O. M. MOWAT.

APPARATUS FOR EXPANDING COUPLINGS.

APPLICATION FILED MAR. 31, 1910.

**1,105,094.**

**Patented July 28, 1914.**

3 SHEETS—SHEET 1.

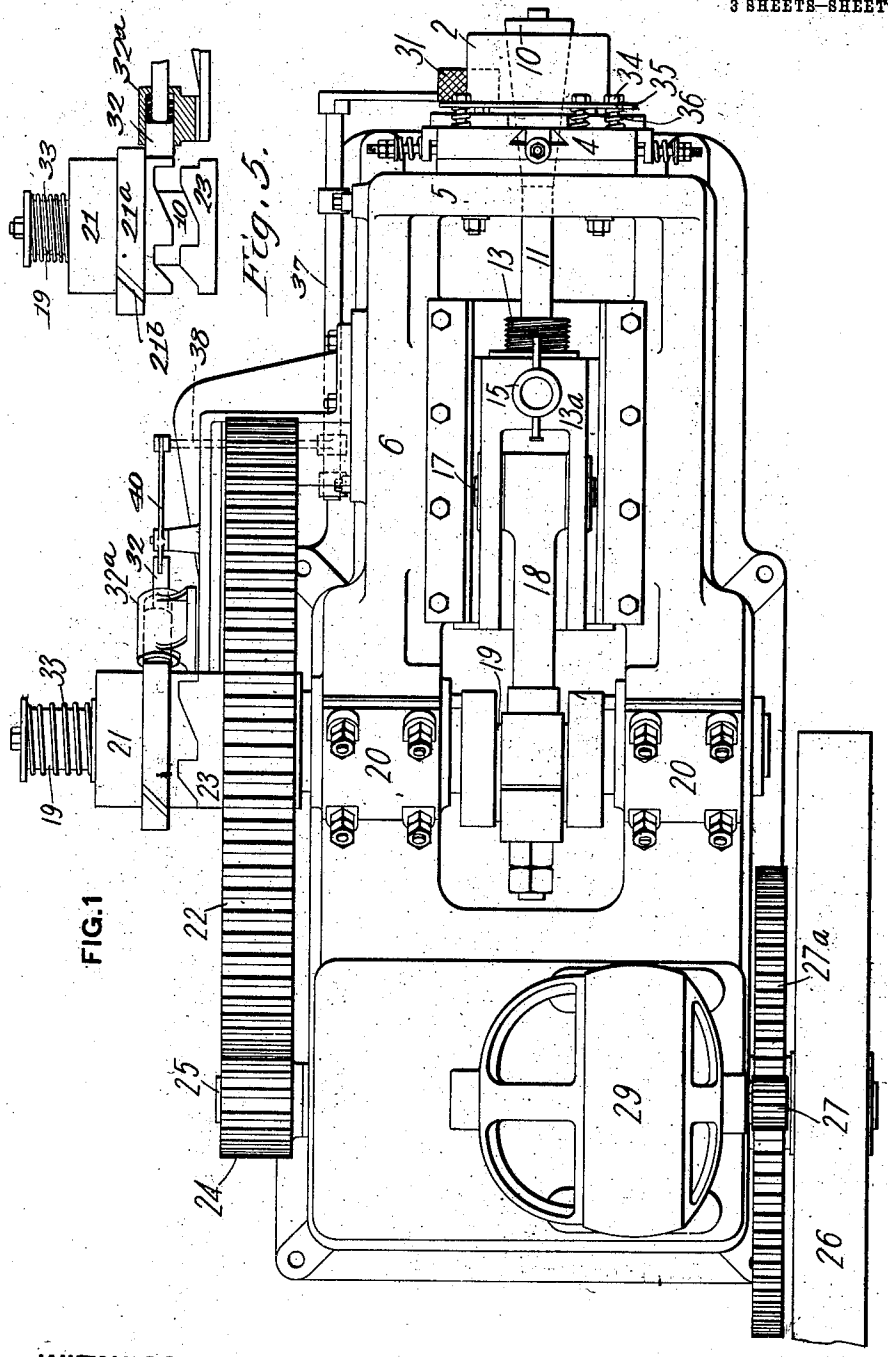


FIG. 1



Fig. 5.

