J. B. ROOT.

MACHINES FOR STRAIGHTENING ROUND BARS AND TUBES.

No. 180,643. Patented Aug. 1, 1876.

Fig: 1.

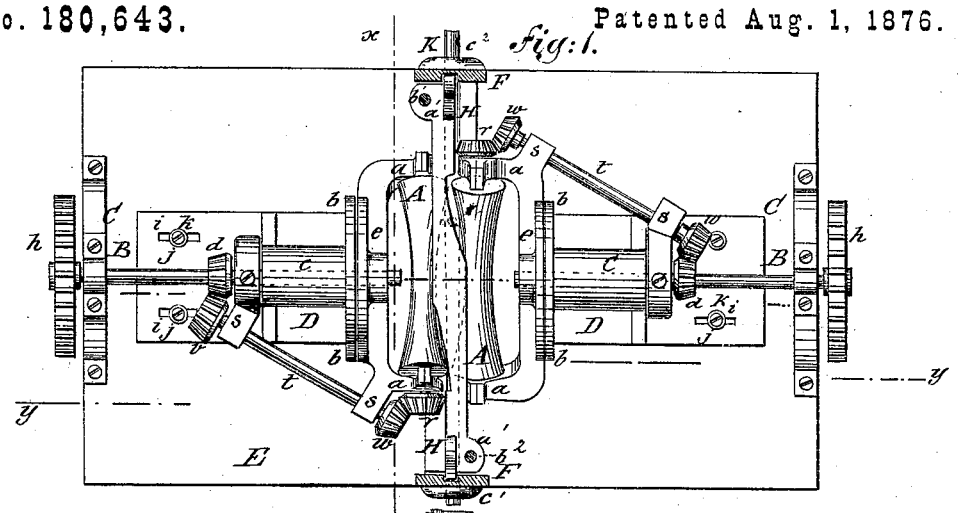


Fig: 2.

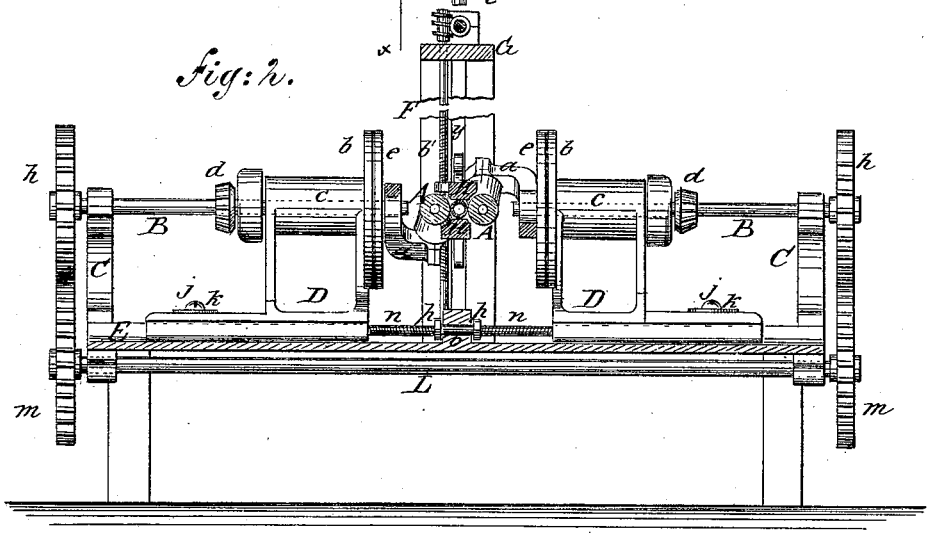
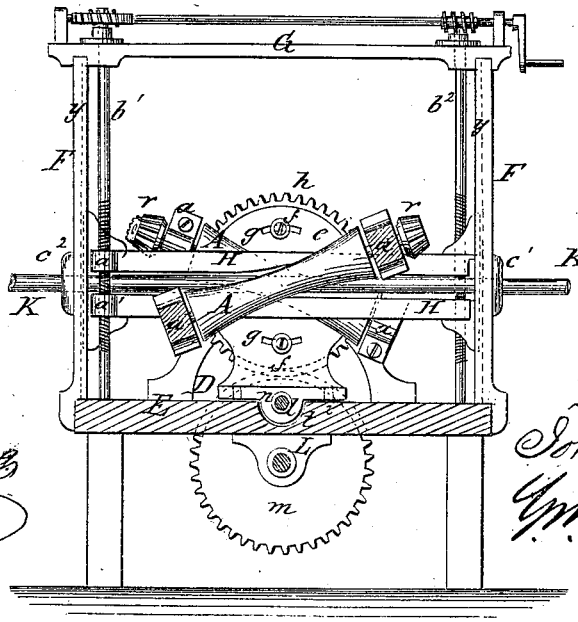


Fig: 3.



