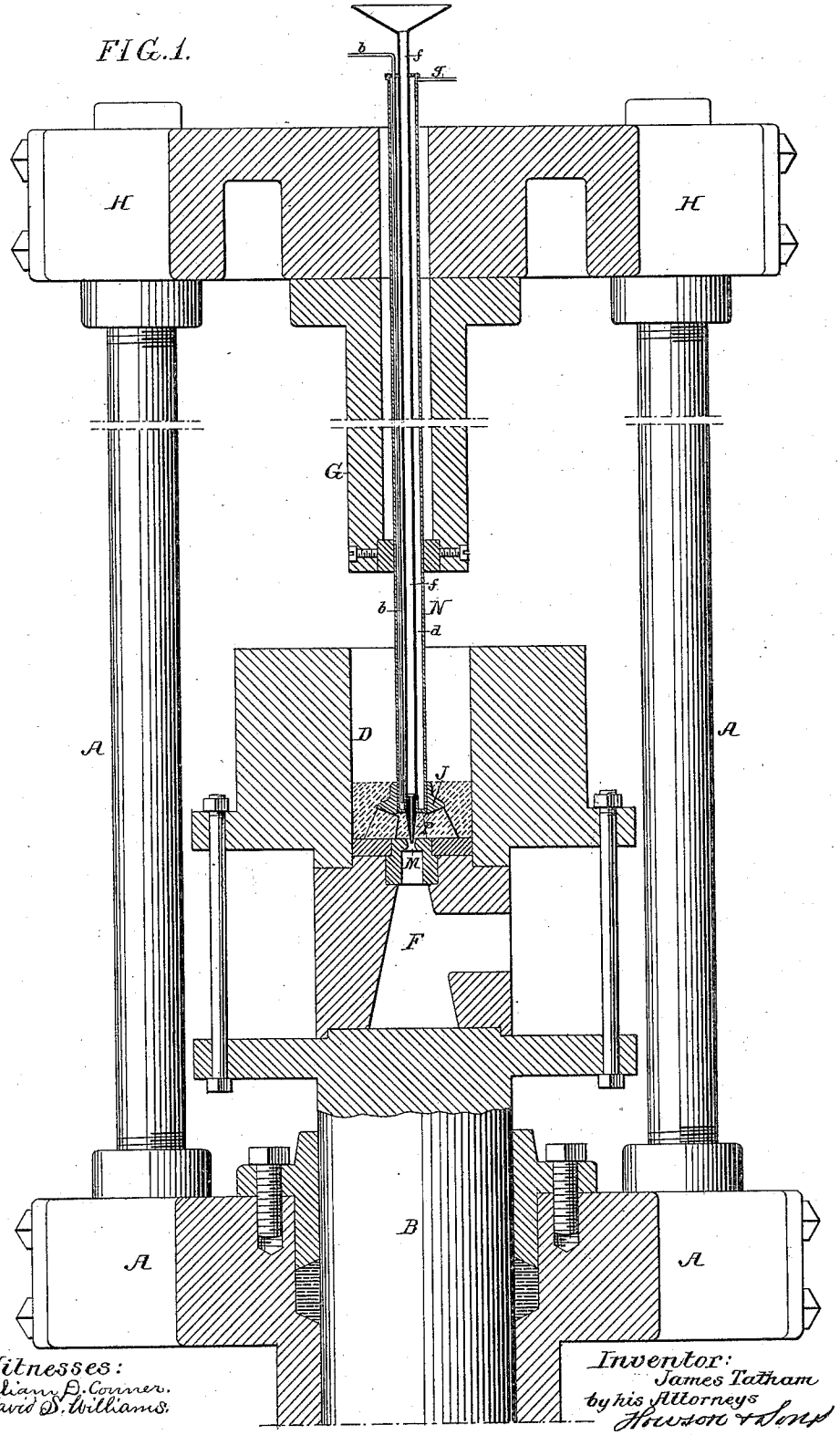
(No Model.) 2 Sheets—Sheet 1.

J. TATHAM.

COVERING INSULATED ELECTRIC CONDUCTORS.

No. 363,182. Patented May 17, 1887.

FIG. 1.



Witnesses:
William D. Conner.
David S. Williams.

Inventor:
James Tatham
by his Attorneys
Howson & Sons

(No Model.) 2 Sheets—Sheet 2.

