(No Model.) 3 Sheets—Sheet 1.

V. ROYLE & J. ROYLE, Jr.

MACHINE FOR COVERING WIRES, CABLES, &c., AND FOR MAKING TUBING AND CORD.

No. 441,808. Patented Dec. 2, 1890.

Fig. 4.

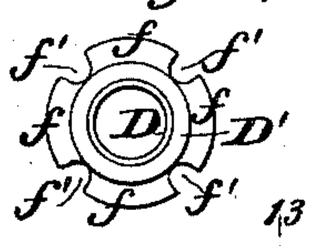


Fig. 1

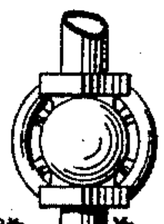


Fig. 3.

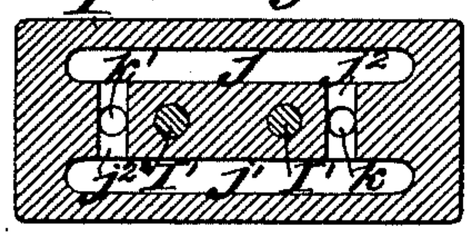
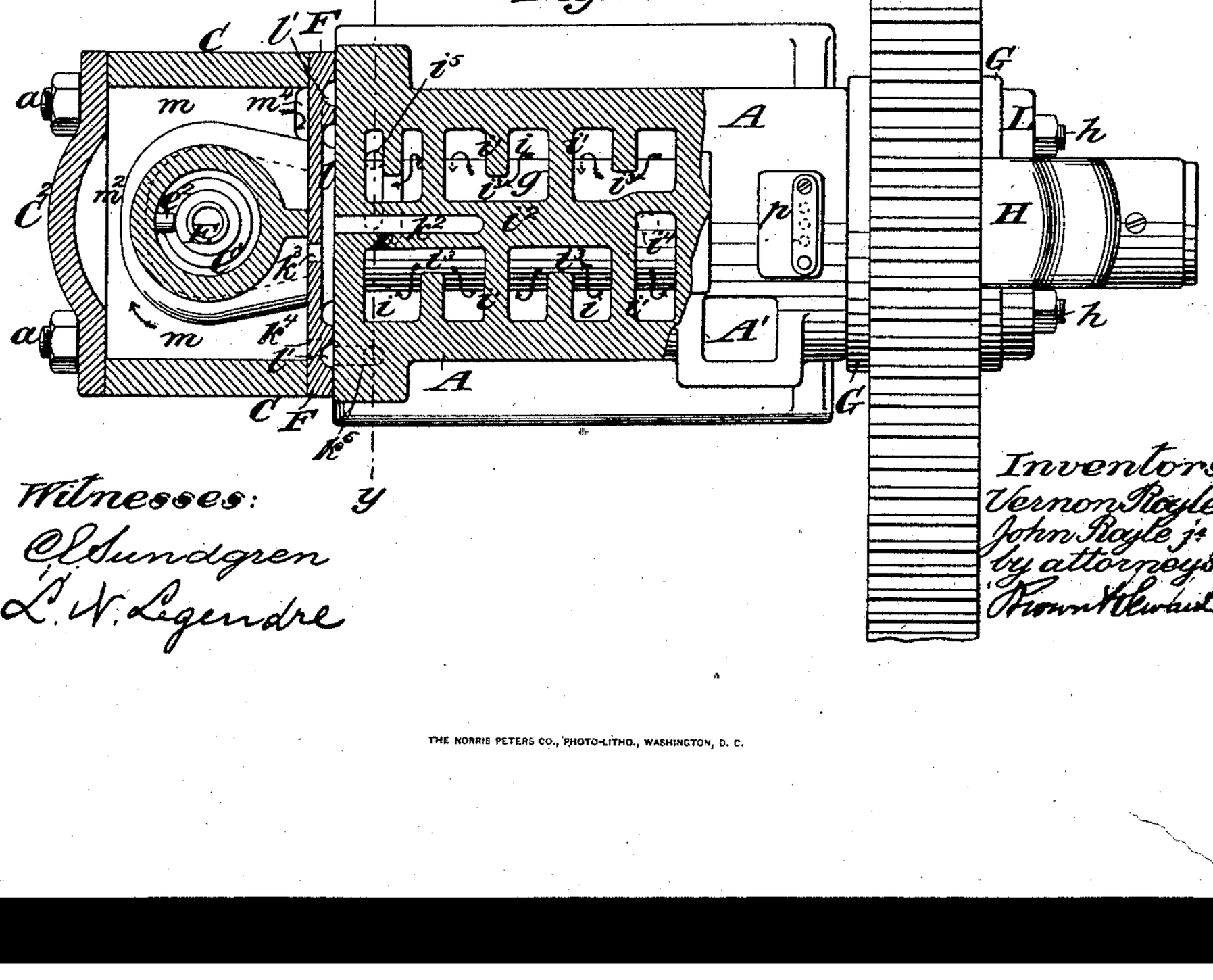


