(No Model.)

W. A. McCALLUM.

MACHINE FOR JOINTING TUBES.

No. 603,337. Patented May 3, 1898.

Fig. 1.

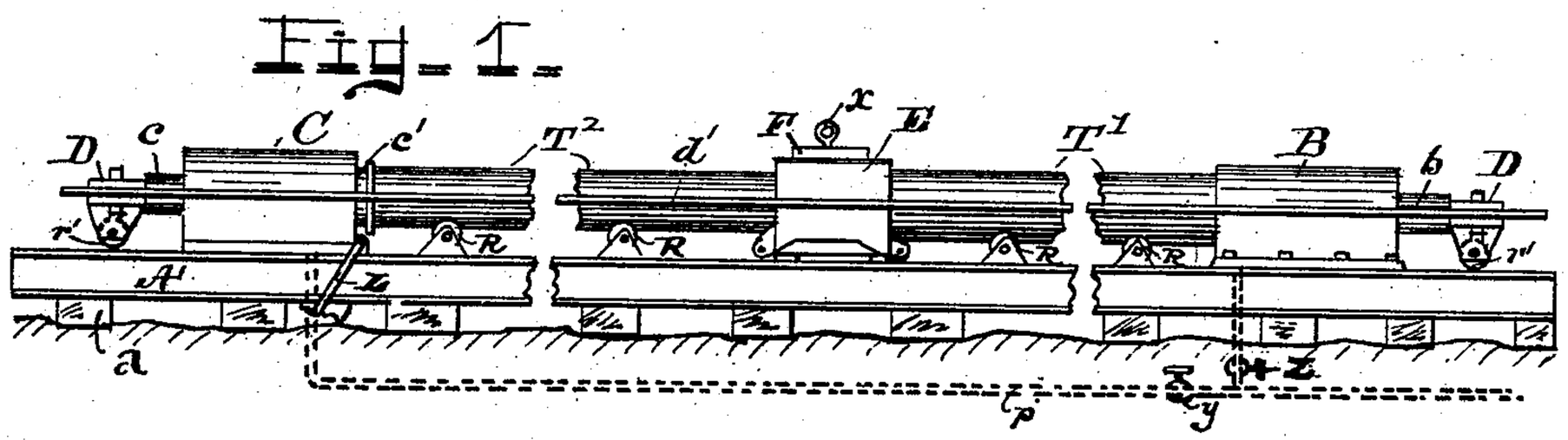


Fig. 2.

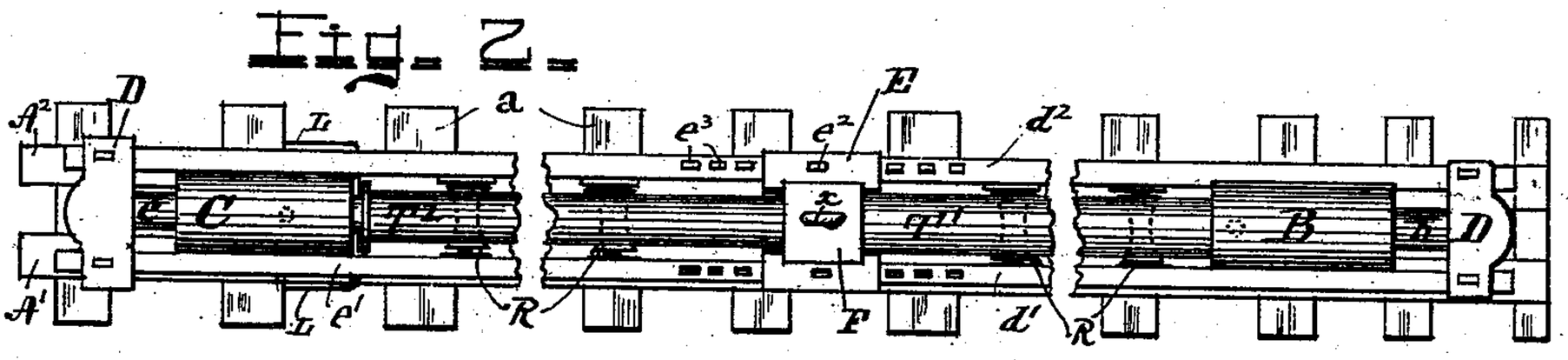


Fig. 3.

