No. 888,984. PATENTED MAY 26, 1908.

C. FELL.

APPARATUS FOR RIFLING PIPES OR TUBES.

APPLICATION FILED OCT. 4, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

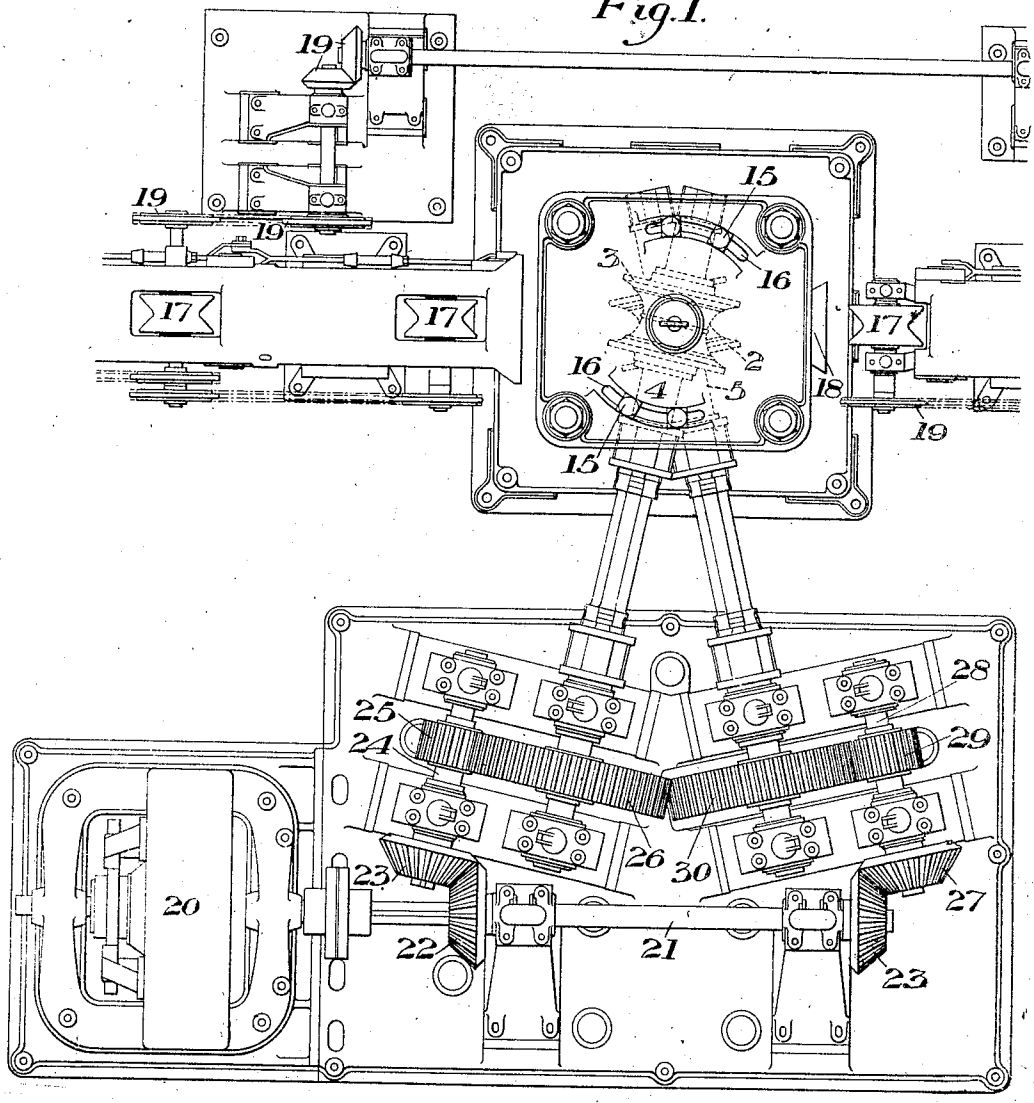


Fig. 2.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 3.

