No. 699,308. Patented May 6, 1902.

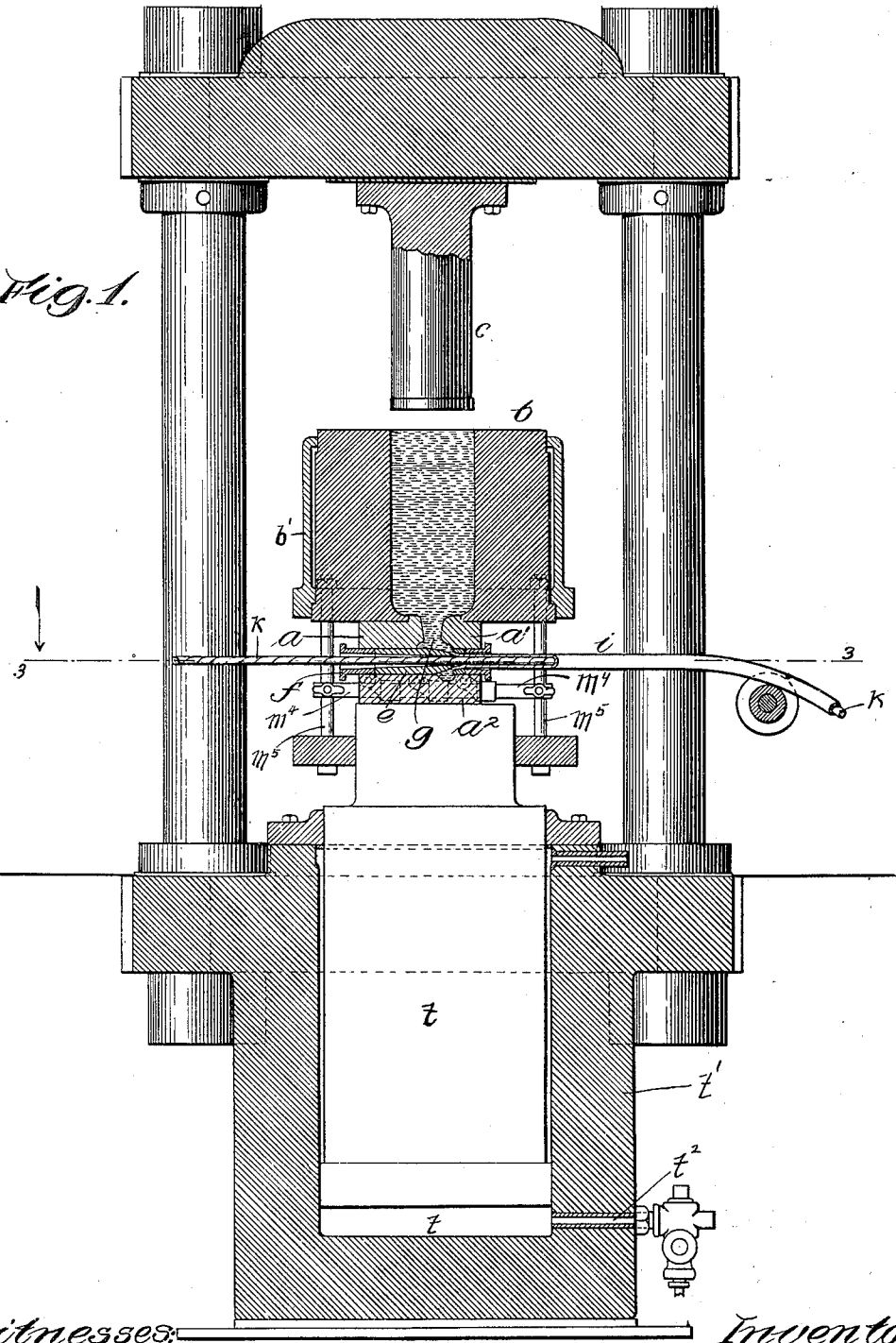
R. F. HALL.

