(No Model.) 2 Sheets—Sheet 1.

J. ROBERTSON.

MODE OF PREPARING PIPES OR TUBES FOR COUPLING.

No. 407,038. Patented July 16, 1889.

Fig. 1.

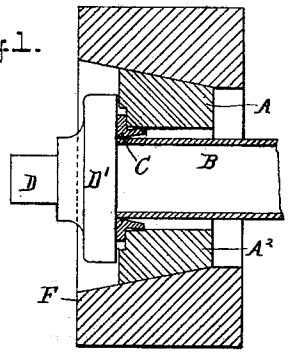


Fig. 2.

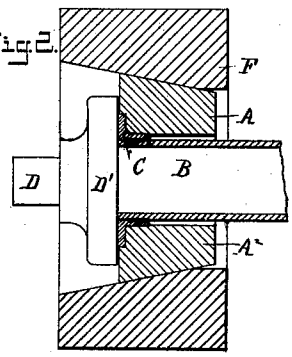


Fig. 6.

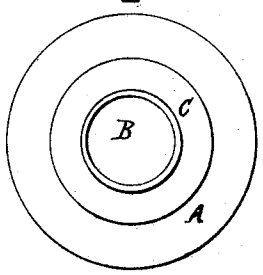


Fig. 4.

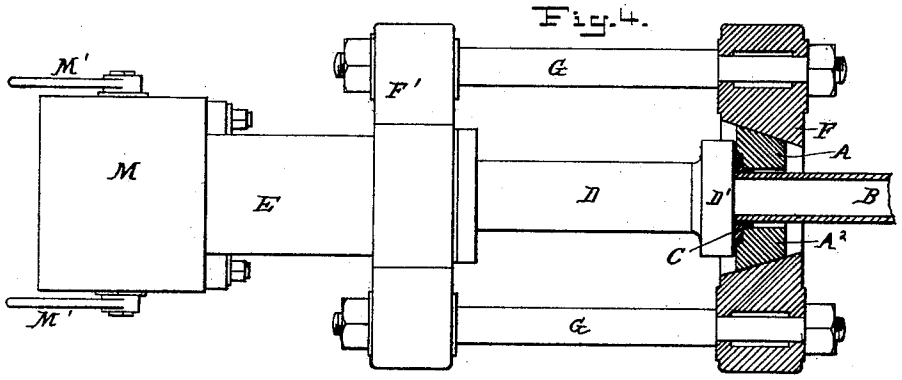


Fig. 3.

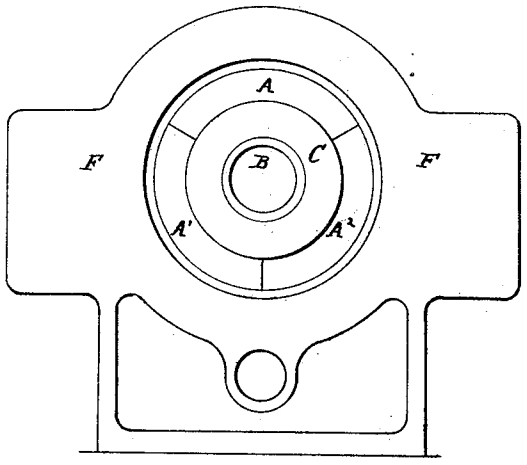
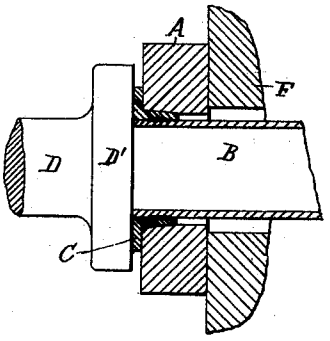