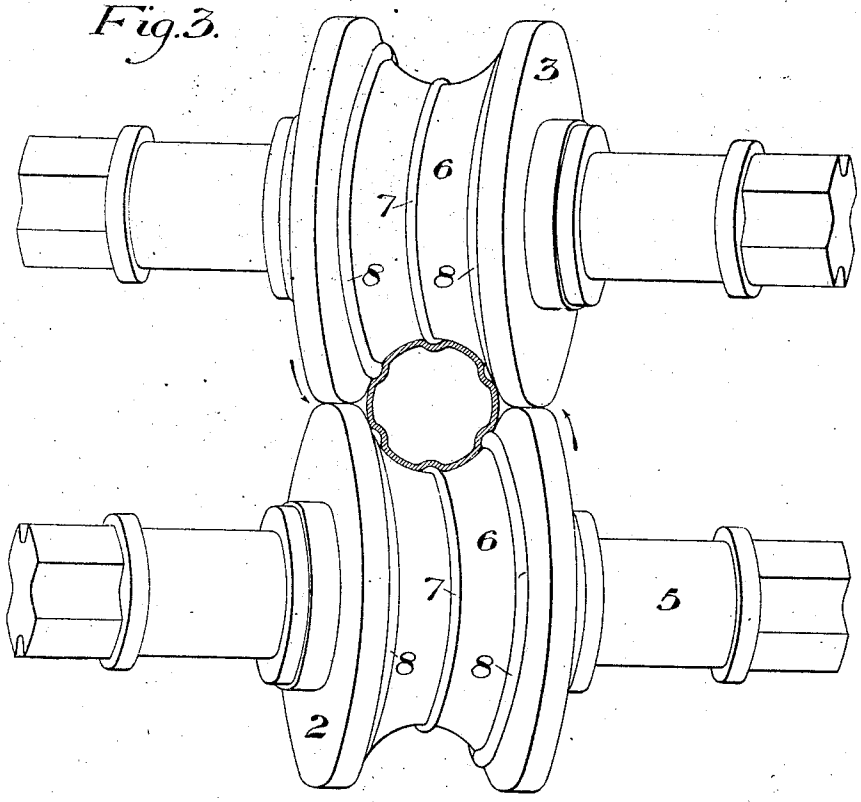
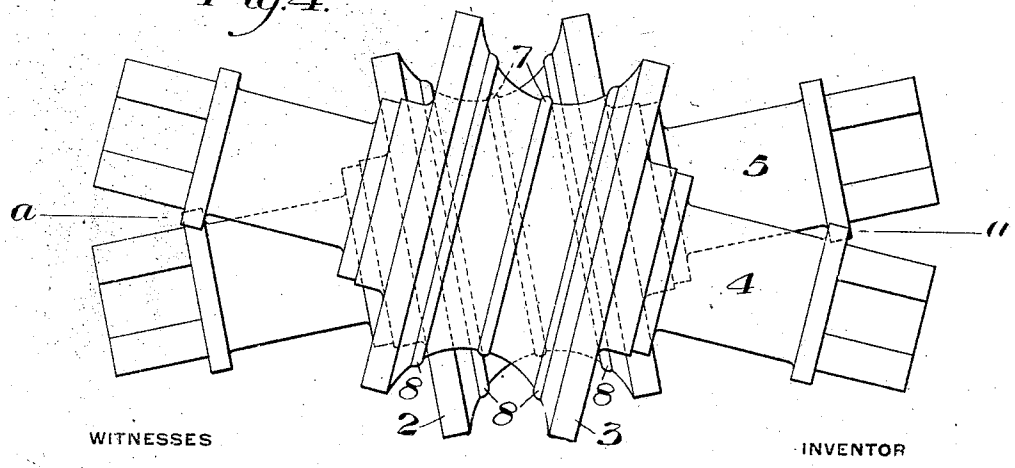