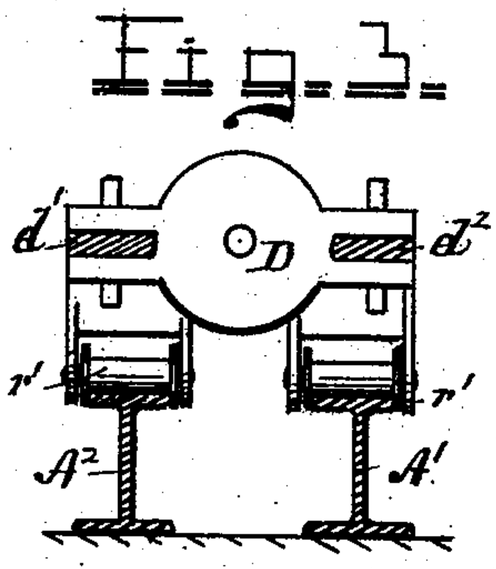


Fig. 4.

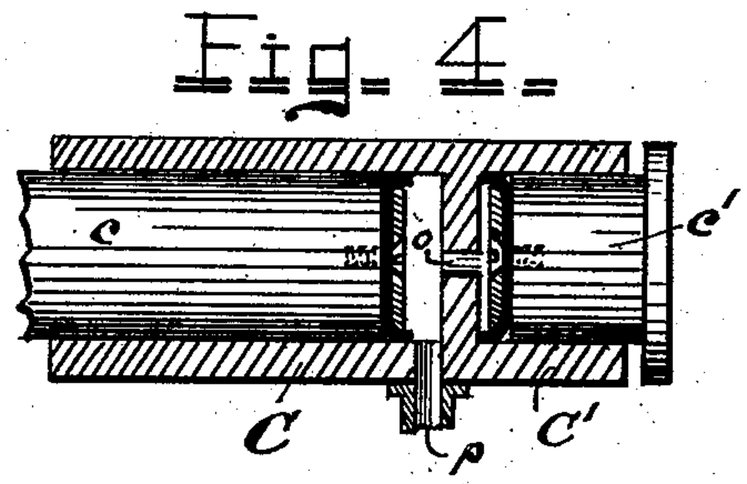


Fig. 5.

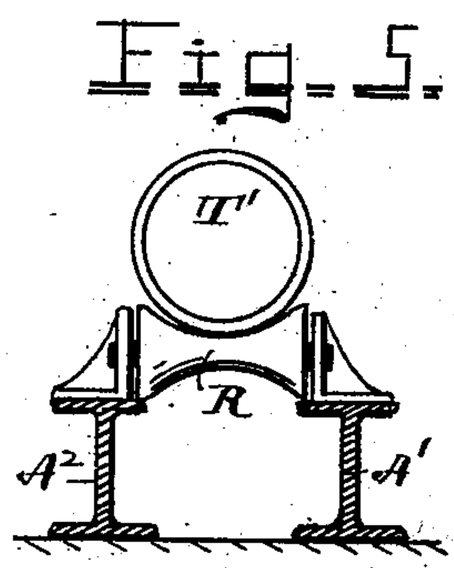


Fig. 6.

