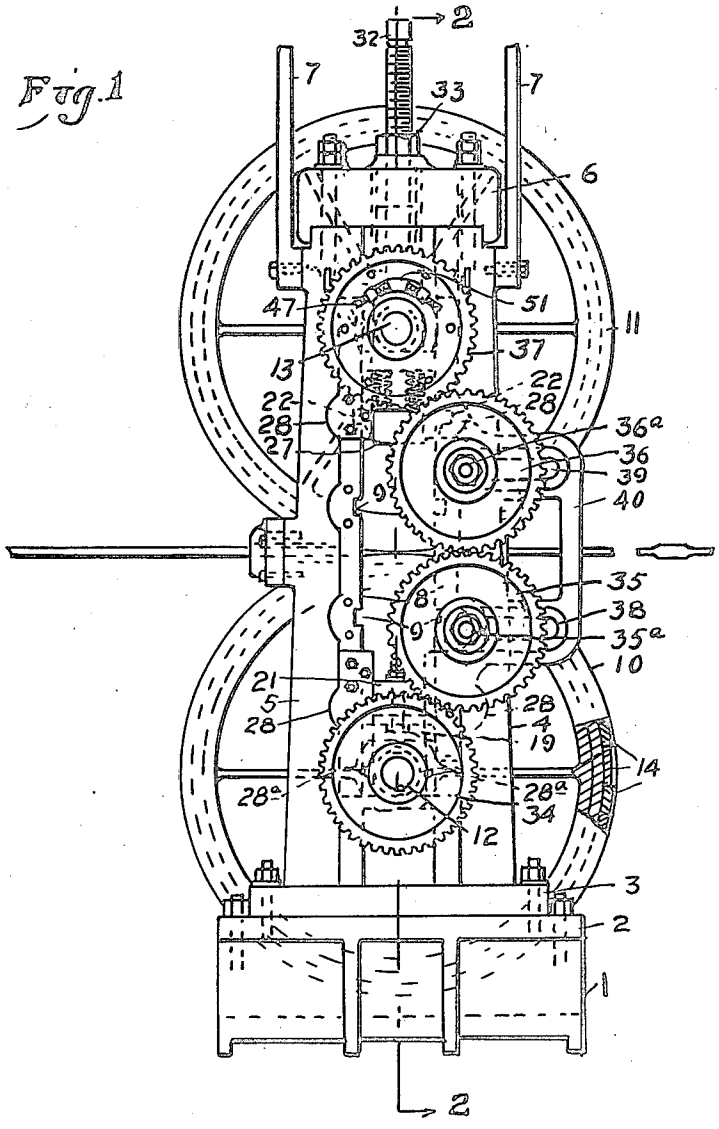
Nov. 20, 1923. 1,474,880

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MILL FOR ROLLING SHAPES

Original Filed July 31, 1918 3 Sheets-Sheet 1

Fig. 1



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Fig. 2

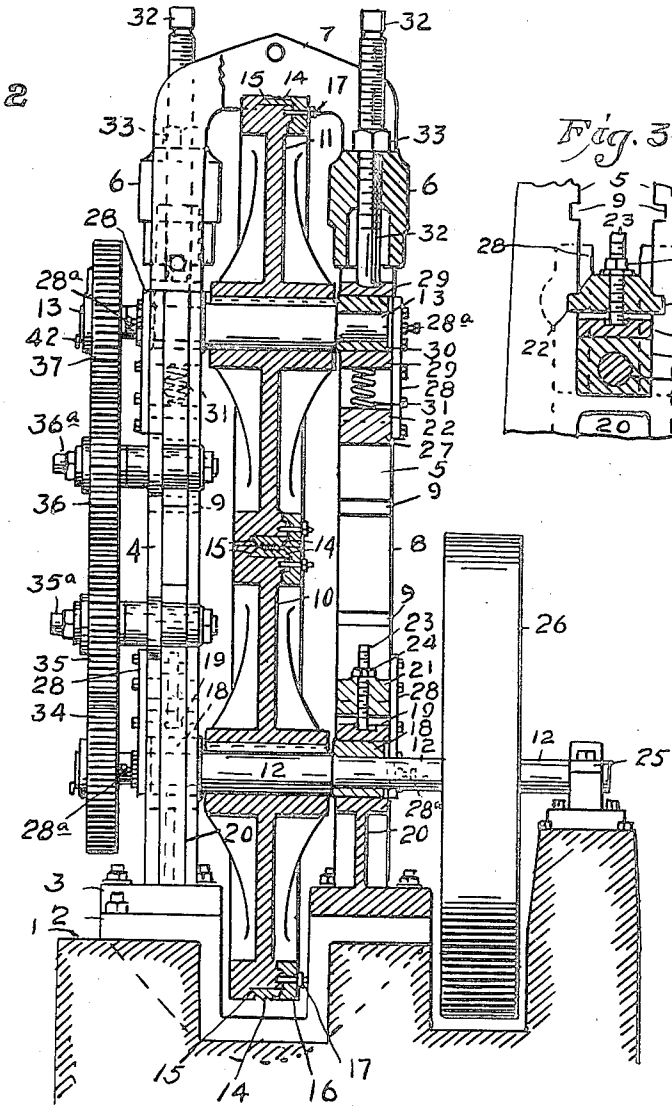


Fig. 3

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Fig. 4

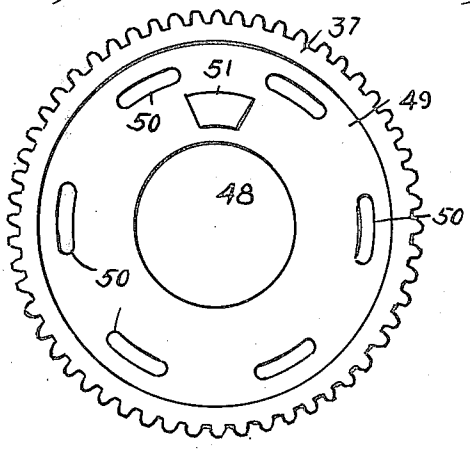


Fig. 6

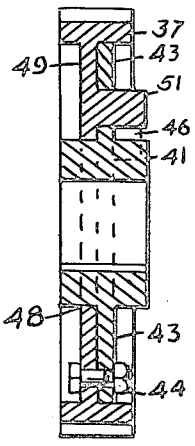


Fig. 5

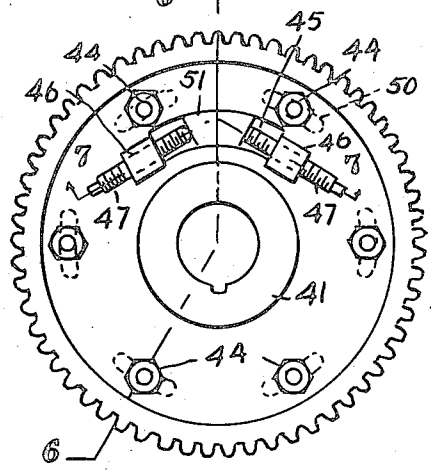
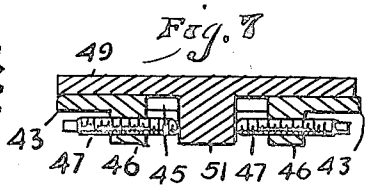


Fig. 7



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UNITED STATES PATENT OFFICE.

GEORGE BAEHR, OF CORAOPOLIS, PENNSYLVANIA.

MILL FOR ROLLING SHAPES.

Original application filed July 31, 1918, Serial No. 274,659. Divided and this application filed October 18, 1920. Serial No. 417,729.

To all whom it may concern:

Be it known that I, GEORGE BAEHR, a citizen of the United States, residing at Coraopolis, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Mills for Rolling Shapes (for which I have filed applications in England November 5, 1919, Patent No. 158,375, and in Canada March 10, 1919, Patent No. 195,958), of which the following is a specification.

My invention relates to mills for rolling shapes, and more particularly to mills which are provided in their working faces with die grooves of the required shape to form, from metal bars or the like, articles of a desired form.

The object of this invention is to provide micrometer adjusting means for obtaining accurate registry of the die grooves in the coacting working faces of the rolls, and preventing the accidental changing of the adjustment.

This application is a division of my application Serial Number 247,659, filed July 31, 1918, now Patent No. 1,448,371, granted March 13, 1923.

