Sept. 29, 1936. A. WAGENBACH 2,055,955

BENDING MACHINE

Filed Feb. 26, 1936 2 Sheets-Sheet 1

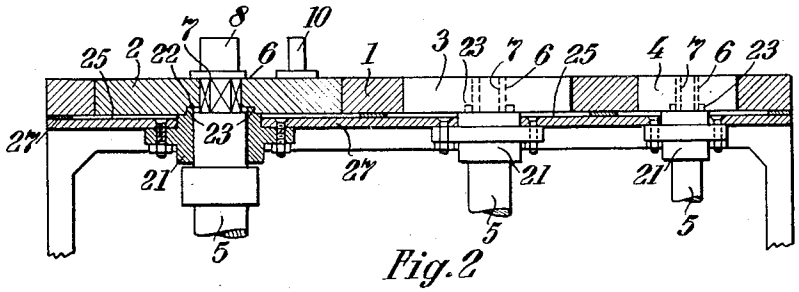


Fig. 2

Fig. 1

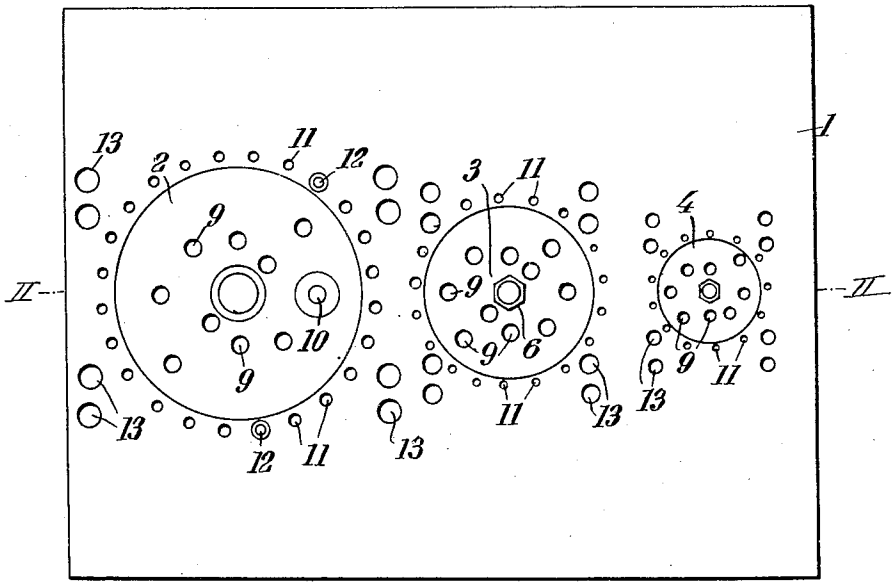


Fig. 3

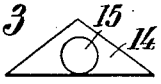


Fig. 4

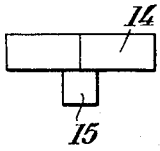


Fig. 5

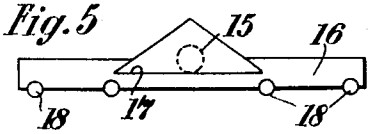
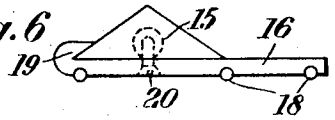