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JOHN B. ROOT, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR STRAIGHTENING ROUND BARS AND TUBES.

Specification forming part of Letters Patent No. **180,643**, dated August 1, 1876; application filed June 5, 1876.

To all whom it may concern:

Be it known that I, JOHN B. ROOT, of the city, county, and State of New York, have invented a new and Improved Machine for Straightening, Polishing, and Rounding Tubes, Pipes, Bars, &c.; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification.

This invention is in the nature of an improvement in machines for straightening, polishing, and rounding tubes, pipes, bars, &c.; and the invention consists in an improved machine for straightening, polishing, and rounding tubes, pipes, &c., constructed with two rolls having concave surfaces, the axes of the rolls being inclined at opposite angles, and the rolls being provided with devices whereby they may be adjusted horizontally, and combined with an upper and lower keeper, between which the tube may pass as it is rolled, and be kept in position between the rolls, the keepers being constructed and combined with devices whereby they may have a vertical adjustment, the rolls above mentioned being provided with devices designed to vary or adjust the angles at which the rolls are inclined. Motion is imparted to the machine by shafting located beneath the bed-plate of the rolls, combined with gear-wheels, all of which is more fully and particularly described and shown in the following description and accompanying drawings, wherein—

Figure 1 represents a plan or top view of my machine; Fig. 2, a side elevation, partly in section, through the line *y y*, Fig. 1, and Fig. 3 a cross-section taken in the line *x x*, Fig. 1.

Similar letters of reference indicate like parts in the several figures.

The rolls A, to which this invention more particularly relates, are designed to straighten, round, and polish tubes and metal pipes, bars, &c., and they are constructed with concave surfaces—that is to say, their smallest diameter is midway between the ends of the rolls, from which point the diameter gradually increases to each end of the rolls, a longitudinal section of the rolls, showing two curves with their convex sides nearly together.

Rolls of this construction, when in position, are placed at opposite angles—that is, so that their axes cross, (as shown in Fig. 3)—and they are fitted in and supported by suitable bearings *a*. These bearings are fastened to a disk, *e*, which disk is affixed to a corresponding disk, *b*, by set-screws *f* and slots *g*. Secured to each of the disks *b*, and extending outward, are bearings *c*. These bearings receive and support shafts B, in connection with the pillow-blocks C. The shafts B have fixed to them, between the pillow-blocks C and the bearings *c*, bevel-gear wheels *d*, and on their outer ends gear-wheels *h*. The disks *b* and *e*, bearings *c*, and consequently the rolls, are supported on base-plates D D. These base-plates have formed in them slots *i i*, through which pass stud-bolts *j j*, which are fastened to the base E of the machine. These stud-bolts are provided with nuts and washers *k*, and the base-plates D D are also provided with lugs *l*, which project down, and enter into a channel, t^2, in the base E of the machine. These lugs have right-hand screw-threads formed in them for one base-plate, and left-hand screw-threads formed in them for the other. Into and through these lugs passes a screw, *n*, this screw having a nut, *o*, and collars *p*, affixed to the base E, midway between the base-plates D D. The rolls A have affixed to the outer end of one of the journals of each roll, and outside of the bearings *a*, on which the journals rest, bevel-gear wheels *r*, and into suitable bearings *s* (which bearings are fixed to the bearings *a* of the rolls, and the bearings *c* of the shafts B, as shown in Fig. 1,) are fitted shafts *t*, on the ends of which are placed bevel-gear wheels *v* and *w*, which mesh into the bevel-gear wheels *r* on the ends of the bearings of the rolls, and also into the bevel-gear wheels *d* on the shafts B. To the base E are cast, or otherwise secured, and on each side, standards F, on the inner surface of which are formed grooves or channels *y y*. These standards are bridged at their upper ends by a cross-beam, G. Lying between the standards FF, one above and one below the rolls A, and between, but not in contact with, said rolls, are two keepers, H H. These keepers are constructed so as to permit their ends to enter into the channels *y y* of the standards F, and they also have lugs *a'* cast

on them, and into the lugs of the upper keeper are cut right-hand screw-threads, and into the lugs of the lower keeper, left-hand screw-threads. Screw-shafts b^1 b^2, with right-and-left screw threads, pass through these lugs into the base E, (to which they are secured, so that they may freely revolve in said lugs.)