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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MACHINE FOR COVERING WIRES, CABLES, &c., AND FOR MAKING TUBING AND CORD.

No. 441,808. Patented Dec. 2, 1890.

Fig. 5.

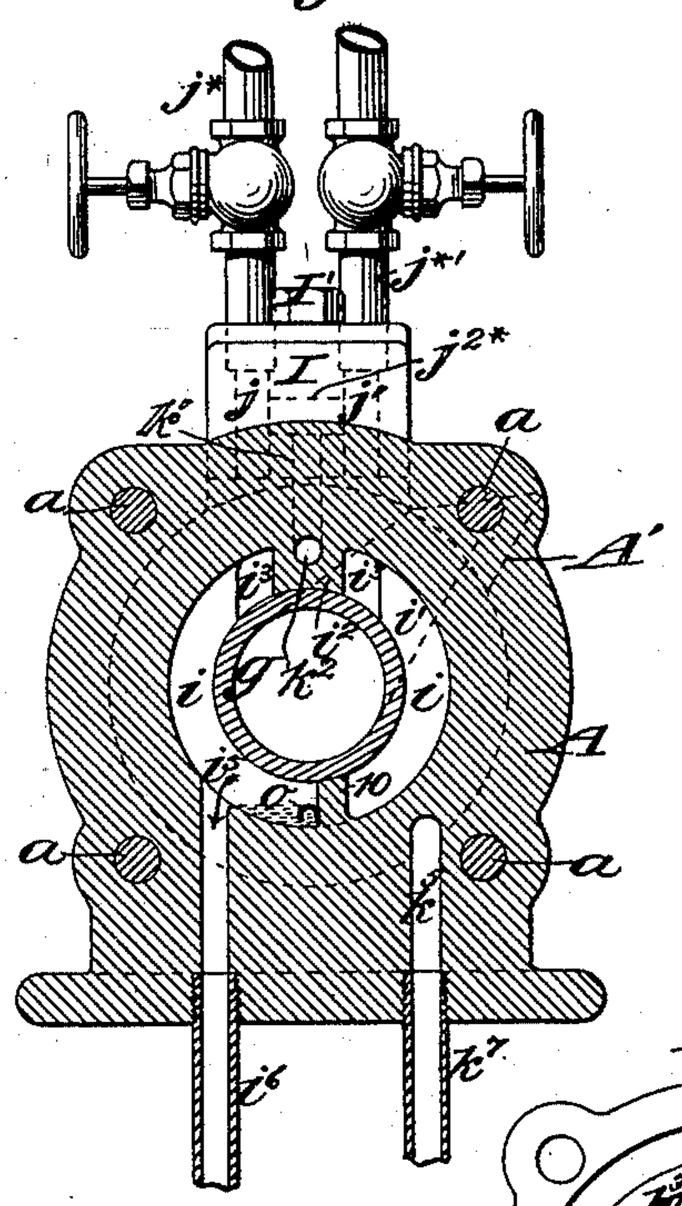


Fig. 7.