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

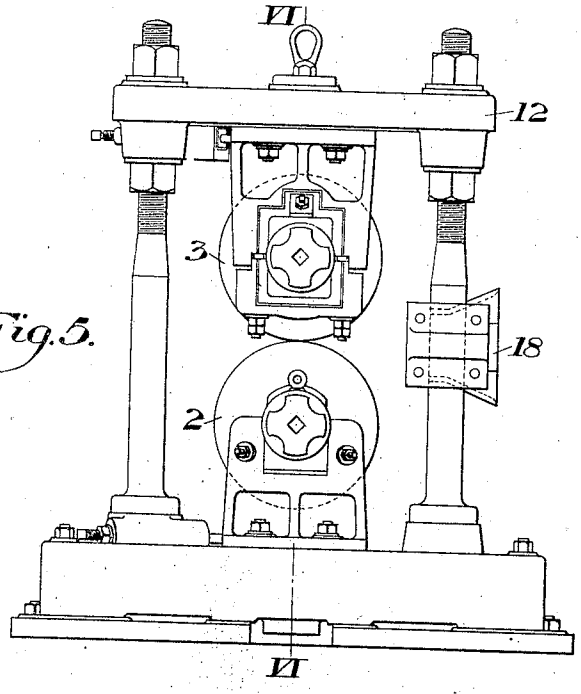
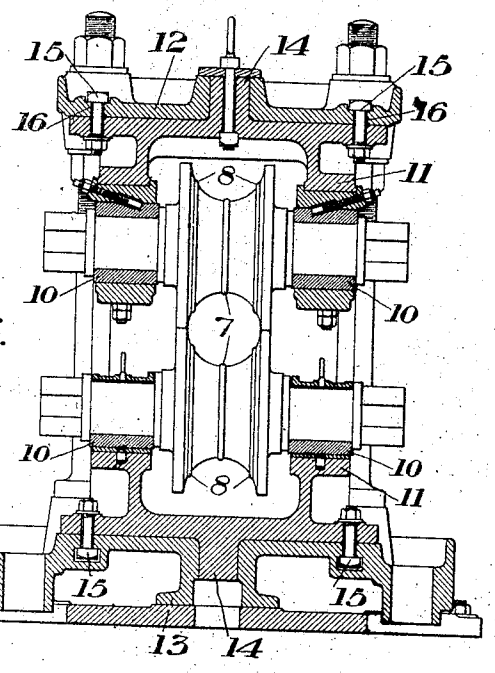


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR RIFLING PIPES OR TUBES.

No. 888,984. Specification of Letters Patent. Patented May 26, 1908.

Application filed October 4, 1907. Serial No. 395,213.

To all whom it may concern:

Be it known that I, CHARLES FELL, of Lorain, Lorain county, Ohio, have invented a new and useful Apparatus for Rifling Pipes and Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of one form of apparatus embodying my invention; Fig. 2 is a side view of a portion of a pipe or tube showing the work done by the apparatus, Fig. 3 is a perspective view showing the rifling rolls removed from the machine, but in working relation to each other; Fig. 4 is a plan view of the same; Fig. 5 is an end view of one of the roll housings; and Fig. 6 is a section on the line VI—VI of Fig. 5. In Figs. 5 and 6 the rolls are shown as in parallel position.

The invention has relation to means for forming grooves or rifles in pipes or tubes, and is designed to provide apparatus whereby this work can be rapidly and effectively carried out by means of rolls, between which the pipes or tubes are fed.

The precise nature of my invention will be best understood by reference to the accompanying drawings, which will now be described, it being premised, however, that various changes may be made in the construction and arrangement of the parts by those skilled in the art without departing from my invention as defined by the appended claims.

In these drawings, the numerals 2 and 3 designate the rifling rolls carried by the respective shafts 4 and 5. Each of these rolls is formed with a groove or pass 6, which is of semi-elliptical form, and whose forming wall is formed with a centrally located circumferential rim 7, and with the lateral circumferentially extending ribs 8. The shape of the groove or pass and of the ribs is the same in both rolls.