Referring to the accompanying drawings which illustrate one form of the present invention, Fig. 1 is an end elevation thereof with a portion broken away; Fig. 2, is in part a side elevation and in part a central vertical section on the line II—II, Fig. 1; Fig. 3 is a detailed view showing a portion of a roll housing and the manner of mounting one of the roll shafts thereon; Fig. 4 is an elevation of a driving gear for one of the roll shafts; Fig. 5 is an elevation of the same gear showing the same applied to the shaft with the adjusting means in place; Fig. 6 is a section on the line VI—VI, Fig. 5; and Fig. 7 is a section on the line VII—VII, Fig. 5.

Numeral 1 indicates the concrete foundation of the mill into which is bolted a metal base plate 2. To this base plate is bolted the base 3 of the roll frame or housing which comprises four upright members oppositely disposed in pairs, 4 and 5, connected at their tops by cross members 6 and 7. One such pair of upright members 4 and 5, is situated at each end of the roll stand, the members of each pair facing each other, and having their inner vertical face 8 provided at intervals with oppositely disposed horizontal notches 9. Mounted in these frames are the bottom roll 10 and top roll 11, keyed respectively to the shafts 12 and 13, with their faces substantially in contact in the usual manner, and carrying removable segmental shaping members 14 in which are formed the die grooves. The segmental members 14 are formed with beveled edges retained under a supporting vertical collar 15 on one side, and under a removable clamping beveled ring 16 on the other side, said ring being clamped to the side face of the roll by the bolts 17.