Through the standards F is a feed-opening, c^1, and an exit-opening, c^2. These openings are so placed that when the tube K is placed through the openings it will lie between the upper and lower keepers, and in contact with the surface of the rolls A.

Beneath the bed-plate E, and fitted into suitable bearings, is a driving-shaft, L, to the outer ends of which are attached gear-wheels *m m*, which mesh into the gear-wheels *h*.

My improved rolls being constructed substantially as above described, they are operated by imparting a rotary motion to the driving-shaft L, which, through the gear-wheels *m* and *h*, in turn, imparts motion to the shafts B, and through the bevel-wheels *d*, revolving the bevel-wheels *v*, and the shafts *t* secured thereto, and through the bevel-wheels *w* and *r*, causing the rolls A to revolve. Motion thus being given to the rolls, the tube K, which it is designed to round, straighten, or polish, is inserted into the feed-opening c^1, and between the keepers H H, and between the rolls A, when as the rolls revolve the tube is advanced through the rolls with a rotary motion, so that in its passage between them its entire surface is in contact with the surface of the rolls, which not only makes the tube perfectly straight by their operation, but it burnishes and polishes the surface of the tube, as well as making it perfectly cylindrical. As the tube is in this way rolled, it passes through the exit-opening c^2 in the standard.

To enable the rolls to act upon different-sized tubes, pipes, &c., which it is designed to straighten, polish, and round, the nuts *k k* on the stud-bolts *j j* in the base-plates D are slackened, and the screw *n* in the channel t^2 in the base E is turned, when its right-handed thread working in the lugs *l l* of one of the base-plates D, and its left-handed thread in the lugs of the other of said base-plates, the base-plates and the rolls will advance toward or recede from each other, as the screw *n* may be turned from right to left for that purpose, and when the required position of the rolls is attained, they are kept in the given position by screwing down the nuts *k k* on the stud-bolts *j j*, confining the base-plates D to the base E.

The channel t^2 in the base E not only forms a recess to receive the screw *n*, but it also acts as a guide for the base-plates D of the rolls to move in when they are adjusted as just described.

The keepers H H are designed to confine the tube or pipe between the rolls, and also to maintain the straightened condition of the tube or pipe, and prevent it from twisting or warping. To adjust these keepers to pipes of greater or less diameter that it may be desirable to straighten, &c., the shafts b^1 b^2, with right and left threaded screws thereon, are turned either to the right or the left, which will cause the keepers to increase or lessen the space between them for the admission of a smaller or larger pipe.

Now, as it is important that the extent of the surface of the rolls that bears upon the tubes, &c., should be regulated so that tubes of different diameters requiring more or less surface of rolls can be properly straightened, &c., the rolls are adjusted for this purpose by slackening the nut of the set-screw *f* in the disk *e*, and changing the angles of the rolls A, the slots *g* in the disk admitting of this adjustment, and the nut and set-screw *f* confining them in the required position by screwing them up again. By this arrangement it is apparent that any extent of roll may be brought to bear upon the tubes by simply changing the angles of the rolls, as above mentioned, for the more the rolls are inclined from the horizontal the less surface will be brought to bear upon the tubes, and vice versa.

The screw-shafts b^1 b^2 that operate the keepers are preferably made to operate together, so that each end of the keepers H H may be raised and lowered simultaneously, and their horizontal position and parallelism be maintained by a shaft, worm, and gears, as shown in Fig. 3. The ends of the keepers are guided and kept in position by the guides or channels *y y* in the standards F F, within which they slide, as the keepers are moved up and down by the action of the screw-shafts b^1 b^2.

Having thus described the construction and operation of my machine, what I claim as new, and desire to secure by Letters Patent, is—

1. The concave rolls A hung in bearings *a*, adjustable angularly in a vertical plane, and combined with bearings D adjustable horizontally, and carrying the bearings *a*, whereby said rolls are adapted to operate upon tubes of different diameters, and with varying areas of surface contact therewith, all constructed substantially as shown and described.

2. The combination of the adjustable rolls A with their driving mechanism, constructed and arranged substantially as herein shown and described.

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