LEAD PRESS.

(Application filed Feb. 14, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

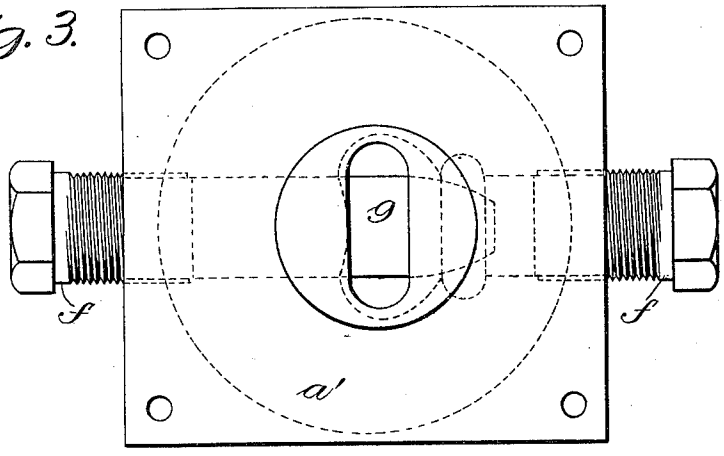
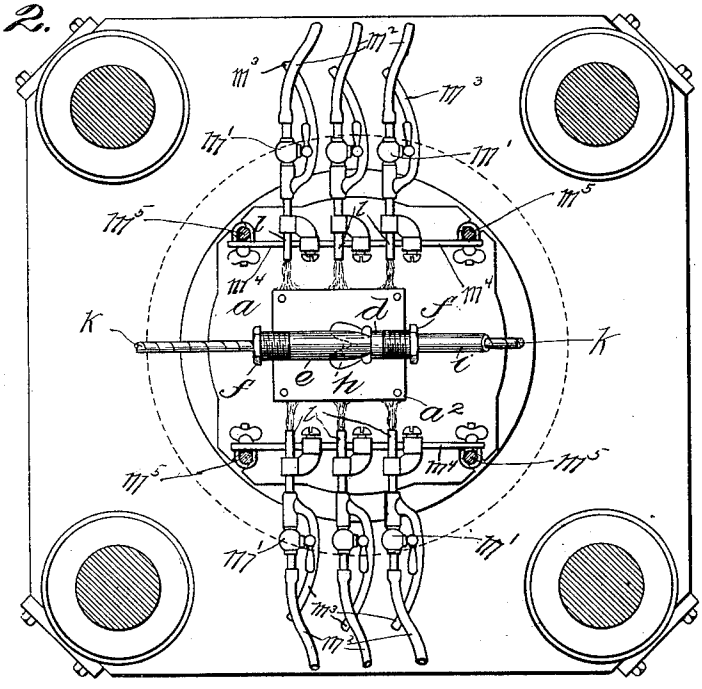


Fig. 2.



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Fig. 4.

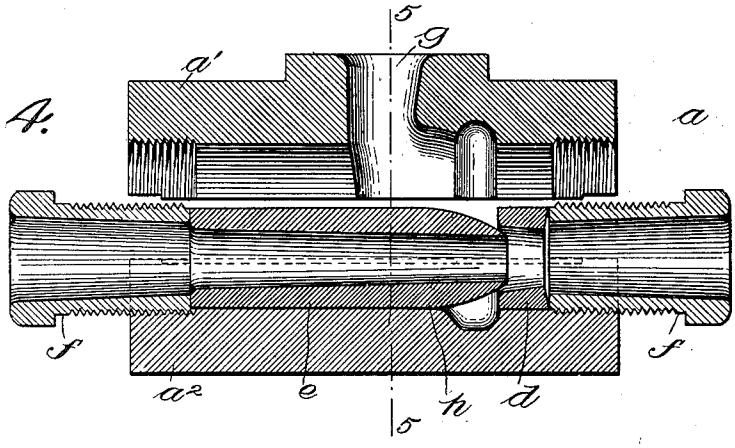


Fig. 5.