Fig. 6



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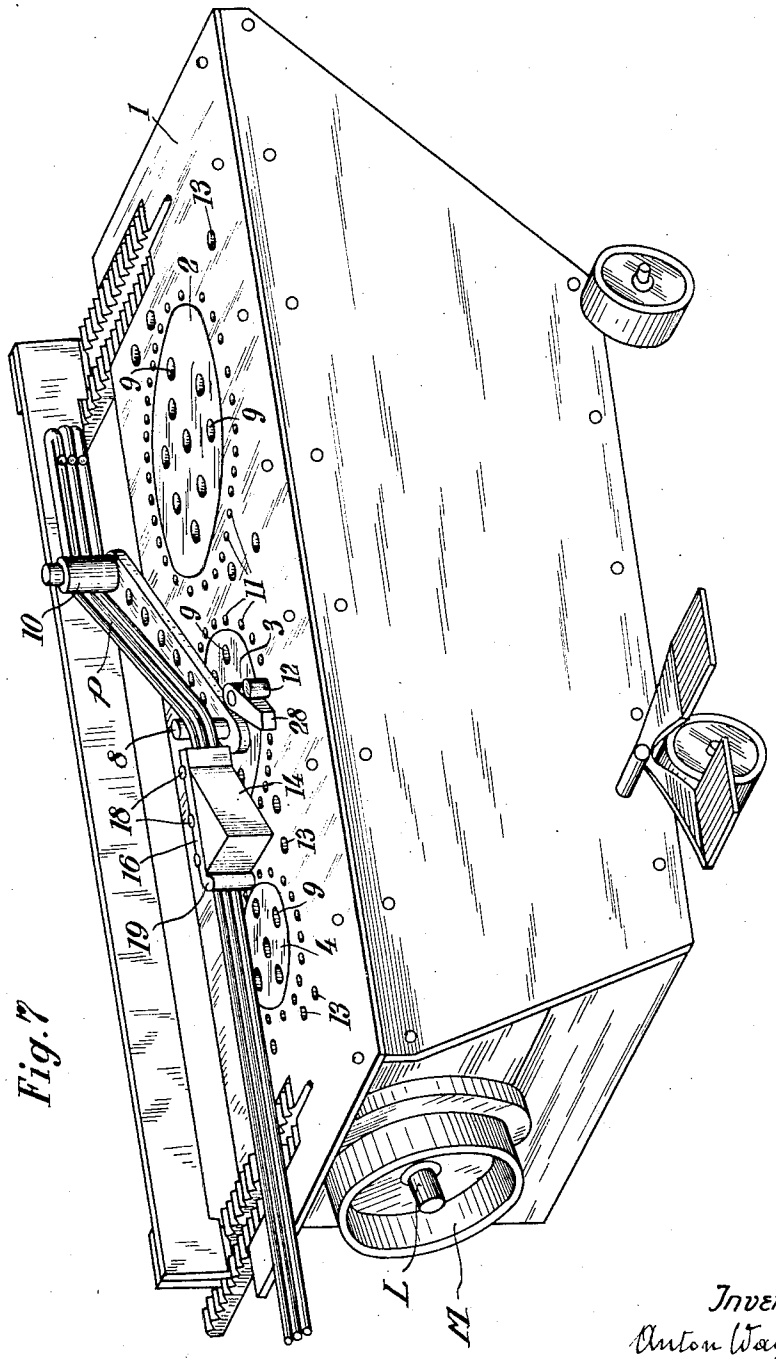


Fig. 7

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UNITED STATES PATENT OFFICE

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BENDING MACHINE

Anton Wagenbach, Wuppertal-Elberfeld, Germany

Application February 26, 1936, Serial No. 65,858
In Germany April 17, 1934

10 Claims. (Cl. 153—15)

The present invention relates to a machine for bending iron rods and sections, more particularly, iron used in concrete structures.

The object of the invention is to provide a bending machine by means of which iron rods, bars and sections of various sizes can be bent, without putting an excessive or detrimental strain upon the machine or the iron, and without the necessity of effecting complicated or difficult adjustments in the machine.

With a view to attaining this object, the machine according to the invention is provided with several selectively employable bending discs, which are preferably of different diameters and are preferably adapted to be driven with different speeds. This arrangement very considerably increases the range within which the machine can be usefully employed. The several bending discs are in a manner known per se, mounted in recesses of the top table of the machine, so that it is not necessary to remove the discs not actually used during the bending operation. The discs are so mounted that when they are not used for bending any particular size of iron, they do not in any way impede or hinder the operation. The improved machine can be very readily and rapidly attended to, notwithstanding the provision of a plurality of bending discs. As it is not necessary with the improved machine to use a bending disc for excessively large sizes, detrimental strains of the bending tools and of the bent iron are entirely avoided.