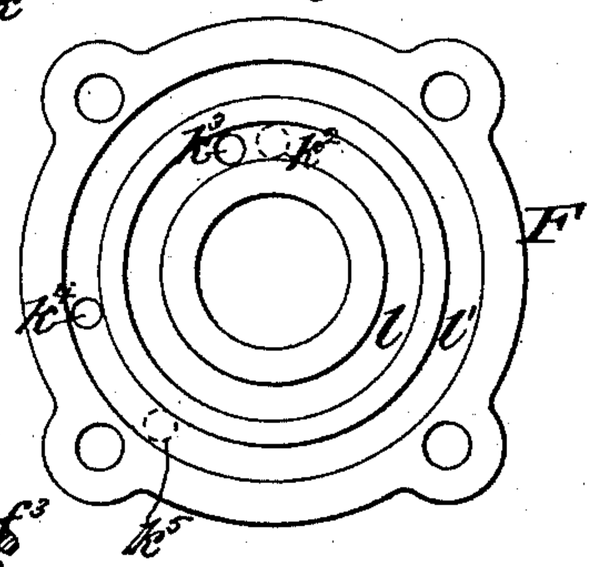
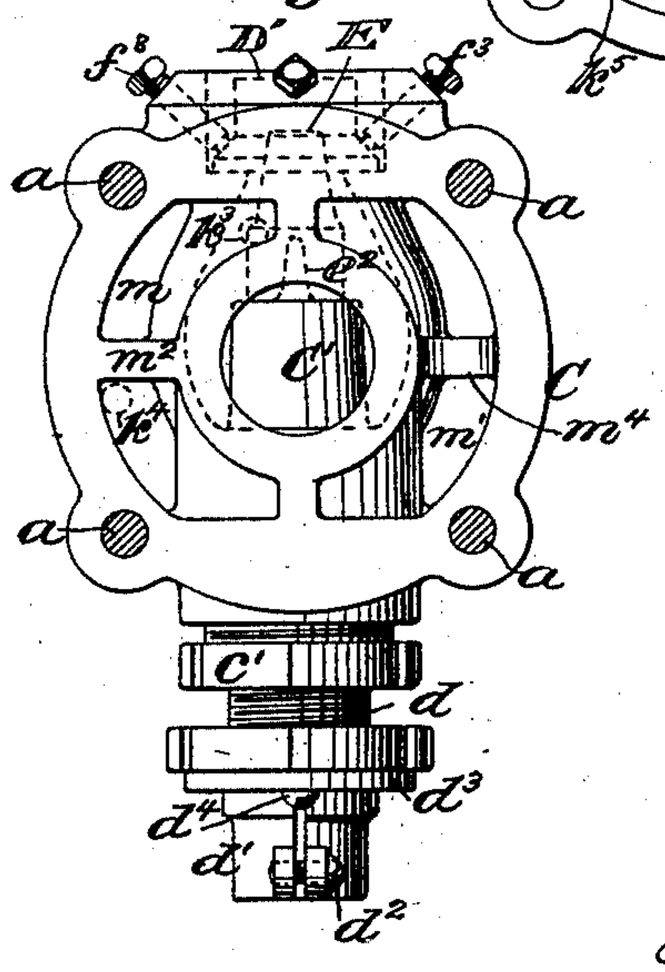


Fig. 6.



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MACHINE FOR COVERING WIRES, CABLES, &c., AND FOR MAKING TUBING AND CORD.

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Fig. 8.