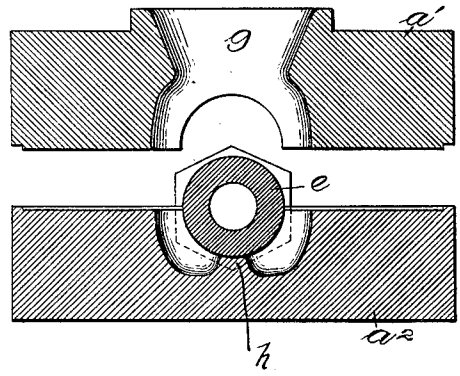
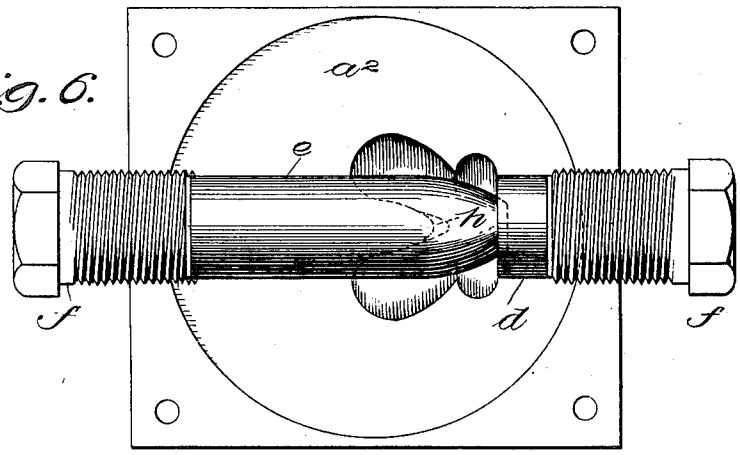


Fig. 6.



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UNITED STATES PATENT OFFICE.

RODERIC F. HALL, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LEAD-PRESS.

SPECIFICATION forming part of Letters Patent No. 699,308, dated May 6, 1902.

Application filed February 14, 1901. Serial No. 47,367. (No model.)

To all whom it may concern:

Be it known that I, RODERIC F. HALL, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Lead-Presses, (Case No. 2,) of which the following is a full, clear, concise, and exact description.

My invention relates to a lead-press, and more particularly to a press for covering electric cables with a protective lead sheath.

My object is to provide an improved and simplified press which will require less power for its operation than similar machines heretofore in use.

A lead-press which is well known in the art and which has been extensively employed heretofore is provided with a bridge in the die-block between the lead-cylinder and the forming-chamber and passages through which the lead may flow on either side of the bridge opening into the forming-chamber on either side of the die and core-tube. Such a bridge is shown in the patent to Robertson, No. 346,563, granted August 3, 1886. This bridge has heretofore been considered necessary to equalize the pressure of the lead at all points around the circumference of the die-opening in order to produce a straight round pipe of uniform thickness. A lead-press which has such a die-block requires very great power for its operation, and a considerable portion of this power is expended in forcing the solid lead from the lead-cylinder to the die-opening through the several passages against the resistance or obstruction caused by the bridge, which is placed directly in the line of flow; but it has heretofore been thought impracticable to omit the bridge, since if this were done the pressure at the upper edge of the die-opening would be much greater than at the lower edge, and the result would be to make the pipe crooked, uneven in shape, and thicker in one part than another, and the nose of the core-tube, it was thought, would be broken by the unequal pressure. I have, however, devised a lead-press having a die-block in which the bridge is dispensed with, but which nevertheless will produce straight round pipe of uniform thickness with much less power than is necessary with presses which use the old form of die-block.