The adjustment of the bending tools for various sizes of rods, bars or sections, has been further simplified by making the tool holding the iron in position during the bending operation, triangular. The triangular holding tool is provided upon its underside with a pin by means of which it is exchangeably mounted in a suitable recess or hole of the table top adjacent to the corresponding disc. The adjustment of the individual bending discs for iron sizes lying within the ranges of the discs, is considerably facilitated, and the means used for adjusting the discs are simplified and cheapened. The same holding tool may, without the employment of any particular adjusting device, be used for three different iron sizes, by arranging the pin upon which the tool is mounted in a suitable position, that is not symmetrically with regard to the three sides of the triangular tool. In addition, the holding tool may be provided with easily exchangeable plate attachments for extending the size of the operative side of the tool. By this means, the pressure surfaces may be extended close to the point at which bending takes place, whereby lateral yielding of the iron is avoided and a very satisfactory bending action is ensured.

The drawings show by way of example one construction of the improved machine embodying the features of the invention.

Fig. 1 is a top view of the improved machine,

Fig. 2 is a longitudinal section on line II—II of Fig. 1,

Fig. 3 is an inverted plan of a holding tool to be employed with the improved machine,

Fig. 4 is an elevation of the holding tool,

Figs. 5 and 6 show in top view the improved holding tool provided with detachable extension plates, and

Fig. 7 is a perspective view of the bending machine.

Referring to the drawings, 1 indicates the table top of the machine. In the table top 1 are mounted three countersunk bending discs or turntables 2, 3, 4 of different diameters, each of which is non-rotatably fixed upon a corresponding vertical shaft 5, which shafts 5 are driven by pulley M through the medium of shaft L. For non-rotatably fixing the discs or turntables upon their shafts, each of the shafts is formed upon its upper end with a hexagonal portion 6 which engages a corresponding hexagonal central hole of the discs, the top surface of the portion 6 being flush with the smooth top surface of the corresponding turntable and the table top 1. The hexagonal portions 6 are each provided with a central bore 7 for the reception of the pin of a bending roller 8 around which the iron is to be bent. In addition to the central bore, each disc is provided in known manner with a large number of other holes 9 which can be selectively used for the insertion of a bending pin 10 by means of which, upon rotation of the discs, the iron P is bent around the central pin 8. Around the discs or turntables, there are provided in the table top 1 holes 11 for the reception of release rollers 12 which, in known manner, effect release of carrier members 28 mounted upon the bending discs and thereby stop the drive of the disc or turntable after the latter has been turned through an angle corresponding to the required bending angle. In addition to the discs, there are provided in the table top holes 13 for mounting a holding tool which serves for supporting the iron behind the bending point. This holding tool is, according to the invention, constituted by a triangular member 14 having the contour of an isosceles triangle, and is provided upon its base with a pin 15 by means of which it can be

inserted in one of the holes 13 of the table top. The holder pin 15 is arranged close to the bases of the isosceles triangle so that the two sides of the triangle are at a different distance from the holder pin 15. The same holding tool can therefore, without the employment of a particular adjusting device, be used for various iron sizes, one or the other side surface of the triangular tool being used as the bearing surface for holding the iron during the bending operation. The large surfaces of the improved holding tool are particularly advantageous when bending twisted iron, inasmuch as they afford a very satisfactory support. The triangular holding tool is so constructed that its largest side surface is used for holding the greatest size of iron. If it is desired to increase the effective supporting surface of the holding tool beyond the size of the three normal surfaces of the tool, a plate 16 is attached to the triangular tool as shown in Figs. 5 and 6, said plate being provided upon its rear side with a dove-tailed groove 17 adapted to fit one of the sides of the tool. The plate 16 is provided with a number of rollers 18 bearing upon the iron to be bent. By the provision of these pressure rollers 18, excessive friction between the holding tool and the iron is avoided and a good support is obtained. The plate 16 may also, as shown in Fig. 6, be provided with a projection 19 engaging one corner of the tool, this construction being useful in cases in which only one-sided extension of the bearing surface is desired. In this construction, connection between the plate and the tool may be improved by means of a counter-sunk screw 20 or by providing the bearing surface of the tool and the plate with corresponding interengaging members such as a rib and groove.

