or bare, with lead, and for other and similar purposes. To this class of machines my present invention relates, and although I shall describe the invention as embodied in a machine which is adapted more particularly for covering wires, yet it will be understood that in so far as the main and essential features of construction are concerned, what is true of a machine when adapted for one of these purposes is equally so when it is adapted for any of the others.

In these machines the object is to apply to an insulated conductor an even and homogeneous coating of lead. They have for this purpose a lead-chamber provided with a suitable die or nozzle, and a piston or plunger, which acts with a steady pressure upon the lead, tending to force it out through the die. An insulated conductor is introduced into the lead-chamber, and is carried out through the die, the diameter of the conductor being somewhat less than that of the orifice in the die. Pressure being now applied to the lead in the chamber, it is forced out through the die, forming a coating around the conductor, which is at the same time drawn or forced through the die and wound upon a suitable reel. The character of the dies and the construction of the lead-chamber and pressure devices vary very greatly, but the general principle of operation is substantially similar to that described. In some cases the lead is maintained in a fluid state or very close to it, while the construction of other machines permits much cooler lead to be employed. The latter is by far the most desirable, inasmuch as the use of hot lead is very apt to injure the insulating-covering of the wires.

In all machines of which I am aware it has been rendered necessary by the principle of construction to periodically insert a fresh supply of lead to the chamber, and in order to do this it has been necessary to stop the pressure while the fresh material is placed under the plunger. It is readily seen that this not only interrupts the continuity of the process, but in cases when the temperature is high it is apt, if not certain, to destroy the insulation of the conductor, which is exposed to the hot lead while the fresh supply of lead is being introduced. Whether the lead be in a fluid or semi-fluid state—in other words, hot or comparatively cool—and whether the machine is designed to make lead tubing or to cover conductors, it is extremely desirable that the process should be a continuous one, and that some means should be employed by which the supply of fresh lead may be kept up without sensibly affecting the pressure or permitting the egress of lead through the die to cease.

To accomplish this is the object of my invention, and I have devised a means for doing this, which is as follows: I use a lead-chamber of any ordinary kind, but of great strength, and provided with a suitable die, and in this case with a nozzle or tube extending nearly through the lead-chamber in line with the die, for permitting the wire to enter the chamber and pass through the die. To the lead-chamber is connected a strong tube, having a much smaller internal diameter than the chamber. These parts are secured to a stout frame in any proper way, and directly in line with the bore of the tube is a plunger, so limited in its movement that it passes down into the tube for a short distance, and is then withdrawn a certain distance above it. A guide is secured around the end of the tube, and through or into the guide is passed a strip of cold lead over the opening of the tube and at right angles thereto.

In using the apparatus the end of the wire which it is desired to cover with lead is passed through the tube in the lead-chamber, and the die and the chamber then filled with lead, which may be simply poured in through the tube above described. A flame is then applied to the lead-chamber, that will keep the lead therein, during the further operation of the machine, at a temperature of about 300° to 400° Fahrenheit. When this has been done,

a continuous lead strip is forced along over the bore of the tube in the above-described guide, and the plunger reciprocated. Each downward movement of the plunger carries with it into the tube a portion of the lead strip, whereby the pressure throughout the tube and lead-chamber becomes so great that the lead in the latter is forced out through the die, carrying with it the conductor, around which it forms a smooth and even coat. The lead in the tube above the lead-chamber is cold, and requires a very great pressure to force it down into the lead-chamber. This property enables me to utilize it as a seal or valve, so that while the plunger is moving upward and the pressure for a time upon the lead column in the tube relieved the pressure within the lead-chamber is not sensibly reduced, nor is the cold lead in the tube forced out. The cold lead, therefore, acts as a valve, which permits new lead to be forced into the tube, and thence into the lead-chamber, but which prevents any egress of lead except through the die.

This invention may be embodied in many forms of apparatus, and may be carried out in many different ways. There may be several lead-feeding plungers for each lead-chamber, and various devices may be used for moving the cold lead strips under the plungers.

I have shown in the accompanying drawings a simple and efficient form of machine which will illustrate the principles of the construction and mode of operation of the invention.

Figure 1 is a central vertical cross-section of a machine or apparatus embodying my invention. Fig. 2 is a view, partly in elevation, of a modified form of the same.