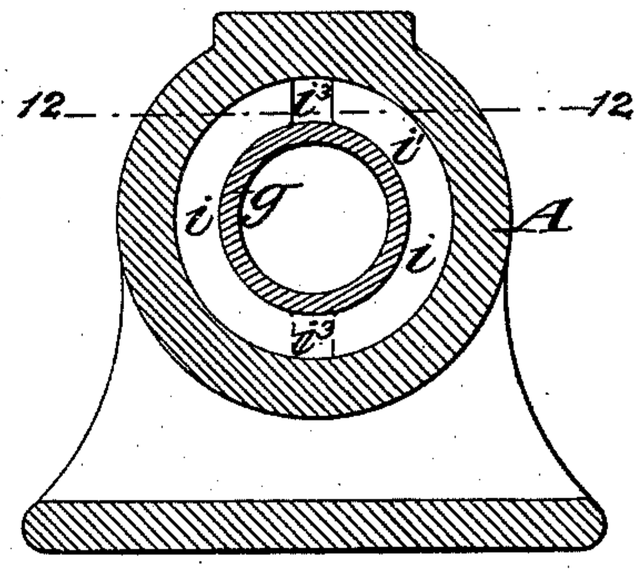
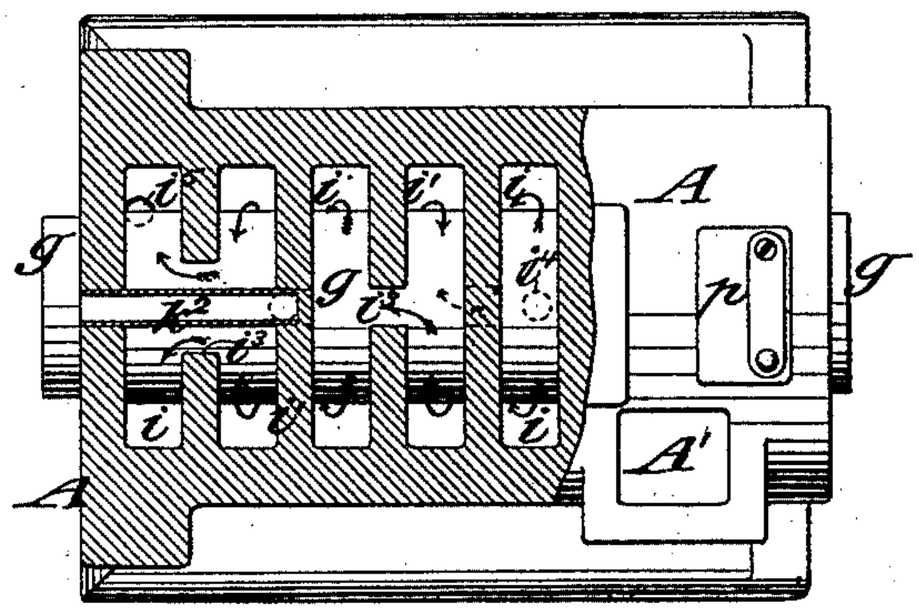


Fig. 9.



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UNITED STATES PATENT OFFICE.

VERNON ROYLE AND JOHN ROYLE, JR., OF PATERSON, NEW JERSEY.

MACHINE FOR COVERING WIRES, CABLES, &c., AND FOR MAKING TUBING AND CORD.

SPECIFICATION forming part of Letters Patent No. 441,808, dated December 2, 1890.

Application filed August 30, 1890. Serial No. 363,513. (No model.)

To all whom it may concern:

Be it known that we, VERNON ROYLE and JOHN ROYLE, Jr., both of the city of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Machines for Covering Wires, Cables, &c., and for Making Tubing and Cord, of which the following is a specification, reference being had to the accompanying drawings.

This invention is especially applicable to the covering of telegraphic conductors of various kinds, as wire or cables, with insulating compounds of a plastic nature or capable of reduction to a plastic condition, but is also applicable to the covering of other bodies with such materials and to the manufacture of tubing and cord of such material.

A machine embodying our invention consists, generally speaking, of a press and a die of a form and size corresponding with those of the exterior of the covering or body to be produced, and when intended for the covering of a wire or body or the manufacture of a tube it includes, also, a thimble or core corresponding with the exterior of the wire or body to be covered or with the interior of the tube to be produced.

We will first describe in detail a machine for covering telegraph-cables embodying our invention, and will afterward point out its novelty in claims.

Figure 1 represents a central longitudinal vertical section of the machine. Fig. 2 represents a plan of the same, mostly in section, the section being taken in the line *x x* of Fig. 1. Fig. 3 represents a horizontal section of part of the machine in the line *z z* of Fig. 1. Fig. 4 is a plan or end view of the die which gives form and dimension to the exterior of the body or covering produced by the machine. Fig. 5 represents a transverse section of the machine, taken in the line *y y* of Figs. 1 and 2. Fig. 6 represents a transverse section in the line 13 13 of Fig. 1. Fig. 7 is a face view of a plate which is interposed between the body and head of the press. Fig. 8 is a transverse sectional view illustrating a modification of the press-body. Fig. 9 is a plan corresponding with Fig. 8 of the press-body, partly in section in the line 12 12 of Fig. 8.