The pipe or tube to be rifled is fed longitudinally between these rolls, the rifles being formed by the ribs 7 and 8. The pitch of the rifling formed in the tube will, of course, depend upon the angular position of the rolls with respect to each other, and when a spiral rifling is to be formed, the two rolls are placed, as shown in Figs. 1, 3 and 4, so that their longitudinal axes cross each other in a vertical plane, which passes through the center of the roll grooves. While these grooves or passes are of semi-elliptical form, as described, in order to clear the pipe or tube which is fed therethrough in a line perpendicular to a line which bisects the angles formed by the roll axes, it will be seen that if a cross-section be taken through the rolls on the last-named line, designated *a*—*a* in Fig. 4, said section will show a circular opening through which the pipe or tube passes, as seen in Fig. 3. The pipe or tube, preferably while heated, is passed between these rolls, which are revolved in the same direction, as indicated by the arrows in Fig. 3, and is thereby rotated about its longitudinal axis, the ribs 7 and 8 forming therein the grooves or rifling indicated at *x* in Fig. 2. The semi-elliptical or flaring form of the grooves causes them to hug the outside diameter of the pipe during the operation of rifling, thus preventing the pipe from becoming flattened or distorted. The three ribs or beads on each roll divide the circle of the cross-section of the pipe into six equal divisions, as clearly shown in Fig. 3.

In order that all the grooves or rifles may be of a uniform depth, it is necessary to make the outside beads 8 of greater height or projection than the center beads 7, since the latter grip the pipe on a true diameter and indent it for their full depth, while the outside beads grip the pipe at the angle to which the rolls are set; or in other words, the outside beads grip the outside diameter of the pipe on an ellipse, and do not indent the pipe for their full depth.

It is, of course, necessary to provide a different set of rolls for each different diameter of pipe, and it is also necessary to provide a special set of rolls for each material change in the pitch of the rifling desired, it being also necessary to change the angle of intersection of the roll axes for each change in pitch. To permit this, the roll shafts 4 and 5 are journaled in boxes 10, which are carried in the arms of U-shaped yokes 11, which are swiveled in the top and bottom plates 12 and 13 of the roll-supporting frames or housings. The vertical axes of the bosses 14 on the yokes 11, which bosses form the swivels or pivots for the rolls, coincide with the point of intersection of crossing of the roll axes. The adjustment of the yokes 11 to secure the rolls in the proper angular relation, may be

effected by means of the bolts 15, which extend through the curved slots 16 in the top and bottom housing plates.

The couplers or wabblers which connect the rolls with their driving gears permit the necessary movement of the rolls for the purpose of making this adjustment, these couplers or wabblers being in this respect similar to the spindle of any three-high plate mill, in which the top roll is vertically adjustable.

17 designate guiding rollers in the line of feed of the pipes or tubes to be rifled, said rollers being placed at each side of the rifling rolls. 18 is a bell-shaped guide, through which the pipes or tubes pass to the rolls. The rollers 17 may be driven by any suitable gearing, such as indicated at 19 in Fig. 1.

Both rolls are positively driven by any suitable arrangement of gearing. In Fig. 1 I have shown an electric motor 20, whose shaft 21 carries two bevel pinions 22 and 23. The bevel pinion 22 meshes with a similar pinion 23 on shaft 24 parallel with the shaft 4, and geared thereto by a spur pinion 25 and spur wheel 26. The bevel pinion 23 drives a bevel pinion 27 on a shaft 28 which is parallel to the roller shaft 5, and is geared thereto by the spur pinion 29 and spur wheel 30.

The advantages of my invention result from the provision of the grooved rolls having circumferentially arranged rifling beads or ribs adapted to engage the pipes or tubes and form rifles therein in the manner described. By the use of these rolls, the work of rifling may be rapidly and efficiently performed, and by the use of different rolls pipes and tubes of all sizes from the smallest to the largest can be rifled at any desired pitch.