WITNESSES

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3 SHEETS—SHEET 2.

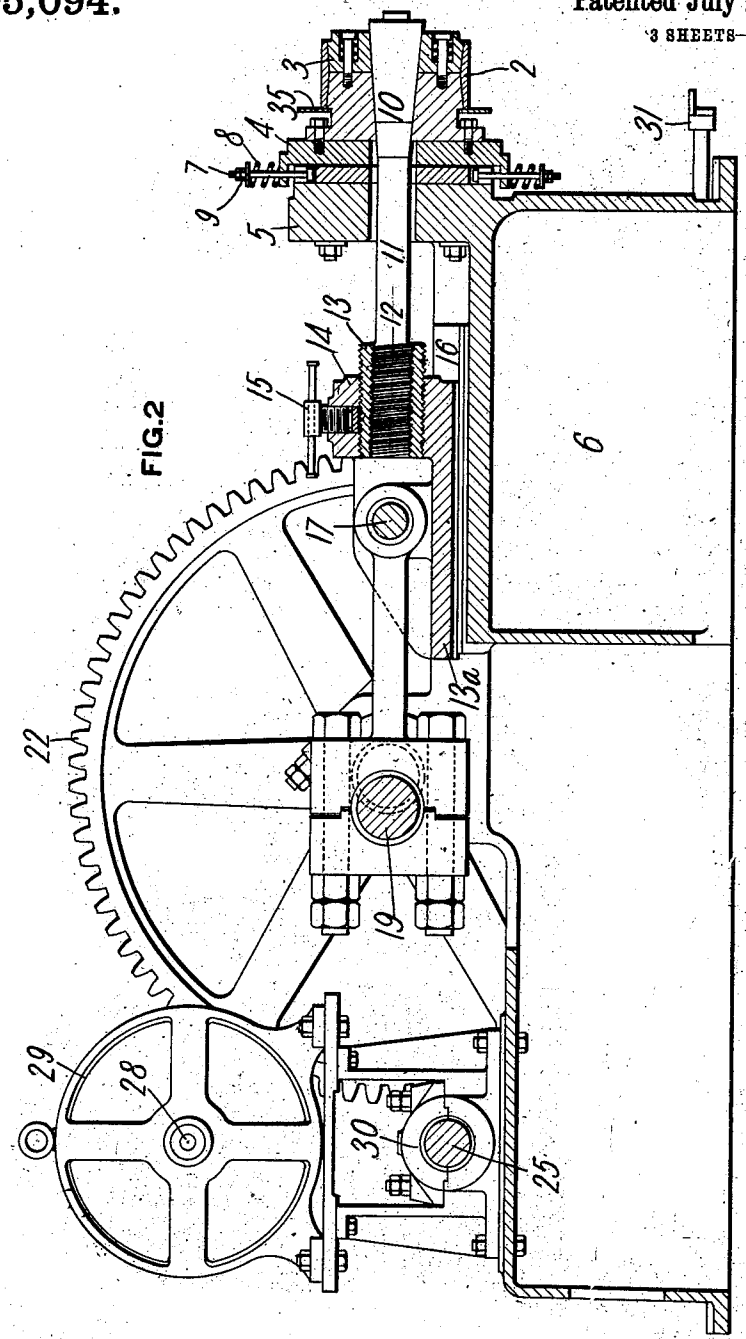



FIG. 2

WITNESSES

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3 SHEETS—SHEET 3.