In accordance with my invention a single unobstructed passage is provided, through which the lead is forced into the forming-chamber, said passage opening directly upon the cylindrical portion of the core-tube at the rear of the die-opening. A raised tongue is formed along the wall of the chamber opposite the opening through which the lead enters, and the core-tube rests upon and is sustained by said tongue at this point against the enormous pressure of the lead, which would otherwise break the core-tube owing to the absence of the bridge before referred to. With a structure such as above outlined the pressure is not uniform around the die-opening, and for this reason such a structure would ordinarily be impracticable, the lead pipe being made crooked and uneven in thickness. I have provided, however, gas-burners arranged to direct their flames upon the die-blocks and adjustable mountings for said burners, whereby the application of the heat to the lead in the forming-chamber may be varied to compensate for variations in pressure at different points. The passage of the lead through the die-opening may thus be equalized at all points, so that a straight round pipe of uniform thickness may be produced.

I will describe my invention more particularly by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the lead-press, showing my improved die-block in position. Fig. 2 is a sectional plan view of the lead-press on line 3 3 of Fig. 1. Fig. 3 is a plan view of the die-block. Fig. 4 is a detail vertical sectional view of the die-block and contained parts, the upper half of the block being lifted up a little from the lower half to show how it is hollowed to form a part of the coating-chamber. Fig. 5 is a transverse sectional view on line 5 5 of Fig. 4, and Fig. 6 is a plan view of the lower half of the die-block with the die and core-tube in position.

Similar letters of reference are used to designate the same parts throughout the several figures.

The hydraulic lead-press shown in the drawings is of a general type which is well known in the art, and it consists in its elements of a hydraulic ram carrying a die-block a and the lead-holding cylinder b on top of the die-block and the stationary plunger or ram c, mounted upon a cross-head above the open mouth of the cylinder. The ram-piston t is arranged to reciprocate vertically within the hydraulic cylinder t', to which water under pressure is supplied through the pipe t^2. The die-block a is placed on top of the ram t, and the lead-holding cylinder b is mounted on top of the die-block in position so that as the ram t is raised the stationary piston c will enter the open mouth of said lead-cylinder and will force the solidified but plastic lead down and out through the die-opening. A steam-jacket b' may be provided for the lead-cylinder b, as shown.

The die-block of my invention is preferably formed in two halves a' a^2, as shown, parted in the middle along the center line of the transverse hole through which the cable to be sheathed is passed. The annular die d and the tubular core-piece e are seated in this transverse hole and are held in place by tubular bushings $f f$, screwed into the ends of the block. The two halves of the die-block are hollowed, as shown, so that a forming-chamber is produced in the interior of the die-block around the opposed ends of the die and core-tube. A single passage g is cut in the upper half of the die-block, through which the lead from the cylinder may be forced into the forming-chamber. This hole or passage g is oblong in shape, as shown most clearly in Fig. 3, with its major diameter in a plane at right angles with the line of the tubular core. The major diameter is preferably somewhat larger than the diameter of the core-tube and it opens into the forming-chamber directly over the core-tube some distance to the rear of the die-opening.

In hollowing the lower half of the die-block to make the forming-chamber a tongue of metal h is left on the bottom, extending forward to support the core-tube against the enormous downward pressure to which it will be subjected when the lead is forced down through the passage g. This tongue h extends forward, as shown, up to the point where the core begins to taper to form the nose.