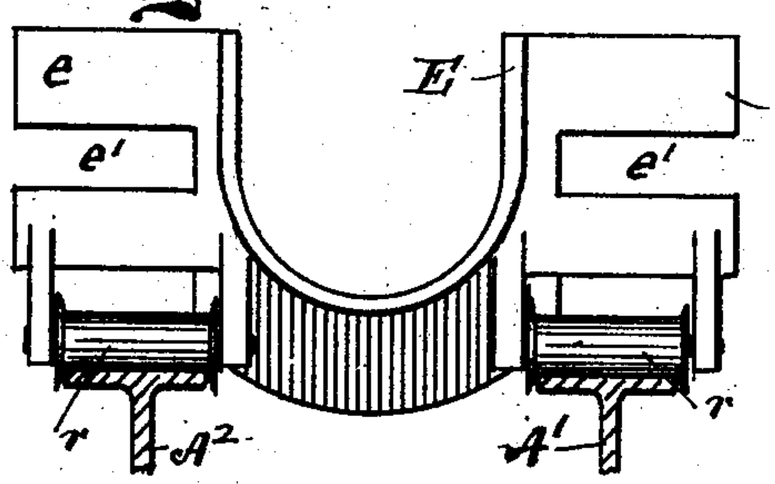
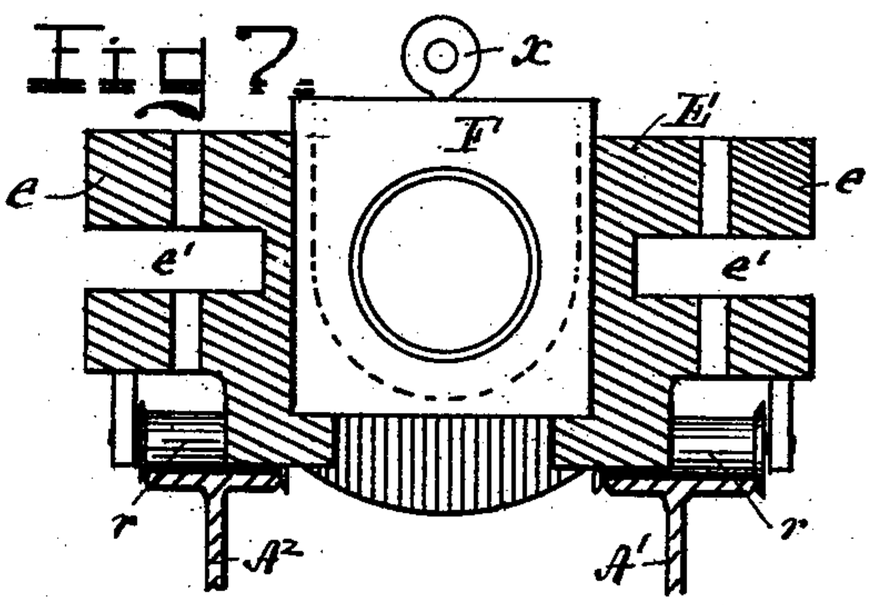


Fig. 7.



Witnesses.
D. K. Thrasher
James L. Foley.

William A. McCallum
Inventor
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UNITED STATES PATENT OFFICE.

WILLIAM A. McCALLUM, OF CINCINNATI, OHIO, ASSIGNOR TO CHARLES ANDREW, OF SAME PLACE.

MACHINE FOR JOINTING TUBES.

SPECIFICATION forming part of Letters Patent No. 603,337, dated May 3, 1898.

Application filed October 15, 1896. Serial No. 609,010. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. McCALLUM, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Machines for Jointing Tubes, of which the following is a specification.

My invention relates to machines for jointing metal tubing, its object being to produce a machine for the convenient and expeditious manufacture of tubular posts by compressing an outer tube upon an inner one, into which it is telescoped at the zone of the lap.

To this end my invention consists in the machine constructed and operating as hereinafter set forth, embodying generally a bed-frame, a central cross-head adapted to move upon the bed-frame and carrying a compression-die, actuating-cylinders at the outer ends of the bed-frame, and connections between the plungers of said cylinders and the cross-head for reciprocating the latter, and rolls for supporting the tubes while undergoing the action of the machine.