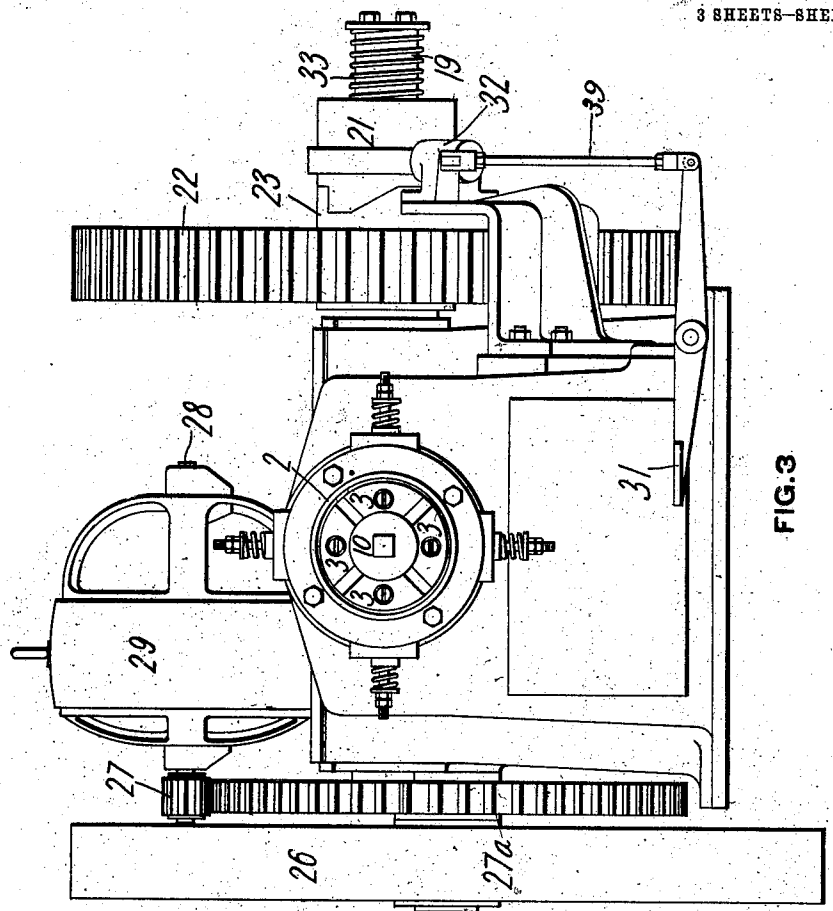



FIG. 3

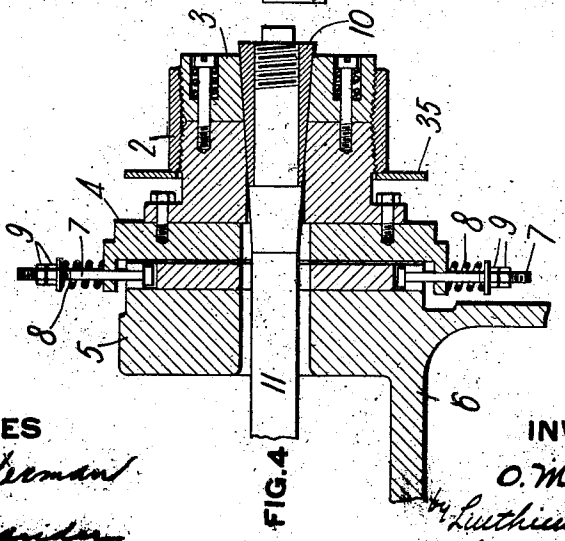



FIG. 4

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR EXPANDING COUPLINGS.

1,105,094. Specification of Letters Patent. Patented July 28, 1914.

Application filed March 31, 1910. Serial No. 552,588.

*To all whom it may concern:*

Be it known that I, OLIVER M. MOWAT, of McKeesport, Allegheny county, Pennsylvania, have invented a new and useful Apparatus for Expanding Couplings, of which the following is a full, clear, and exact description.

My invention relates to the manufacture of pipe couplings and similar annular bodies, and the object of the invention is to provide improved means for expanding the couplings, and more particularly for expanding the couplings after they have been tapped or internally threaded. Heretofore it has been proposed to expand such couplings by means of expanding dies which were forced outwardly by driving a plug into an opening in the expanding tool, and in this way taper the coupling from each end inwardly toward the center of its length, this operation being performed after the threading operation.