Similar letters of reference designate corresponding parts in all the figures.

A and *g* designate the press-body, consisting of the cylindrically-bored trunk having a feeding-hopper A′, and B is the feed or pressure screw fitted to said trunk, said trunk and screw constituting the principal elements of the press, which is substantially like the press represented in our Letters Patent No. 325,363, dated September 1, 1885, and like other presses for similar purposes, except as to the provision for heating and cooling it, which will be hereinafter fully described.

C is the press-head containing the die D and the core E, the axis of the die and the thimble or core being arranged in the same plane with the axis of the press-body, but perpendicularly thereto. This press-head is secured to the body by bolts *a* outside of the latter, passing through lugs in the body and head. In order to provide for adjusting the said head with the axis of the die and core either horizontal or vertical and that the die and the thimble or core may be presented upward, downward, or in either direction horizontally, the bolts *a* are four in number, and the holes provided for them in the body and head are equally spaced, so that the bolt-holes in the head may range with those in the body in four different positions of the latter. The head has an opening in one side to receive the changeable die D and is bored through the opposite side in line concentrically with said die to receive the core-holder E′, into which the changeable thimble or core E is represented as screwed at *e*, Fig. 1. This holder passes through a stuffing-box *b* on the opposite side of the head to the die and is packed tightly around its exterior within said box by means of compressible packing-rings *c* and a gland *c′*. These packing-rings also assist in rigidly securing the core-holder E′, yet permit its longitudinal movement.

To provide for the adjustment of the thimble or core forward or backward within or relatively to the die, the said holder is fitted with an externally-screwed socket *d*, which screws into a female thread in the gland *c′*. This socket is secured to the core-holder so that both move longitudinally together by means of a split clamping-collar *d′*, which is clamped tightly on the rear end of the die-holder by means of a clamping-screw d^2. In order to provide for this adjustment of the

core-holder without turning it, the screwed socket d is fitted loosely to the holder and is attached to the clamping-collar d' by means of a ring d^3, which is secured to it by screws d^4, and which enters a groove in the said collar. When the socket d is screwed into or out of the gland, it turns on the collar d' and core-holder E′, and so moves the said holder forward or backward without turning it.

In the machine represented, which, as hereinbefore mentioned, is for covering cables, not only the thimble E is hollow, but also the holder E′, to permit the passage through them of the cable, the interior of the thimble being just large enough for the cable to pass through; but for making tube a solid core might be substituted for the hollow core or thimble E. In either case the exterior of the core or thimble might be made taper, and so may the entrance to the die, so that by the longitudinal adjustment of the core-holder the annular space between the core or thimble and the die may be varied, according to the required thickness of the covering of the cable or of the walls of the tube.

In order to provide for the substantial support of the core-holder E′ against the pressure of the plastic substance forced into the head C by the press-screw, the head has constructed integral with it an internal socket C′, which projects into the cavity of the said head beyond the center thereof, as shown in Fig. 1, and from the back of the said socket there is a rib-like projection of the solid metal, as shown at e^2 in Figs. 1 and 2 and in dotted lines in Fig. 6, for the further and higher support of the core-holder, the said projection e^2 being tapered upward, as shown by the dotted lines in Fig. 6, to permit the plastic material to pass more freely over it behind the core and into the die.

The die D is represented as fitted tightly into a socket or holder D′ for the purpose of facilitating the use of dies of different sizes, which may be fitted to the same holder in such manner as to be interchangeable.