The particular features of invention embodied therein will be more specifically described, and set forth in the claims.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the machine complete, omitting the hydraulic forcing-pump; Fig. 2, a plan view of the same; Fig. 3, an end elevation of same, showing one of the plunger connections with the draw-bars; Fig. 4, an axial cross-section of the die-withdrawing cylinder and its supplemental cylinder and plunger; Fig. 5, a cross-section of the machine, showing one of the supporting-rollers; Fig. 6, an end elevation, and Fig. 7 a cross-section of the die-carrying cross-head.

Referring now to the drawings, A′ A² designate two parallel I-beams resting upon cross-ties *a*, suitably spaced apart to constitute a bed-frame for the machine. Upon the bed-frame near one end is firmly bolted a hydraulic cylinder B, with plunger *b* arranged to move outwardly, and at the opposite end of the frame is a similar cylinder C, with plunger *c* moving outward oppositely to the first, the cylinder C being adjustably secured to the bed-frame, as by a hook or yoke L. Outwardly the plungers *b* and *c* each engage movable blocks D, provided with rollers *r*′ to move upon the ways A′ A² of the bed-frame. The opposite blocks D are connected by parallel draw-bars *d*′ *d*², passing outside the cylinders B C in the horizontal plane of their axes above the ways A′ A².

At an intermediate point between the cylinders B C the draw-bars *d*′ *d*² connect with the cross-head E, arranged to reciprocate upon the bed-frame as impelled by the plungers *b c* alternately. The cross-head E is of the form indicated in the figures, provided with rollers *r*, supporting it upon the ways A′ A² and with a central recess adapting it to receive and carry a hollow die F, a series of interchangeable dies being provided adapted to the different sizes of pipe to be operated upon.

The dies F are solid blocks preferably of steel, each of rectangular or other external form, adapted to fit in the recess of the cross-head E (whereby it is carried and operated in relation to the tubes acted upon) and provided with an aperture of the diameter required to engage and act upon the tubes.

The cross-head E is attached to the draw-bars *d*′ *d*² by its wings *e*, having side recesses *e*′, through which the draw-bars pass and are secured by keys *e*², suitable engaging holes *e*³ being provided in the draw-bars at proper intervals to adjust the cross-head to any desired position in relation thereto.

The cylinders B C are permanently closed at their inner ends and are open at their outer ends and fitted with close-fitting plungers *b c*, provided with cup-leather packings in the usual manner.

The further construction and the functions of the several parts will appear in connection with the mode of operation, which is as follows: The plunger of the main operating-cylinder B being in its receded position, the larger tube T′ of the tubes to be jointed is placed between the draw-bars *d*′ *d*² upon suitably-provided supporting-roll R, with one end abutted against the rear end of the cylinder B and the other adjacent to and in line with the opening of the compression-die F. The smaller of the tubes T² is then placed in a relatively similar position in the extended

axis of the first, one end being passed through the compression-die F and telescoped within the larger tube T′ the distance of the desired lap and the other end adjacent to the rear end of the cylinder C being likewise supported upon rolls R from the ways A′ A². The driving-pump (not shown herein) is then set in operation and water forced through the pipes *p* (indicated by dotted lines in Fig. 1) into the cylinder B, moving its plunger *b* outward and drawing the cross-head E in the same direction, whereby the compression-die F is drawn inward upon the end of the tube T′, compressing it centripetally upon the tube T² and at the same time upsetting it longitudinally to some extent. When the die has reached the limit of the desired zone of compression, a valve, as *z*, controlling the flow to the cylinder B, is closed and one, as *y*, controlling the flow to the cylinder C, is opened. The cylinder C has a short rear extension C′, fitted with a short supplemental plunger *c*′ moving rearward. An aperture *o*, through the wall separating the two cylinders, admits the water to the two plungers simultaneously, but the smaller one having less resistance is first moved rearward until it comes into contact with the end of the tube T², thus forming a take-up to accommodate any lost motion and constitute an abutment for the smaller tube. The pressure of water then moves the plunger *c* outward, carrying the cross-head E backward and stripping the die from the tube T′. By pressure of the supplemental plunger *c*′ the post formed by the now united tubes T′ T² is held firmly in position between the said supplemental plunger and the cylinder B while the plunger *c* is operating. When the compression is complete and the die receded from the zone of lap, the composite tube T′ T² is lifted out of the machine with the die F still upon it, the latter supported by a hook *x* from a traveling crane (not shown) and slipped off the end of the tubes and again replaced in its containing cross-head for a new operation.