The object of my invention is to provide improved apparatus for expanding such couplings having novel means for tapering the inner surface of the couplings from the ends toward the center of the length of the couplings.

A further object of the invention is to provide apparatus having improved means for expanding the couplings with which couplings of various sizes are tapered, and apparatus having means for centering the couplings in place on the expanding dies forming part of the apparatus.

Referring to the drawings forming part of this specification, Figure 1 is a plan showing coupling expanding apparatus constructed and arranged in accordance with my invention. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is an end elevation looking from the front end of the machine toward the driving motor by which the apparatus is operated. Fig. 4 is a detail section on a larger scale, showing the expanding dies and the means by which dies are caused to expand, and to collapse, in the operations of tapering and expanding the couplings. Fig. 5 is a sectional detail showing the clutch jaws held in disengaged or inoperative position.

In the drawings, 2 designates a coupling in position on the expanding dies and 3—3 are collapsing dies which are removably secured to the radially movable die heads 4. The heads 4 are movably secured on the die-head frame 5 forming part of the base 6 of the apparatus, suitable slides being provided in which the heads 4 are reciprocated. The heads 4 are moved inwardly and are yieldingly held in their collapsed position on the die-head by means of the bolts 7 and helical springs 8, the tension on the springs being adjusted by means of the nuts 9 on the bolts 7.

Inserted in the tapering opening formed between the inner edges of the dies 3 so as to be longitudinally movable is an expanding mandrel having a tapered portion 10 connected by a straight portion 11 with a threaded portion 12. The tapered portion 10, being subject to wear and requiring renewal at long intervals, is removably secured on the straight portion 11, and change in the size of the tapered portion is effected by substituting larger or smaller tapered expanding portions 10 on the straight section 11 to suit the different sizes of couplings, the expanding dies 3 also being changed to larger or small sizes.

The threaded portion 12 of the expanding mandrel is screwed into a sleeve 13, and the sleeve 13 is screwed in place on the cross head 14 and locked by means of the locking bolt 15. The cross head 14 is slidingly mounted in the ways 16 forming part of the base 6 and is connected by a wrist pin 17 and pitman 18 with the crank shaft 19. The crank shaft 19 is mounted in bearings 20 forming part of the base 6 and on its outer end is an outwardly movable clutch member 21 having a flange $21^a$ provided with an angular face portion $21^b$, the clutch member 21 being splined or otherwise slidingly mounted on the crank shaft. Also mounted on the crank shaft 19 so as to rotate freely thereon is a spur gear 22 having an integral clutch jaw member 23 which is arranged to engage with the axially movable jaw member 21 of the clutch. The spur gear 22 meshes with a spur pinion 24 on the shaft 25, this shaft being connected by the slow-down gears 27 and $27^a$ with the armature shaft 28 of the driving motor 29. The shaft 25 is provided with a fly wheel 26 on one of its ends, and is mounted in bearings 30 on the base 6 of the apparatus.

A treadle 31 is connected by the rocking shaft 37, lever 38, link or rod 39 and bell crank 40 to a stop 32 slidably mounted in

the stop guide 32a. The stop 32 is arranged to engage with the angular face 21b on the flange 21a and move the clutch member 21 on the shaft 19 so as to be disengaged from the clutch member 23. When the clutch member 21b is so moved the stop 32 is projected forwardly in its guide 32a through the medium of the spring 32b in the guide 32c, so as to engage with the side surface of the flange 21a (as shown in Fig. 5) and hold the movable clutch member in its disengaged position. Movable member 21 of the jaw clutch is held in its disengaged position until released by the operator through the treadle 31 and a helical spring 33 which is provided on the end of the shaft 19 is arranged to move the jaw member 21 into its clutching position when released by the stop 32.

Secured on the movable heads 4 by bolts 34 is a yielding stop 35 by means of which the longitudinal position of the coupling 2 relative to the expanding dies is regulated. Springs 36 are provided on the bolts 34 to cushion the coupling when put into place by the operator.