To provide for the positive concentric adjustment of the die and core, we prefer to make the die laterally adjustable relatively to the core, instead of making the core adjustable relatively to the die, as has heretofore been done, because by that means we are enabled to support the core more rigidly against the lateral pressure to which it is subject and to preserve a tight joint between the adjustable core-holder and the head at the base of said holder. This adjustment is provided for in the following manner: The base of the die-holder D′ is flat and it has a flange f, which is beveled on its outer side at an angle of about forty-five degrees to the base, as shown in Fig. 1, and in this beveled flange are notches f', as shown in Fig. 4. The flat base of the said die-holder is supported upon or against the flat bottom or back of a recess f^2 provided in the press-head, the said recess being wide enough for the adjustment of the die-holder in all directions laterally therein. Through the walls of this recess are screwed adjusting-screws f^3, which have such an inclination as to press upon the beveled outer face of the flange f perpendicularly thereto. The screws applied in this way serve the twofold purpose, first, of holding the die-holder firmly in place when all screwed up tight, and, second, of adjusting the said holder to bring the die concentric with the core by screwing outward one or more of the screws and screwing inward another or others. By slackening all of the said screws f^3 the die-holder is left free to be turned to bring its notches f' opposite the screws, which permits the holder and the die in it to be taken out whenever desirable.

To provide a jacket for the heating and cooling of the press-body and the screw B by the circulation through the press-body of steam, water, or other heating or cooling fluid, the outer shell A of the body, which is of cast-iron, has cored in it a circuitous passage or jacket i, the inner walls of which are formed by a cylindrical bushing g, of drawn-steel tiling, fitted and expanded into the shell A. The said bushing, which contains the bore to which the press-screw B is fitted, is represented as also entering into and centering a plate F between the body and the head C and a cylindrical hub G, bolted onto the back of the body by bolts h, the said hub G also serving another purpose, to be hereinafter described.

The jacket or passage i, as shown in Figs. 1, 2, and 5, is formed in the shell A by a series of internal annular flanges i', into which the bushing fits tightly, and a longitudinal rib i^2, connecting all of the said flanges, an opening i^3 being formed through each flange, first in one flange on one side of the said rib i^2 and then in the next flange on the other side of the said rib, and so on alternately through the whole series, the inlet-opening being at i^4 near one end of the body, and the outlet-opening i^5 being near the other end of the body, as shown in Figs. 1, 2, and 5. The outlet-opening and outlet-pipe i^6 are also shown in Fig. 5. Near the outlet-opening there is a partition 10, (shown in section, Fig. 5, and dotted in Fig. 2,) which only extends from the last flange i' to the end of the press-body, and which forms the end of the passage i, the only outlet from which is at the bottom at i^5, as before described.

For the purpose of draining the water of condensation from the bottoms of the several annular channels between the flanges i' i' of the jacket when steam is used as a heating medium, we make holes through the several flanges near the bottoms thereof and insert through the said openings a horizontal pipe o, (see Figs. 1 and 5,) which is open along its bottom. Through this pipe all the channels are drained into that one in which the outlet i^5 is situated. To drill the said holes in the flanges i and insert the pipe o, a hole

is first drilled through the end of the shell; but after inserting the pipe the last-mentioned hole is plugged up with a screw-plug o', as shown in Fig. 1. The heating or cooling fluid arrives at the inlet i^4 through a chest I, bolted by bolts I′ onto the top of the shell A. This chest is shown in section in Figs. 1 and 3. It has two compartments $j\,j'$, the former for heating fluid, as steam, and the latter for cooling fluid, as water, the separate fluids being supplied to the respective compartments by pipes $j^*\,j'^*$, furnished with stop-valves. The two compartments $j\,j'$ are in communication with each other by lateral openings $j^2\,j^{2*}$ in their partition, and from the opening j^2 is a passage k to the jacket-inlet i^4, as shown in Fig. 1, which will conduct either the heating or the cooling fluid into the jacket, according to which of the stop-valves in the pipes $j^*\,j'^*$ is open. This construction of the press-body with a passage in the interior of the shell and a bushing which forms the inner wall of said passage and combines with said passage to form a jacket enables the said wall of the jacket which is next the bore and feed-screw to be made much thinner than is possible in a press-body in which the jacket and bore are cast integral with the outer shell, and therefore the said construction enables the heating or cooling fluid to be brought as near as practicable to the compound that is being worked in the press, with the result that any change required in the temperature may be more quickly effected.