The bearings 18 for shaft 12 rest upon transverse seats or supports 20 between the upright frame members 4 and 5, and are held rigidly in place upon said supports by means of journal boxes 19 which rest upon said bearings, cross members 21 which have lateral flanges 22 fitting into the lowest pair of notches 9 in the uprights 4 and 5, and screws 23 having locking nuts 24, which are threaded through said cross members 21 and engage the boxes 19 of the bearings and thus clamp said bearings rigidly against the seats or supports 20. The shaft 12 extends to an out-bearing 25 mounted on the concrete foundation, and is provided with a pulley 26 for driving the same. Any other driving means for the rolls may be substituted, however.

The shaft 13 of the upper roll is supported by cross members 27 similar to the members 21 and provided with lateral flanges 22 fitting into the uppermost pair of notches 9 in the upright frame members. Journal boxes 29 enclose the bearings 30 of shaft 13, and are supported on coiled springs 38 which rest on the cross members 27. Bearing against the top of the journal boxes 29 are abutment members 32 in the form of screws threaded through the cross frame members 6 and held in adjusted position by locking nuts 33. This manner of mounting the bearings for shaft 13 permits of an accurate adjustment of the roll 11 into proper working relation with roll 10. Plates 28 are bolted to the side face of the upright frame members and overlap the members 21 and 27, respectively, to retain them in proper position. To secure proper alinement in a vertical plane of the shaping grooves in the cooperating rolls, said rolls are arranged to be adjusted axially by means of set screws 28ª threaded through the plates 28 and having

their ends contacting with the bearings of the roll shafts, so that by properly adjusting said screws, the roll shafts and the rolls mounted thereon may be moved axially.

The rolls shown in the drawings are the largest which can be used in the particular stand illustrated. When it is desired to use rolls of smaller diameter in the same stand, the rolls 10 and 11 are taken out, the desired rolls substituted therefor, and the bearings therefor supported at the proper positions by simply moving the cross members 21 and 27 to the other parts of supporting notches 9. The cross supports 21 for the lower shaft are moved up to the set of notches just above those with which they are shown as engaging, the bottom supports 20 are built up by blocks or otherwise, to bring the journal boxes up to the necessary position, and the roll shaft is then clamped into position by screws 23 as will be obvious. Likewise, for the upper shaft, the cross supports 27 are moved to the set of notches 9 just below those in which they are shown as engaging, and the abutment screws 32 are turned down to the necessary position until the roll faces are in proper working relation. By this adjustment the feeding mechanism operates on the same level as with the first or larger set of rolls. As shown in the drawings, the notches 9 are so located as to accommodate a set of rolls of exactly one-half the diameter of the rolls 10 and 11. If, however, it is not necessary to have the feeding mechanism always on the same level, or if a vertical adjustable feed mechanism is provided, rolls of still different sizes can be substituted in this housing by mounting the lower roll shaft in the position shown in Figs. 1 and 3, and with the upper roll supports in one of the sets of notches 9 below the position of the upper roll supports shown in Figs. 1 and 3.

In order to maintain continuous exact registry of the forming grooves in the faces of the rolls, the roll shafts 12 and 13 are positively geared together by means of a gear wheel 34 on the shaft 12 and which meshes with and drives an intermediate gear 35 which in turn meshes with a similar gear 36 and this in turn meshes with a gear 37 secured to the shaft 13 of the upper roll. Consequently, continuous synchronism in the rotation of the rolls is insured.

To adapt this interconnecting gearing to the rolls of different size in the same housing, the gears 37 and 36 are mounted on stub shafts 35^a and 36^a mounted in horizontal ways 38 and 39 in extension 40 on the vertical frame members 4. When smaller rolls are substituted for those shown, the shafts 12 and 13 are necessarily closer together, and to allow for this, the gears 35 and 36 are merely moved outwardly in the horizontal ways 38 and 39 to the required distance, while maintaining the proper relations of the four gears, and are then clamped in that position. The result is merely to change the relative positions of the gears without in any way changing their positive inter-driving relations.