In the operation of my improved apparatus the motor 29 is caused to constantly rotate and through the connecting slow down gearing to rotate the spur gear 22 having the clutch member 23 secured thereto. The expanding mandrel 10 having been adjusted longitudinally on the cross head 14 to suit the particular set of dies being used and the size of couplings being expanded, the couplings are placed in position on the expanding dies 3 and the operator by manipulating the treadle 31 retracts the stop 32 and releases the clutch jaw 21 which permits the spring 33 to move this jaw member into clutching engagement with the clutch jaw 23. The crank shaft 19 is in this way caused to rotate and, through the connecting mechanism, to reciprocate the tapered mandrel 10 in the expanding dies 3. When one revolution of the shaft 19 is made, the angular face 21b by engagement with the end of the stop 32 causes the clutch member 21 to slide on the shaft 19 and the clutch jaw 21 is automatically drawn into and held in its disengaged position until again released by the operator. When the mandrel 10 is reciprocated the dies 3 are forced radially outward and the tapering peripheral faces of the dies expand the inner surface of the coupling to the same taper as the faces of the dies. When the dies have been expanded, the joints between the radially movable segments are opened and this operation does not expand the coupling on lines opposite the joints. For this reason, when the mandrel 10 has been drawn inwardly and again moved outwardly into position to permit collapsing of the dies, the operator turns the coupling on the dies through a part of a revolution so as to bring the parts located opposite the joints in the dies during the first expanding operation into position opposite another point on the dies which is located between the joints. The mandrel 10 is then again reciprocated inwardly and outwardly and the dies forced outwardly a second time, this operation expanding the unexpanded portions of the coupling which were opposite the joints in the dies in the first expanding operation.

As the couplings are preferably tapered or threaded with a straight thread before the expanding operation, it is necessary that the points of the threads on the coupling be substantially opposite the root of the threads on the dies and for this reason the stop 34 is adjustably secured on the head 4, in this way insuring that the coupling will be placed lengthwise in proper position relative to the dies.

The above described operations are repeated with the successive couplings and the threaded couplings are quickly and accurately tapered from their ends inwardly, the double taper of these couplings being accomplished with the one operation.

The advantages of my invention will be apparent to those skilled in the art. The distance the coupling is expanded may be varied and the power employed may be regulated by adjusting the mandrel axially in the cross head.

Modifications in the construction and arrangement of the parts may be made without departing from my invention.

I claim:—

1. Apparatus for expanding pipe couplings and the like comprising in combination a segmental expanding die having radially movable sections, a stop to position the couplings on the die, a taper pin lengthwise movable within the die for expanding the die sections, means for adjusting the pin lengthwise within the die, and power means connected to said taper pin for reciprocating the pin within the die in the coupling expanding operations.

2. Apparatus for expanding pipe couplings and the like comprising in combination a segmental expanding die having radially movable sections, a yielding stop to position the couplings on the die, a taper pin lengthwise movable within the die for expanding the die sections, means for contracting the die sections, a reciprocating cross head adjustably connected to the taper pin, and power means for actuating the cross head to reciprocate the taper pin and expand the die sections in the coupling expanding operations.

3. Apparatus for expanding pipe couplings and the like comprising an expanding die, a taper pin lengthwise movable within said die for expanding the die sections, means for adjusting the pin lengthwise

within the die, and power means connected to said taper pin for reciprocating the pin within the die in the coupling expanding operation.

4. Apparatus for expanding pipe couplings and the like comprising an expanding die, a taper pin lengthwise movable within said die for expanding the same, a cross-head, an adjustable connection between said cross-head and said taper pin for adjusting said pin with relation to said die, and power means for reciprocating said cross-head.

5. In apparatus for expanding pipe couplings and the like the combination with an expansible die having radially movable segments, means engaging with and expanding the die within couplings placed thereon, and a horizontally reciprocating cross head connected to the die expanding means, of a rotary motor for actuating the cross head and die expanding means, and mechanism detachably connecting the motor with said cross head.

In testimony whereof, I have hereunto set my hand.

OLIVER M. MOWAT.

Witnesses:
THOS. W. BELL,
JOS. W. BLACKBURN.