From the opening j^{2*}, before mentioned, in the chest I (see Figs. 1 and 3) there is a passage k', which communicates through a passage k^2 (see Figs. 1 and 5) in the press-body A with a concentric annular groove l (see Figs. 1, 2, and 7) in the face of the plate F, hereinbefore described as interposed between the press-body A and head C, the said groove serving the purpose, in whatever position the head is turned, of conducting the heating or cooling fluid to the jacket $m\,m'$, which is provided in the press-head C for the circulation of such fluid, which passes from the said groove to the said jacket through a hole k^3 (see Fig. 7) provided in said plate within said groove and communicating with the upper compartment m of the jacket $m\,m'$ of the press-head, the two said holes being always kept in register with each other by always shifting the plate F with the press-head C.

The jacket $m\,m'$ of the press-head is divided into two compartments by a transverse partitition m^2, which also extends into the removable bonnet C^2 which is provided on said head. The heating or cooling fluid enters through the hole k^3 into the upper compartment m and passes thence through an opening m^4 (see Figs. 2 and 6) in the partition m^2, whence it makes its exit through a hole k^4, which is shown in Fig. 7, and which has its position dotted in Fig. 6, into a second concentric annular groove l' in said plate, which groove is always in communication through a passage k^5 in the press-body (shown in section, Fig. 5, and in dotted outline in Fig. 2) with an outlet-pipe k^7.

For driving the screw B the said screw is prolonged in the form of a shaft B′ and projects through the press-body and through the fixed hub G, before mentioned as bolted to the latter, and a spur-gear J or driving-pulley is fitted to turn freely on the said hub and connected with the said shaft by a clutch H, which is fast upon the shaft and engages between the spokes of the gear or pulley. The gear or pulley is kept in place on the fixed hub G by means of an annular plate or collar L, of larger diameter than said hub, which is bolted to the said hub by the same bolts h. which bolt the said hub to the press-body. This collar L serves as a thrust-bearing for the screw B, the thrust being received from a shoulder n on the screw-shaft B′ through steel washers $n'\,n^2$, inserted into a counterbore in the hub G between the said shoulder and the thrust-collar L. Three washers are represented.

The above-described provision for driving and receiving the thrust of the press-screw relieves the screw of the weight of the gear J or driving-pulley, which is necessarily large and heavy, and it provides facility for changing the screw when necessary, as when the nuts are taken off from the bolts h the screw can be withdrawn through the hub G, the thrust-collar coming with it.

In Figs. 1 and 2 there is shown an oil-box p, from which branch passages p' are provided leading through the hub G for the lubrication both of the gear or pulley J and of the thrust-bearing and its washers.

If it should be desired to use the machine to make a simple cord, the core and core-holder may be removed, and the opening through which the core-holder enters the press-head may be closed by any suitable means.

In the modification of the press-body shown in Figs. 8 and 9 the circuitous passage between the shell A and the bushing g consists of plain flanges i', cast on the interior of the shell and having each a single opening i^3 through it, the said opening being in the upper part of one flange and the lower part of the next one through the series, as may be understood by reference to the said figures. In this example the inlet is at i^4 and the exit at i^5, as in the first-described example, and the passage k^2, leading to the head, instead of being cored out, as shown in Fig. 2, is made by a pipe, as shown in Fig. 9.

The circuitous passage provided in the press-body for the heating or cooling fluid by either of the constructions herein shown and described causes a much more uniform heating of the bore of the cylinder and its contents than a simple jacket formed by two plain cylinders, one within the other, as has been common in such apparatus.

It may be here remarked that the plate F

is only made separate from the press-head C as a matter of convenience for the construction of the passages in and through it which could not be so easily made in the head itself; but the said ring, being always shifted with the head C and never changing its position relatively thereto, is to all intents and purposes a part of the head.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with the press-head constructed with a recess in its exterior, having a flat bottom or back, and a die having a flat base and a flange with a beveled outer face, of screws inserted obliquely through the walls of said recess and pressing on the beveled face of said flange for the purposes of adjusting said die laterally into position and holding the said die when adjusted, substantially as herein set forth.