In the operation of the press as the lead is forced down through the passage g it is divided by the cylindrical surface of the core and flows down on either side thereof, filling the forming-chamber, and as the pressure increases passes out through the annular die-opening, emerging from the die-block in the form of a tube or pipe i, sheathing the cable k. It will be seen that the downward pressure of the lead from the opening g is sustained by the heavier cylindrical part of the core-tube and that the lead before it reaches the nose of the core-tube is moving in a direction longitudinally thereof and surrounds the smaller end, so that direct lateral pressure on the smaller end is avoided. With the die-block as heretofore constructed, having a bridge between the lead-chamber and the coating-chamber and passages leading into the coating-chamber on each side of the die and core-tube, the pressure of the lead from all sides toward the center will be substantially equalized by said bridge to force the lead through the die-opening and around the cable-core with the same pressure at all points on its circumference and so to give the cable-core a coating or sheath of uniform thickness. In other words, the bridge obstructs the flow or movement of the lead at the point where it tends to flow the fastest and easiest. In the die-block of my invention, wherein the bridge is dispensed with and the resulting opposition to the flow of lead avoided, while much less power is required for the operation of the press, yet the benefit of the equalizing effect of the bridge is not obtained. In my lead-press, therefore, to equalize the flow of lead through the die-opening I compensate for the inequality of pressure by heating the lead in the die-block and so softening it, especially at the places where it would otherwise tend to flow the slowest. In the drawings I have shown for this purpose three gas-jets l l l on each side of the die-block mounted adjustably, so that they may be caused to direct their flames upon any desired part of the die-block. Gas-cocks m' m' are provided for controlling the flow of gas and so regulating the heat. The gas-burners may be connected by pipes m^2 with a suitable source of gas-supply, and air may be supplied to said burners by pipes m^3. The burners are mounted adjustably upon the horizontal rods m^4 m^4, which in turn are adjustable vertically upon the rods or bolts m^5. The gas-jets can thus be arranged to heat any portion of the die-block, so that the application of the heat to the lead may be varied to equalize the flow at all points around the circumference of the die-opening. If the lead-covered cable as it emerges from the press tends to curve around to one side or the other instead of coming out straight, this means that the lead on one side of the die-block is cooler, and consequently harder to work than on the other side. In accordance with my invention, therefore, I direct the flames at a point on the die-block which will soften the lead to increase its flow on the side of the die-opening where the pressure has been diminished. The precise point at which the flames should be directed cannot always be stated in advance for every die-block; but in general the lower part of the die-block or the lead on the opposite side from the passage through which it enters said chamber requires to be heated the most. By observing the cable as it comes out the points at which the lead flows

the slowest may easily be determined upon and the heat varied accordingly to equalize the flow.

The principal advantage of my invention is that it enables me to produce a perfect lead pipe with a simpler machine and with less expenditure of power than heretofore.

I am well aware that gas-flames have heretofore been used to heat the die-blocks of lead-presses; but they have not been used in the way herein pointed out for equalizing the flow of lead on all sides of the die-opening to compensate for a difference in pressure caused by the lack of a bridge.

I claim as my invention—

1. In a lead-press, the combination with a die-block having a forming-chamber hollowed in the interior thereof, and a die and core-tube meeting in alinement in said chamber to form a die-opening, a single unobstructed passage *g* being provided in the die-block through which lead may be forced into the said chamber, said passage opening directly upon the body portion of the core at the rear of the die-opening, a raised supporting-tongue *h* extending along the wall of the forming-chamber at a point directly opposite the opening of said passage, said core-tube resting upon and being sustained by said tongue at such point against the pressure of the lead entering the forming-chamber through said passage, means for forcing plastic lead into the forming-chamber through said passage, gas-burners arranged to direct their flames upon the die-block, and adjustable mountings for said burners, whereby the application of the heat to the lead in the forming-chamber may be varied to compensate for variations in pressure at different parts of said chamber.

2. In a lead-press, the combination with a die-block having a forming-chamber therein and a die and core-tube meeting in alinement therein to form a die-opening, a single unobstructed passage *g* being provided in the die-block, opening directly upon the body portion of the core-tube at the rear of the die-opening, means for forcing plastic lead through said passage into the forming-chamber and so through the die-opening, and a raised supporting-tongue *h* extending along the wall of the forming-chamber opposite the mouth of said passage *g*, the core-tube resting upon and being sustained by said tongue.

In witness whereof I hereunto subscribe my name this 8th day of January, A. D. 1901.

RODERIC F. HALL.

Witnesses:
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GEORGE P. BARTON.