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

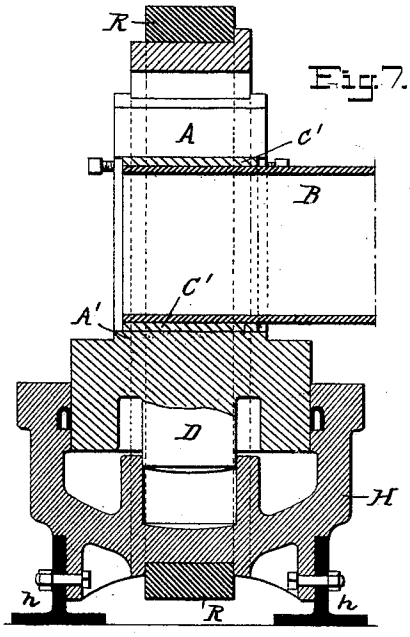
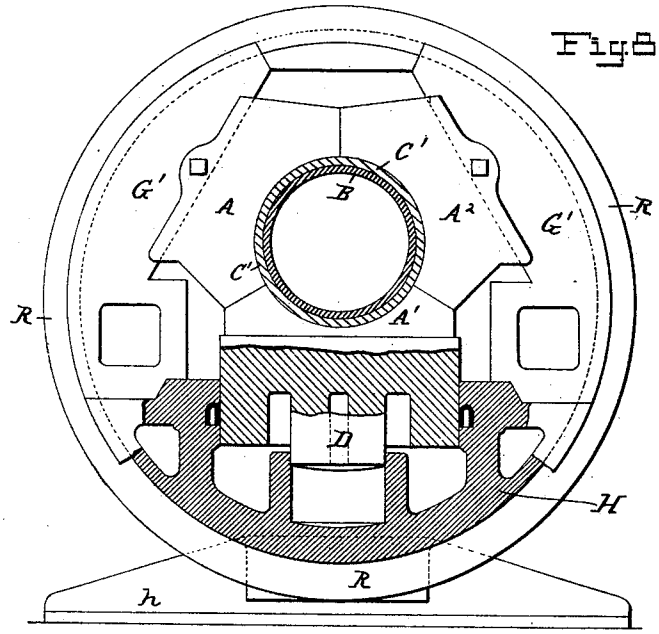


Fig. 8.



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UNITED STATES PATENT OFFICE.

JAMES ROBERTSON, OF BIRMINGHAM, COUNTY OF WARWICK, ENGLAND.

MODE OF PREPARING PIPES OR TUBES FOR COUPLING.

SPECIFICATION forming part of Letters Patent No. 407,038, dated July 16, 1889.

Application filed May 22, 1889. Serial No. 311,728. (No model.) Patented in England November 18, 1886, No. 14,993; in France September 6, 1887, No. 185,678; in Belgium September 7, 1887, No. 78,800, and in Germany September 13, 1887, No. 43,944.

To all whom it may concern:

Be it known that I, JAMES ROBERTSON, a subject of the Queen of Great Britain and Ireland, and residing at 95 Colmore Row, Birmingham, in the county of Warwick, England, have invented Improvements in Preparing Pipes or Tubes for Coupling, (for which I have obtained Letters Patent in Great Britain, No. 14,993, dated November 18, 1886; in France, No. 185,678, dated September 6, 1887; in Belgium, No. 78,800, dated September 7, 1887; and in Germany, No 43,944, dated September 13, 1887,) of which the following is a specification.

My invention consists of an improved mode of preparing pipes for coupling purposes, more particularly pipes formed of wrought-iron or steel, by the application thereto of wrought-iron or steel socket ends or bosses in the manner hereinafter described.

The essential feature of my invention consists in applying to the ends of the tubes or pipes socket ends or bosses, of wrought-iron or steel or similar hard metal while in a cold state, or as cold as not to be made soft by heat, and crushing such socket ends or bosses by direct lateral or radial compression upon the ends of the tubes. No artificial heat is given to the socket end or boss to obtain shrinkage by cooling.

My invention is designed only for working upon socket ends or bosses of hard metal—such as wrought-iron or steel—and is not suitable for soft-metal sockets or bosses or for soft-metal pipes or hose-pipes.

I am aware that it was many years ago proposed to compress coupling-sockets of lead or similar soft metal for lead pipes; but my invention relates to a different art, in which hard metal—such as wrought-iron or steel—is employed.

In the accompanying drawings, Figure 1 is a sectional view of a pipe end with a flanged socket end or boss about to be compressed upon the same by means of dies, also shown in section. Fig. 2 is a corresponding view illustrating such socket or boss as compressed down upon the end of the pipe. Fig. 3 is an end view showing the construction of the dies with the pipe and socket end or boss in place. Fig. 4 is a plan view, drawn to a smaller scale, of a complete press by means of which my invention may be carried into effect. Fig. 5 is a view corresponding with Fig. 2, but showing my invention carried out with a somewhat different form of die. Fig. 6 is a front view of the die with the pipe end and socket or boss thereon. Fig. 7 is a transverse section of a pipe with another form of boss or socket compressed thereon in dies, which are also shown in section. Fig. 8 is an end view corresponding with Fig. 7, and showing a part of the dies in section.