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FIG. 2.

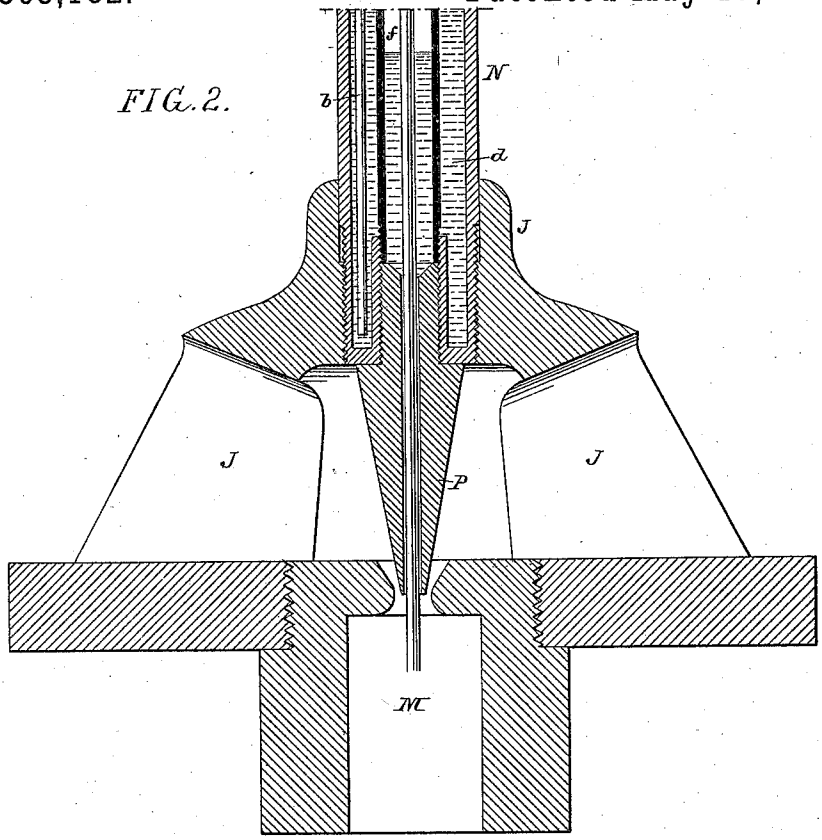
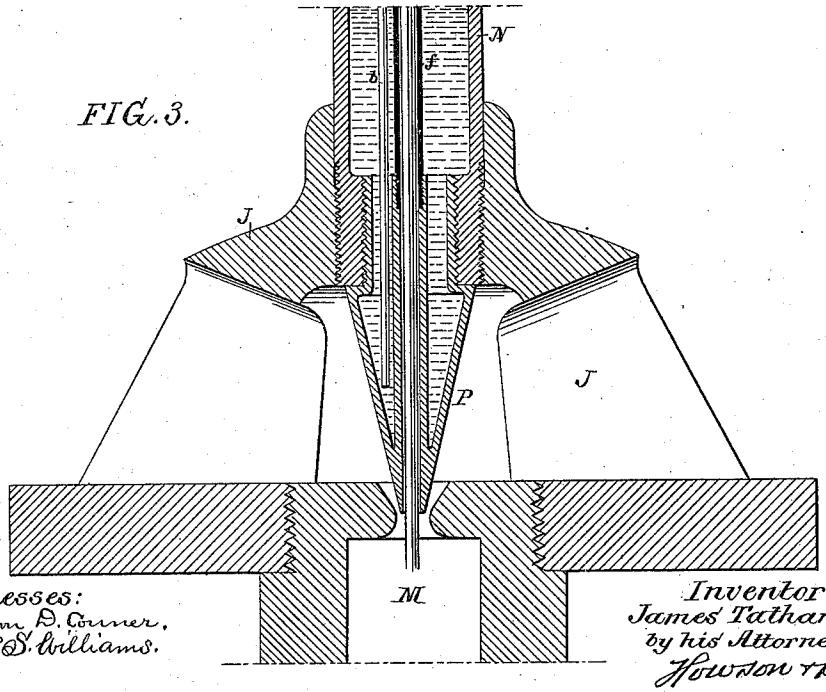


FIG. 3.



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UNITED STATES PATENT OFFICE.