The details of the machine may be widely varied; thus the rolls may be driven by any suitable arrangement of gearing other than that shown and described; the roll shafts may be supported and adjusted at the proper angles in other ways, and various arrangements of feeding devices for the pipes or tubes can be employed.

I claim:—

1. In apparatus for rifling pipes or tubes, a pair of skewed rolls formed with circumferential grooves or passes for the pipes or tubes having circumferentially extending beads rifling or ribs; substantially as described.

2. In apparatus for rifling pipes or tubes, a pair of skewed rolls formed with circumferential grooves or passes for the pipes or tubes having circumferentially extending beads rifling or ribs, and means for positively rotating both of the rolls; substantially as described.

3. In apparatus for rifling pipes or tubes, a pair of rolls having each a groove or pass for the pipes or tubes with circumferentially extending beads rifling or ribs, the two rolls having their axes crossing each other and means for positively driving the said rolls; substantially as described.

4. In apparatus for rifling pipes or tubes, a pair of rolls supported with their axes crossing each other, and having each a semi-elliptical groove or pass formed with a plurality of projecting beads rifling or ribs; substantially as described.

5. In apparatus for rifling pipes or tubes, a rifling roll having semi-elliptical groove or pass formed with a central rib or bead and with lateral ribs or beads, the lateral ribs or beads being of greater length or projection than the central rib or bead; substantially as described.

6. In apparatus for rifling pipes and tubes, a pair of rolls supported with their axes crossing each other at the centers of the rolls, each of said rolls having a semi-elliptical groove or pass formed with a central rib or bead, and two lateral ribs or beads equally spaced from the central rib or bead and of greater length or projection; substantially as described.

7. In apparatus for rifling pipes or tubes, a pair of rolls supported with their axes intersecting each other at the centers of the rolls, and each having a groove or pass formed with a plurality of equally spaced circumferential beads or ribs of different diameters, and means for adjusting the rolls to vary their angular relation; substantially as described.

8. In apparatus for rifling pipes or tubes, a pair of rolls, supporting frames or housings therefor, yokes swiveled in said frames or housings and carrying bearings for the rolls, and means for securing said yokes in different positions to vary the angular relations of the rolls, said rolls having each a pass formed with a plurality of rifling beads or ribs, together with means for positively rotating the rolls; substantially as described.

9. In apparatus for skewed rifling pipes or tubes, rifling rolls, arranged to support the pipe or tube adjacent to their points of rifling contact therewith, and means for effecting a relative rotary movement of the pipe or tube and the rolls about the longitudinal axis of the pipe or tube; substantially as described.

10. In apparatus for rifling pipes or tubes, skewed rolls arranged to form rifling bends in the walls of the pipes or tubes, and having supporting walls for the pipes or tubes adjacent to their points of rifling contact therewith, and means for effecting a relative rotary movement of the pipes or tubes and the rolls about the longitudinal axis of the former; substantially as described.

11. In apparatus for rifling pipes or tubes, a skew-roll formed with a semi-ellip-

tical pass whose walls are formed with rifling beads or projections; substantially as described.

12. In apparatus for rifling pipes or tubes, a pair of skew-rolls having complementary passes formed with circumferentially extending bending ribs or beads, the walls of said passes being arranged to support the pipe or tube adjacent to the points of contact of the bending ribs or beads therewith, and between such ribs or beads; substantially as described.

13. In apparatus for rifling pipes or tubes, a pair or skewed rolls having circumferential grooves which together form a closed pass for the pipes or tubes, the walls of said grooves having rifling ribs or beads, substantially as described.

14. In apparatus for rifling pipes or tubes, a pair of skewed rolls having circumferential grooves which together form a closed pass for the pipes or tubes, the walls of said grooves having rifling ribs or beads, and also forming a support for the pipes or tubes throughout a major portion of their circumference, substantially as described.

In testimony whereof, I have hereunto set my hand.

CHARLES FELL.

Witnesses:
D. L. JENKINS,
J. S. CRAIG.