In Figs. 1 to 6 I have shown the wrought-iron or steel socket end or boss on the end of the pipe as flanged and adapted to be joined to a corresponding flanged socket on the adjoining end of the next pipe, the two flanges being held together by bolts passing through openings in the flanges, or by other suitable means.

In Figs. 7 and 8 I have shown the socket or boss as a plain cylindrical one, which may be screw-threaded on its periphery for the reception of a correspondingly-threaded coupling.

Where the socket or boss to be applied to the pipe end is flanged, I prefer to employ the construction of dies illustrated in Figs. 1 and 2, in which B is the pipe end and C is the flanged socket, of wrought-iron or steel, which I press upon the pipe end by means of the dies or matrices A A′ A^2. These three parts of the dies are of conical or inclined form externally, and are contained within a cross-head F, having a correspondingly-formed central opening. The ram-head D′, pressing against the end of the pipe and the socket or boss and the larger ends of the three-part die, is caused to push them inward into the cross-head in the direction of the length of the tube or pipe B, so that in this way the wrought-iron or steel socket end or boss is compressed down upon the end of the pipe by direct lateral or radial compression, diminishing the diameter of the socket end or boss. This form of die is especially adapted for pressing and fixing flanged

sockets or bosses upon the ends of tubes or pipes, and it has the advantage of increasing the force of the pressing-ram, according to the degree of angle or inclination formed on the external surfaces of the three-part matrices. The external surfaces of the matrices are lubricated, and their angle is such that the center line of the ram and the tube will readily slack off as soon as the pressure of the ram is withdrawn. The degree of angle shown in the drawings would increase the pressing action of the matrices, as compared with the direct compressing action of the hydraulic ram, to about four times.

In the drawings I have shown the socket or boss as compressed upon the end of the tube or pipe, with intermediate jointing material—such as cord or thread of asbestus or other materials—wound upon the tube. In such case the socket or boss is made widest at the inside, as indicated in Fig. 1.

While I do not wish to limit myself to any particular form of die or hydraulic press, I have illustrated in Fig. 4 a construction of a hydraulic press which may be used in connection with the form of die referred to. In this construction the cylinder E and the ram D are preferably arranged horizontally, and the cross-head F is united to a cross-head F′ upon the cylinder end by means of strong bolts or stays G. With the cylinder are combined suitable actuating-pumps placed in a water-cistern M, and of which the controlling-levers M′ are shown.

In the modification illustrated in Figs. 5 and 6 the die or matrix A, instead of being in three parts, is in one piece, and simply bears against the end of the cross-head F of the press, through which the end of the pipe B projects. The central opening in the matrix or die A is made upon the side adjacent to the ram-head D′, of the tapering form illustrated and of such a size that when the ram-head D′ forces the flanged socket end or boss and pipe end into the tapering opening in the die such socket end or boss will be forcibly compressed upon the end of the pipe. A hydraulic press, similar to that shown in Fig. 4, may be used in connection with this construction of die.

Where plain bosses or socket ends of wrought-iron or steel are to be compressed upon pipe ends, as shown in Figs. 7 and 8, the die may be made in two or more parts; but I prefer to make it in three parts A A′ A^2, which may be forced toward each other by direct pressure in a suitable hydraulic press. The frame of the press consists in this instance of a ring R, embracing the angled guide-pieces G′, and the base-piece H, which carries the ram, is mounted upon the feet *h*. The bottom part of the die A′ is supported by the ram D, while the parts A and A^2 bear against the inclined faces of the guides G′. The socket end or boss C′, of wrought-iron or steel, is placed upon the end of the pipe B and between the separated dies, which are then forcibly brought together, so as to compress the hard-metal boss by direct radial or lateral pressure upon the end of the pipe, diminishing the diameter of the boss.

I claim as my invention—

1. The mode herein described of preparing a pipe for coupling, said mode consisting in placing upon the end of the pipe a boss or socket end of wrought-iron or steel, and compressing this hard-metal boss or socket end in a cold state on the end of the pipe by direct radial or lateral pressure, diminishing the diameter of the socket, as set forth.

2. The mode herein described of preparing pipes for coupling, said mode consisting in placing over the end of the pipe or tube a wrought-iron or steel boss or socket end, interposing a jointing material, and crushing this hard-metal boss or socket end in a cold state onto the said tube or pipe and jointing material by direct lateral or radial compression, diminishing the diameter of the socket, all substantially as set forth.

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

JAMES ROBERTSON.

Witnesses:
WILLIAM LINDSAY,
WM. ROBERTSON.