JAMES TATHAM, OF PHILADELPHIA, PENNSYLVANIA.

COVERING INSULATED ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 363,182, dated May 17, 1887.

Application filed August 28, 1886. Serial No. 212,059. (No model.)

To all whom it may concern:

Be it known that I, JAMES TATHAM, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain Improvements in Covering Insulated Electrical Conductors, of which the following is a specification.

The object of my invention is to protect from injury by heat the insulating-covering of an electrical conductor which is being sheathed with lead or other ductile metal in apparatus similar to an ordinary lead-pipe press; and this object I attain in the manner and by the means hereinafter set forth and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of sufficient of a lead-pipe press to illustrate the means which I have devised for carrying out my invention; and Figs. 2 and 3 are enlarged sectional views of part of the press, Fig. 3 showing a slightly-modified form of the apparatus.

The press is similar to that set forth in my Letters Patent No. 327,835, dated October 6, 1885, A being part of the hydraulic cylinder and B the plunger, carrying the lead-reservoir D and hollow column F, the press having the usual cap-plate, H, to which is secured the pendent hollow ram G, through a suitable plug at the lower end of which passes the hollow core N, which is supported by a block, J, contained within the lead-reservoir and resting on the hollow column, said hollow core N having a detachable nose, P, tapering from butt to point and terminating in the opening of die M, which is secured to or is carried by the base-plate of the core-holder.

The insulated conductor, which is to be provided with a coating or sheathing of lead or other ductile metal, passes down through the hollow core and through the die, and as the reservoir D is raised the lower end of the ram, pressing upon the lead contained in the said reservoir, forces the lead out through the die and around the conductor as the latter issues from the end of the hollow core.

In treating wires which have a coating of gutta-percha or other insulating material liable to be burned or injured by heat it is necessary to provide means for obstructing the passage of heat from the lead to the conductor passing through the interior of the core, and it has been proposed to cause a circulation of water through the hollow core for this purpose. I find, however, that something more than the circulation of water through the hollow core is necessary in order to prevent the destruction of the insulating-covering of the conductor, for if the lead possesses a high degree of heat when applied to the insulated conductor as it passes through the die the effect of the refrigerating-core is neutralized, as will be readily understood.

In carrying out my invention, therefore, I always allow a considerable portion of an old charge of lead to remain in the lower portion of the cylinder at the end of each operation of the press. For instance, in the press shown in Fig. 1 a portion of the old charge, extending up to the level shown by dotted lines, must remain in the cylinder, owing to the fact that the block J prevents a further entrance of the ram into the cylinder. This remaining portion of the old charge is of such a low temperature that it will not injuriously affect the insulating-covering of the conductor, and its volume is such that before the first portion of the new charge can reach the die and be brought into contact with the insulating-covering the temperature of the metal will have been reduced below the point at which it is injurious to said covering. It will thus be seen that all portions of the conductor which are in proximity to the hot metal of a fresh charge are protected by the circulation of water through the hollow core, and that after the first charge there is no chance for any of the metal of a new charge to reach the insulating-covering of the conductor until the temperature of the metal has been reduced below the danger-point.

Various means may be adopted for causing a circulation of water through the hollow core of the press. I prefer, however, to provide the hollow core with a water-inlet pipe, *b*, extending down to the lower portion of the annular space *d*, which intervenes between the outer shell of the core and the central tube, *f*, which incloses the conductor, the cold water being thus delivered directly at the lower end of the core, where it is most needed, and the water rising through the annular space *d* and escaping through the pipe *g* at the top.

The central tube, *f*, is preferably of sufficient diameter to contain a supply of oil or other insulating material, which surrounds the insulated conductor down to the point of issuance of the latter from the nose of the core, and thus aids in preventing the undue heating of the insulating-covering of the conductor during the passage of the latter through the core.

If desired, the nose of the core may be made hollow, and the water-inlet pipe may be carried down into the same, as shown in Fig. 3.

Other means than the core-supporting block J may, if desired, be used as a stop for determining the extent of penetration of the ram; but the block J being already in position and available as a stop its use for this purpose is preferred.

The use of the core-supporting block J is an important element in the proper carrying out of my invention, for it will be observed that this block occupies a large part of the lower portion of the lead-cylinder, so that the actual volume of the lead contained in the cylinder up to the level of the top of the exposed portion of the nose P of the core is but small, and the heat imparted thereby to said nose is much less than if the latter were entirely surrounded by a mass of lead extending to the wall of the cylinder—as, for instance, in the machine shown in Bishop's Patent No. 18,131, September 8, 1857.

