(No Model.)

H. B. COBB.

LEAD PRESS.

No. 408,377. Patented Aug. 6, 1889.

Witnesses:
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UNITED STATES PATENT OFFICE.

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LEAD-PRESS.

SPECIFICATION forming part of Letters Patent No. 408,377, dated August 6, 1889.

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To all whom it may concern:

Be it known that I, HENRY B. COBB, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented a new and useful Improvement in Lead-Presses, of which the following is a specification.

My present invention relates to an improvement in lead-presses for the manufacture of lead tubing, and particularly for the manufacture of such tubing as the covering for a plastic or other substance, which, while being fed into the tube as the latter is formed, must be protected against injury from the heat of the lead.

One machine for this purpose of my invention constitutes the subject of an application for Letters Patent which was filed by me in the United States Patent Office October 5, 1888, Serial No. 287,270, and the immediate object of my present invention is to improve upon the construction of the die and core-tube shown and described in the said application to produce rapid absorption of heat from the internal passage.

In the drawings, Figure 1 illustrates a lead-press of my improved construction in broken sectional elevation; Fig. 2, an enlarged broken sectional view of my improved construction of die and core-tube; Fig. 3, a section taken on the line 3 3 of Fig. 2; and Fig. 4 is an end view.

The lead-press proper, a more detailed description of which appears in my aforesaid pending application, is briefly described as follows:

Columns r, supported on a suitable foundation, are surmounted by a block or table r', which supports upon its under side a head r^2, and the latter, in the same manner, supports the box B. The box B is preferably in two parts t and t', grooved and chambered in a manner to form, when the two parts are bolted together, a central chamber q and two horizontal cylindrical passages o p, leading from opposite sides of the box into the chamber q, and steam-chambers n n' are provided above and below the passages o p. A hollow plunger C extends vertically downward from the under side of the part t', with which it is preferably integral, a passage m through it communicating with the chamber q through smaller passages m^2, diverging, as shown, to form the bridge m' between them. The passages o p receive, respectively, the core-tube and die of my improved construction, hereinafter described, for the formation of the lead tubing.

F is a ram, operated usually by hydraulic pressure, to be reciprocated vertically, and is surmounted by a lead-cylinder G, having the usual circumferential passage n^2 in its wall for steam. The normal position of the cylinder G is just below the plunger C, which is arranged to enter and fit snugly into the former as the ram is raised.

D is the core-tube, tapering toward one end to the extremity thereof on its outer side and cylindrical the rest of the way, as shown. Internally the core-tube is provided with a bore l, extending a short distance from its tapered extremity, whence the bore is twice enlarged to afford shoulders and chambers, as hereinafter described, to receive one portion of a water-jacket, the internal tube of which forms a continuation of the bore l, as shown.

D′ is an externally-threaded plug, shaped internally to receive the other portion of the water-jacket and arranged at one end to abut against the large end of the core-tube D.

D^2 is the water-jacket, comprising an internal tube k, which at one end fits closely into the first enlargement of the bore l and abuts against the shoulder l', and at its opposite end extends to the outer extremity of the plug D′. The water-jacket D^2 is formed also with an outer tube k', having a perforated head x, to fit snugly around the inner tube k. The tube k' abuts at its end x against the part l^2 of the core-tube D, and at its opposite end fits closely the part l^3 of the plug D′, which is an enlargement of the bore l^4 in the latter, said bore l^4 being of equal diameter with the inner surface of the tube k'. The inner tube k of the water-jacket is provided on opposite sides with longitudinal ribs i, the free edges of which touch the inner surface of the outer tube k' and the sides of the bore l^4, and thus divide the space surrounding the tube k into

two chambers i' and i^2. A reducing-nut h, which screws into the end of the plug D', meets adjacent ends of the ribs i and closes the chambers i' i^2 at one end; and the ribs i extend from the said nut h to a point a little short of the head x of the outer tube, which closes the chambers i' i^2 at the opposite end, and an opening i^3 is thus formed to afford communication between the chambers i' and i^2 near the forward end of the core-tube. Communicating with the chambers i' i^2, respectively, are the water-supply and drainage pipes H H', which enter at the bore l^4. A chamber g is formed between the outer surface of the tube k' and walls of the core-tube D and plug D', and is filled with asbestus or other non-heat-conductive packing, for a purpose hereinafter described. Water fed through the pipe H enters the chamber i', and flowing to the opening i^3 enters the chamber i^2 and escapes through the drainage-pipe H'.