By readjustment of the cylinder C and the cross-head E to new positions upon the bed-frame and new relations with the draw-bars to accommodate new lengths of pipe and placing a new die in the cross-head to accommodate tubes of different diameter posts of any desired size can be made by the machine.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a tube-jointing machine embodying a longitudinally-extended bed or frame, operating-cylinders at or near the outer ends thereof, having plungers operating outwardly in opposite directions, draw-bars connecting said plungers, and a compression-die movable upon the bed or frame between the cylinders by attachment to the draw-bars, substantially as set forth.

2. In a tube-jointing machine, of the character indicated, the combination of a bed-frame, a fixed operating-cylinder at or near one end thereof, an adjustable withdrawing-cylinder at or near the opposite end thereof, draw-bars connecting the plungers of the cylinders, and an intermediate cross-head adapted to be attached adjustably to and be reciprocated by the draw-bars, and a hollow compression-die carried by the cross-head, substantially as set forth.

3. In a tube-jointing machine, of the character indicated, in combination with the bed-frame, operating and withdrawing cylinders, the draw-bars and intermediate cross-head, a supplemental cylinder and plunger in connection with the withdrawing-cylinder, said plunger acting as an adjustable backing for the tube under treatment, substantially as set forth.

4. In a tube-jointing machine, the combination of the bed-frame, operating-cylinders, draw-bars and cross-head, the intervening removable carrying-rolls in bearings attached to the bed-frame, substantially as set forth.

5. In a tube-jointing machine of the character indicated, the combination of the bed-frame; oppositely-acting cylinders attached thereto; cross-heads attached to the plungers of the cylinders and moved upon the bed-frame as a support; draw-bars connecting the cross-heads; and a central cross-head or die-carrier adjustably attached to the draw-bars, substantially as set forth.

6. In a tube-jointing machine, of the character indicated, the combination of the opposite cylinders, bed-frame, draw-bars, and the cross-head or die-carrier adjustably attached to the draw-bars, and an annular die carried by said cross-head, substantially as set forth.

7. In a tube-jointing machine, of the character indicated, the combination of the bed-frame, opposite cylinders, draw-bars, and the intermediate cross-head adapted to move upon the bed-frame, and provided with lateral wings provided with slots to receive the draw-bars, and removable pins connecting the same with the cross-head at any desired points, and an annular die carried by said intermediate cross-head, substantially as set forth.

8. In a tube-jointing machine of the character indicated in combination with the motor-cylinders for operating the die, a supplemental cylinder and plunger located at the back of the motor-cylinder with a perforated partition between the two and a take-up plunger operated by said supplemental cylinder against the end of the tube under treatment, to engage the same and accommodate any variations of length, substantially as set forth.

9. In a tube-jointing machine, the combination of the bed-frame, the opposite operating and withdrawing cylinders, the cross-heads and connections, and a pipe connecting the two cylinders, provided with two controlling-valves, and a supply connection entering between said valves, substantially as set forth.

10. In a tube-jointing machine of the character indicated, the cross-head or die-carrier

constructed with an open vertical slot or socket for the insertion of dies and with lateral wings for connection with the draw-bars, and with bearing-rolls for support and guidance upon the bed-frame, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM A. McCALLUM.

Witnesses:
L. M. HOSEA,
JAMES L. FOLEY.