In order to initially secure proper registering of the portions of different sizes of the forming grooves in the faces of the rolls, it is necessary to adjust one of the rolls circumferentially relative to the other, and this adjustment must be very accurate. For this purpose one of the driving gear perimeters is separate from an adjustable web portion 43 movable relatively to its hub portion. As shown, the upper gear 37 comprises a sleeve or hub portion 41 which is fixed to the shaft 13, and has a circular flange or web 43 extending outwardly therefrom, which web is provided with holes for bolts 44 and with a segmental slot 45, and at each end of said slot with a raised lug 46 provided with a threaded hole for a set screw 47. The peripheral portion of the gear 37 is provided with a large central opening 48 fitting loosely over the sleeve or hub portion 41, and its web portion 49 is provided with curved concentric slots 50, adapted to receive the bolts 44, and is also provided with a projecting lug 51 extending through the curved slot 45 in the web 43 of the hub portion, as shown in Figs. 5, 6, and 7. In this position the adjusting screws 47 bear upon the opposite sides of lug 51, and by advancing one screw and retracting the other, the lug may be moved to any desired position within the limits of the slot 45, and locked in that position. Consequently by loosening the bolts 44, and advancing one screw 47 and retracting the other, the upper roll may be slightly turned without movement of its driving gear face 37, and without movement of the lower roll, thereby very accurately adjusting said roll relative to the lower roll, after which it is locked in position by tightening the bolts 44 to clamp the peripheral portion of gear 37 to its hub or web portion and again make the driving gear rigid with the shaft of the roll. This permits a very rapid micrometric adjustment of the roll surfaces to secure exact registration of the forming grooves.

I have omitted the feeding mechanism which forms no part of this application and is fully shown and described in my Patent Number 1,448,371, of which the present application is a division.

The construction and arrangement described provides a roll housing in which forming rolls of several sizes may be mounted and in a manner to permit them to be easily changed; also means for positively driving both rolls in exact synchronism, thus insuring continuous registration of the die faces in definite relation to each other; and

also means for rotatably adjusting one of the rolls relative to its driving means without removing it from its bearings to secure proper initial registry of the forming surfaces of the cooperating rolls. The many uses and advantages of these features will be apparent to those familiar with the art.

I claim:

1. In combination, a pair of rolls for forming articles of varying cross section, shaft members therefor, a housing in which said shaft members are mounted, intermeshing gear members connecting said shafts, and means to adjust one shaft member rotatably with respect to its driving gear member, the said means comprising a lug carried by one of the last two named members and screws carried by the other of said two members and contacting with the lug on opposite sides thereof.

2. In combination, a pair of rolls provided with die faces, shaft members therefor, a housing in which said shaft members are mounted, intermeshing gear members connecting said shaft members, one of said gear members having a rotatably adjustable connection with its shaft member, means to adjust one shaft member rotatably with respect to its driving gear member, the said means comprising a lug carried by one of the last two named members and screws carried by the other of said two members and contacting with the lug on the opposite side thereof, and means for locking said last named gear member to said last named shaft member in various adjusted positions.

3. In combination, a pair of rolls provided with die faces, shafts therefor, housings in which said roll shafts are mounted, intermeshing gears connecting said roll shafts, and micrometer means to adjust one of said rolls relative to its driving gear and comprising a sleeve keyed to the roll shaft, a gear surrounding said sleeve and provided with a web having a slot, a lug on said sleeve extending through said slot, and screws mounted on the gear and contacting with said lug on opposite sides thereof.

4. In combination, a pair of rolls provided with die faces, shafts therefor, housings in which said roll shafts are mounted, intermeshing gears connecting said roll shafts, and micrometer means to adjust one of said rolls relative to its driving gear and comprising a sleeve keyed to the roll shaft, the gear surrounding said sleeve and provided with a web having a slot, a lug on said sleeve extending through said slot, screws mounted on the gear and contacting with said lug on opposite sides thereof, and means to clamp said sleeve to the said gear web.

5. In combination, a pair of rolls provided with die faces, shafts therefor, housings in which said roll shafts are mounted, intermeshing gears connecting said shafts, and means to adjust the relation of one roll shaft to its gear comprising a sleeve keyed to the roll shaft and provided with an outwardly projecting web, the gear surrounding said sleeve and provided with an inwardly projecting web having a slot therethrough, a lug on the sleeve web extending through said slot, lugs on the web of the gear on opposite sides of the slot, and screws threaded through said lugs and bearing against said first named lug from each end of the slot, whereby to adjust the gear rotatably relative to the sleeve.

6. In combination, a pair of rolls provided with die faces, shafts therefor, housings in which shafts are mounted, intermeshing gears connecting said shafts, and means to adjust the relation of one roll shaft to its gear comprising a sleeve keyed to the roll shaft and provided with an outwardly projecting web, the gear surrounding said sleeve and provided with an inwardly projecting web having a slot therethrough, a lug on the sleeve web extending through said slot, lugs on the web of the gear on opposite sides of the slot, screws threaded through said lugs, and bearing against said first named lug from each end of the slot, whereby to adjust the gear rotatably relative to the sleeve, and clamping bolts extending through matching openings in the sleeve and gear webs for clamping them together.

Signed at Pittsburgh, Pa., this 15th day of October, 1920.

GEORGE BAEHR.