E is the die, preferably concave at one end, as shown, and provided with a bore f, which is somewhat larger than the bore l in the core-tube. The bore f extends but a short distance from the concave end, after which it enlarges into a chamber with shoulders for the reception of a portion of the water-jacket E^2, the internal tubing e of which is provided with numerous perforations, as shown, and forms a continuation of the bore f. An externally-threaded plug E' occupies the same relation to the die E as does the plug D' to the core-tube D, and it is shaped internally to receive the other portion of the water-jacket E^2. The water-jacket E^2 comprises the internal perforated tube e, which at one end fits into the first enlargement of the bore f and abuts against the shoulder f', and extends with its opposite end through the bore d in the farther extremity of the plug E'. An outer tube e' of the water-jacket E^2 is provided with a perforated head y, to fit snugly around the inner tube e. The head y of the tube e' fits closely the second enlargement f^2 of the bore f, and at its opposite end fits closely the first enlargement d' of the bore d in the plug E'. The inner diameters of the bore d and tube e' coincide and serve to form a chamber b about the inner perforated tube e, being closed at one end by the head y and at its opposite end by a reducer c. I is a water-supply pipe, which communicates with the chamber b at the bore d. Water introduced through the pipe I first enters the chamber b, and flows thence into the tube e through the perforations in the latter and out at the end z. A chamber a, formed between the tube d' and shell of the die E and plug E^2, is packed with a non-heat-conducting material. The tapering end of the core-tube enters the concave end of the die and approaches the bore f, without quite touching at any point, to form a channel w of equal width throughout and preferably annular.

In the operation of the machine the cylinder G is filled with molten lead, and is allowed to stand until cooled down to the proper condition for pressing, when the ram F is actuated to raise the cylinder G. As the cylinder ascends, the plunger C enters it, and as it bears against the lead forces the latter up through the passage m to the chamber q. Cold water is then introduced into the water-jackets D^2 E^2 through the pipes H I. As the chamber q becomes filled with lead, continued pressure of the ram forces the lead around the core D through the channel w between the point of the core and the die in the form of a tube. At this stage the substance to be incased by the lead (the present machine is more especially designed for coating plastic tubing through which water is running, as set forth in my application, Serial No. 287,269, filed October 5, 1888) is inserted through the core-tube until it reaches the die, where it becomes coated with the lead as the latter is formed into tubing, and the pressure of the lead forces the newly-formed tube and its contents out of the end z of the die.

The constant flow of cold water through the water-jacket D^2 serves to keep the tube k at a comparatively low temperature, and as the water-jacket is surrounded by the non-heat-conducting material g the absorption by the water of heat from the shell of the core-tube is greatly reduced and consequent chilling of the lead in the chamber q prevented. The substance to be coated as it passes through the tube k is thus kept cool until it reaches the bore l. The pressure exerted against the lead forces it rapidly through the channel w, so that the substance to be coated is drawn through the bore l so quickly as not to be injuriously affected by the heat of the latter.

When the lead passes through the channel w into the tube e of the die, it is cooled almost instantaneously to a sufficient degree by contact with the water which flows through the perforations in said tube, so that the contact of the coated material with the lead in its molten state is not of sufficient duration to affect the former injuriously. As in the case of the water-jacket in the core-tube D, the water-jacket E^2, as it is surrounded by a non-heat-absorbing substance at a, does not absorb heat from the shell of the die E to any material extent.

Besides the danger they avert of injury from heat to the material to be coated, the die and core-tube of my improved construction greatly increase the producing capacity of the lead-presses to which they are applied, because while there is no special saving of time in the filling of the lead-cylinder practice has shown that with my method molten lead of an exceptionally high temperature may be employed in forming the tube, and for this reason the ordinary time for cooling preparatory to producing the discharge is cut down by my method more than one-half. For example, in a lead-press having a cylinder capacity for a charge sufficient to produce about one hundred and forty feet of tubing,

and having a die and core-tube of ordinary construction, it requires seven minutes to dispose of a charge or cylinder full of lead, four minutes of the time being consumed in allowing the lead to set or cool in the lead-cylinder to a degree which would bring it to the proper condition for pressing. With the use of my improved die and core-tube the lead for the same purpose will cool sufficiently in one and one-half minute, and as the lead used is much hotter, and therefore in a more liquid state, it flows more freely, whereby an additional one-half minute is saved in the time of discharging the lead from the cylinder through the die.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a lead-press, the combination of a core-tube and a die, having a passage *w* between them, and a perforated tube *e*, surrounded by a water-jacket within the die, substantially as described.

2. In a lead-press, the combination of a core-tube and a die, having a passage *w* between them, and a tube *e* within a water-jacket surrounded by non-heat-conducting material within the die, substantially as described.

3. In a lead-press, the combination of a core-tube and a die, having a passage *w* between them, a tube *k* within a water-jacket surrounded by non-heat-conducting material within the core-tube, and a tube *e*, surrounded by a water-jacket within the die, substantially as described.

4. In a lead-press, the combination of a core-tube and a die, having a passage *w* between them, a tube *k*, surrounded by a water-jacket D^2, comprising chambers i' i^2, with an opening i^3 between them within the core-tube, a water-supply pipe H, leading into the chamber i', and a drain H′, leading from the chamber i^2, substantially as and for the purpose set forth.

HENRY B. COBB.

In presence of—
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