2. The combination, with the press-head having a recess f^2 in its exterior, and a die having a beveled flange f supported in said recess, of set-screws f^3, passing obliquely through the walls of said recess to press upon the said flange to both adjust and secure the die, the said flange having notches f' to provide for the removal of the said die, all substantially as herein set forth.

3. The combination, with the head of a press for covering wires, cables, or other bodies or making tubing, of a die laterally adjustable relatively to the core, and a core which is adjustable in an axial line or lengthwise relatively to said die, substantially as herein set forth.

4. The combination, with the press-body and the longitudinally-adjustable core-holder, of the press-head having a lateral opening for said holder and having the internally-projecting socket C′ surrounding said opening, and the narrow projection e^2, extended beyond said socket on the side opposite the press-body for the support of the said holder, substantially as herein described.

5. The combination, with the press-head having a screw-threaded opening for a core-holder, of a core-holder adjustable lengthwise through said opening, an externally-screw-threaded socket d, fitted to said core-holder and screwing into said screw-threaded opening, an externally-grooved clamping-collar d', secured firmly to said core-holder, and a ring d^3, secured to said socket and entering the groove in the clamping-collar, all substantially as herein set forth.

6. The combination, with the press-head and the longitudinally-adjustable core-holder passing through one side thereof, of the stuffing-box b, the compressible packing-rings c therein, and the gland or follower c', for compressing said rings, for making a tight joint between the press-head and core-holder, and for assisting to secure the core-holder in place, substantially as herein set forth.

7. The combination, with a press-body having a cylindrical bore and a feed-screw fitted thereto, of a press-head having in it a transversely-arranged die and core and adjustable to present said die and core in different directions, substantially as herein described.

8. In a machine for covering wires, cables, or other bodies or manufacturing tubing or cord, comprising a cylindrically-bored press-body and a pressure-screw working therein, the said body having within it a circuitous passage within its walls for the circulation of a heating or cooling fluid, substantially as herein described.

9. The press-body composed of a shell A, having internal flanges i', and a bushing g, fitted within said flanges, the said flanges and bushing combining to form a circuitous passage within the body, substantially as and for the purpose herein set forth.

10. The hollow press-head constructed with a transverse partition, having an inlet on one side of the said partition, an outlet on the other side of the said partition, and an opening through said partition for producing a circuitous circulation of heating or cooling fluid through it, substantially as herein described.

11. The combination, with the press-body having an inlet-passage k^2 and outlet-passage k^5 within it, of the hollow press-head adjustable around the axis of said body, having two compartments, and constructed with grooves $l\ l'$ in its inner face communicating, respectively, with said inlet and outlet passages and with inlet-hole k^3 and exit-hole k^4, through which said grooves communicate with said compartments, substantially as herein described, for preserving communication between the interior of the head and the said inlet and outlet in different positions of the head relatively to the body, as herein set forth.

12. The press-head constructed of three parts C C^2 F, viz: a central part C, an outer bonnet C^2, and an inner plate F, the said central part and bonnet having corresponding partitions m^2, by which they are divided into two compartments, and the inner plate having holes k^3 k^4, communicating, respectively, with inlets and outlets for fluid, and grooves $l\ l'$, forming communication, respectively, between said grooves and said compartments, substantially as herein set forth.

13. The combination, with the press-body having within it a circuitous passage, of the open-bottomed drain-pipe o, passing through the partitions between the channels of said passage and bringing all said channels into communication with a common outlet, substantially as herein set forth.

14. The combination, with the press-body and the press-screw having a shoulder on its shaft, of a fixed hub on said body, through which the shaft passes, a driving-gear or pulley loose on said hub, a clutch fast on the shaft, and a collar secured to said hub and serving the two purposes of confining the gear

or pulley thereon and of a thrust-bearing for the screw, substantially as herein described.

15. The combination, with the press-screw having a shoulder *n* on its shaft, and the press-body having thereon a hub G, within which is a cavity, of the driving-gear J or pulley fitted to said hub, the collar L, secured to said hub, the clutch H on the screw-shaft, engaging with said gear or pulley, and the washers n' n^2, placed in said cavity between the shoulder *n* and the collar L, all substantially as and for the purpose herein set forth.

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