The circulation of water in the core so reduces the temperature of the supporting-block and core-nose that the heat contained in the limited body of lead left in the body of the cylinder is not sufficient in practice to effect during the time required for recharging said cylinder an injurious heating of the insulating-covering of the conductor, especially when the latter is surrounded by liquid-insulating medium, as described. The upper part of the block which supports the hollow core is, however, much less in diameter than the lower part, so that the upper portion of the mass of lead left in the cylinder is of considerable bulk; hence while the old charge is being forced from the cylinder ample time is afforded for the welding of the old and new charges, so as to avoid defective joints in the sheathing, the heat of the larger mass of lead which surrounds the upper portion of the core-block having no injurious effect on the insulating-covering of the conductor, owing to the fact that the water-chamber of the core extends for a considerable distance below the top of said core-supporting block.

In the machine shown in the patent of Bishop, before referred to, the water used for cooling the hollow core descended an outer annular passage in the latter and ascended an inner annular passage, in direct contact with the conductor passing through the core. In my machine, however, the conductor passes through a central tube in the core, and this is essential, even if insulating-liquid is not used for surrounding the conductor; otherwise the water adhering to and carried down by the covering of the conductor will not only cause defects in the leaden sheathing, but will also injuriously affect the insulating properties of the covering. The water descending the annular passage in the core of the Bishop machine, moreover, was in contact with the heated shell of the core; hence when it reached the lower end of the core it was highly heated, whereas when the cold water is introduced through a pipe discharging near the delivery end of the core, as in my machine, a much lower degree of temperature can be maintained at said delivery end of the core than is possible when the plan shown in Bishop's patent is adopted.

A core-supporting block substantially such as I now use is shown in my Patent No. 327,835, before referred to. Such supporting-block alone, however, is not capable of preventing injury to the insulating-covering of the conductor by heat; but when the block is used in combination with a water-circulating core the temperature of said block and the core-nose is so reduced that it can readily counteract the effect of the heat contained in the small body of lead left as part of the old charge in the bottom of the lead-cylinder.

I therefore claim as my invention—

1. The combination of the cylinder of the press, the die, the hollow core for the passage of the conductor, a core-supporting block surrounding the nose of the core and contained within the cylinder at the delivery end of the same, and means for causing the circulation of cooling-fluid through the hollow core, all substantially as specified.

2. The combination of the cylinder of the press, the hollow core having a tube for the passage of the conductor, and a circulating-chamber for cooling-fluid having no communication with said tube, and a core-supporting block contained within the cylinder at the delivery end of the same, all substantially as specified.

3. The combination of the cylinder of the press, the core-supporting block contained therein at the delivery end of the same, a hollow core having a cooling-chamber extending down into the upper end of the supporting-block, and means for circulating cooling-fluid through said hollow core, all substantially as specified.

4. The combination of the cylinder of the press with a hollow core having a tube for the passage of the conductor and an annular space between said tube and the outer shell of the core for the circulation of cooling-fluid, said cooling-space having no communication with the tube, all substantially as specified.

5. The combination of the cylinder of the press, the hollow core having a passage for the conductor and a space for the circulation of cooling-fluid, and a fluid-supply pipe extending down through said space and discharging close to the delivery end of the core, all substantially as specified.

6. The combination of the hollow core containing a chamber for the circulation of cool-

ing-fluid and providing a passage for the insulated conductor, a hollow nose containing a circulating-chamber communicating with that of the core, and a fluid-supply pipe discharging directly into the chamber in said nose, all substantially as specified.

7. The within-described mode of protecting the insulating-covering of an electrical conductor during the operation of sheathing the same with ductile metal in a pipe-press, said mode consisting in surrounding the insulated conductor with an insulating-liquid until the sheathing metal is applied thereto, circulating a cooling-fluid between the insulating-liquid around the conductor and the hot metal which is to form the sheathing, and maintaining a mass of comparatively cool metal between each fresh charge of hot metal and the insulated conductor at the sheathing-point, all substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES TATHAM.

Witnesses:
JOHN ARCHROFF,
ARCHER MCLEARN.