The character and plan of construction of the frame, and of all portions of the device not herein distinctly specified as composing my invention, may be varied in a great many ways. I shall therefore describe one of the most simple and convenient forms in illustrating the invention.

A is a strong iron table; B, a stout frame bolted thereto and carrying a shaft, C, operating by an eccentric or crank, an extensible connecting-rod, D, and cross-head E, working in suitable vertical guides.

F is a strong iron or steel box or chamber, joined to the table by a steel cylinder, G, having a bore of any shape, but of a section much smaller than that of the chamber F. The tube or cylinder G passes through the bed-plate of the table, to which it is screwed or otherwise firmly secured, and its bore is directly in line with a steel plunger, H, carried by the cross-head E. The plunger H is of such size and shape that it fits smoothly in the bore of the cylinder, and its movement is such that it enters the bore a short distance on each downward stroke. A guide, K, consisting of a metal block, with a narrow cut-away portion, is fixed over the tube G, so that a lead strip, L, when inserted in the cut-away portion, will be brought over the orifice or bore of the cylinder. If the plunger be set in motion, it will carry that portion of the lead strip down into the tube G which lies over the orifice in the tube, so that if the strip be continually pushed up when the plunger leaves the tube the latter in a short time will be filled with lead. The connecting-rod D is made extensible in some convenient way, in order that the play or movement of the plunger with reference to the tube may be adjusted. An ordinary double-screw-threaded extension-coupling, M, is shown as the means for varying the range of movement of the plunger.

The lead-chamber F is provided with a common form of die, O, which may be a steel block, with a small opening through the inner face, gradually expanding toward the outside. A steel tube, P, of generally tapering form, is screwed into the side of the chamber opposite the die, and it extends up to or for a short distance within the orifice of the die, leaving an annular space, through which the lead is forced.

R is the wire or conductor to be coated. It is passed through the tube P and the die O, and when the pressure is sufficient within the chamber the lead forced out through the die forms a compact and even sheathing around the conductor. The wire is then unwound from a reel, S, and on issuing from the die with its lead coating it is wound on a reel, S'. Guides T are used to direct and sustain the wire wherever it is necessary.

V is the burner or source of heat for warming the lead in the chamber.

In lieu of one plunger, two or more may be used, as shown in Fig. 2, and in the same manner the dies may be increased in number. The plungers, in case more than one are used, may be worked by one shaft and pulley-wheel, W, or by different ones.

Further modifications in the construction of this device I do not consider it important to describe in detail.

It will be readily understood that with the apparatus as shown, or by such changes as are well known in the art, it may be used for making tubing of lead or of any other metal or alloy having like properties.

What I claim is—

1. In a wire-covering or lead-pipe machine, the combination, with the lead-chamber provided with a die or orifice, of a reciprocating plunger adapted to enter an opening or passage communicating with the interior of the chamber, substantially as set forth.

2. In a wire-covering or lead-pipe machine, the combination, with a lead-chamber provided with a die or orifice, of a reciprocating plunger adapted to enter an opening or passage communicating with the interior of the lead-chamber, and of considerably smaller diameter or section than the chamber, as set forth.

3. The method of feeding or supplying lead to the pressure-chamber of a wire-covering or lead-pipe machine, which consists in forcing at

intervals cold lead into said chamber through a contracted passage, and maintaining the lead in the passage or near the orifice through which it is introduced at a low temperature, whereby it acts as a seal or valve against the pressure within the chamber, as set forth.

4. The combination, with a lead-chamber, of a former or die for the egress of the lead when under high pressure, a tube of smaller diameter than the chamber, and a reciprocating plunger adapted to work into and out of the tube, for forcing cold lead through the tube into the chamber.

5. The combination, with a supporting-frame, of a lead-chamber provided with a die for forming lead tubes or the like, one or more tubes entering said chamber, reciprocating plungers working into and out of the tubes, and guides surrounding the ends or openings of the tubes and adapted to direct lead strips over said openings, as set forth.

6. The combination, with a lead-chamber provided with a die or orifice, of one or more tubes entering the chamber and an adjustable reciprocating plunger for each tube, the said plungers being adapted to enter the tubes for a certain distance on each downward stroke, as set forth.

ASAHEL K. EATON.

Witnesses:
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J. DANIEL COMPTON.