The bearings 21 of the shafts 5 arranged in the bending discs or turntables, are each provided with an annular projection or neck portion 23 fitting into a corresponding annular recess 22 formed in the under surface of the disc or turntable. By this construction, any workpiece or rust particles detached during the bending operation from the iron, are prevented from entering the bearings and causing undue friction or wear. Between the discs and the table top on the one hand, and the base plate 27 carrying the table top, a free space 25 is provided. This arrangement enables any workpiece or rust particles dropping from the iron during the bending operation and reaching the lower side of the discs, to be readily removed by means of bellows.

The counter-sunk mounting of the bending discs and the provision of a plurality of discs, enable various iron sizes to be bent with various speeds upon the same machine, without the necessity of a complicated adjustment or of an exchange of the tools provided for various iron sizes. For bending any particular iron size, it is only necessary to insert the pins into the holes 9, and to insert the releasing rollers and the holding tools into the corresponding holes. The middle bending roller 8 must, of course, on changing the discs, be removed and inserted into the disc to be used.

The scope of the invention is not restricted to the illustrated example, various modifications being possible within the scope of the invention. It may particularly be pointed out that the packing of the bearings may be obtained by other means. The triangular holding tools need not be of the shape of an isosceles triangle, it being of course possible to use triangular shapes in which all the three sides are of different lengths, whereby the tool becomes applicable for three different iron sizes.

I claim:

1. In a bending machine for bending iron rods, bars and sections, more particularly for use in connection with concrete structures, the subcombination of: a table top; several selectively employable bending discs mounted in said table top; a triangular holding tool adapted to be inserted into the table top; and an extension member removably attachable to one of the sides of said holding tool.

2. In a bending machine for bending iron rods, bars and sections, more particularly for use in connection with concrete structures, the subcombination of: a table top; several selectively employable bending discs mounted in said table top; a triangular holding tool adapted to be inserted into the table top; and an extension member removably attachable to one of the sides of said holding tool, said extension member having a dove-tailed groove upon its rear surface fitting one of the sides of said triangular holding tool.

3. In a bending machine for bending iron rods, bars and sections, more particularly for use in connection with concrete structures, the subcombination of: a table top; several selectively employable bending discs mounted in said table top; a triangular holding tool adapted to be inserted into the table top; and an extension member removably attachable to one of the sides of said holding tool, said extension member having a hook-shaped end adapted to engage one of the corners of said holding tool.

4. A rod bending machine having a plurality of bending discs, with their faces in substantially the same plane, said faces forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, means exteriorly of the discs for holding the rods, and means for turning the discs.

5. A rod bending machine having a table, a plurality of bending discs, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a rod holding tool having a pin adapted to be selectively inserted in a hole in the table to position the tool to the rod to be bent, and means for turning the discs.

6. A rod bending machine having a table, a plurality of bending discs of different diameters, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a rod holding tool having a pin adapted to be selectively inserted in a hole in the table to

position the tool to the rod to be bent, and means for turning the discs.

7. A rod bending machine having a table, a plurality of bending discs of different diameters and in alignment with each other, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a rod holding tool having a pin adapted to be selectively inserted in a hole in the table to position the tool to the rod to be bent, and means for turning the discs.

8. A rod bending machine having a table, a plurality of bending discs, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a triangular rod holding tool having a pin adapted to be selectively inserted in a hole in the table to position the tool to the rod to be bent, and means for turning the discs.

9. A rod bending machine having a table, a plurality of bending discs, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a triangular holding tool having a fixed pin adapted to be selectively inserted in a hole in the table to position the tool to the rod to be bent, and means for turning the discs.

10. A rod bending machine having a table, a plurality of bending discs, with their faces in substantially the same plane as the table, said faces and the table forming supports for the rod to be bent, there being openings in the faces of the discs, bending members arranged to be selectively inserted in the holes in a disc to be used for bending, any adjacent disc being free of obstructions to permit the rod to pass thereover during the bending, a triangular holding tool having a fixed pin adapted to be selectively inserted in a hole in the table to position the tool to the rod to be bent, the distance from said pin from one side of the tool being different from at least one of the other sides, and means for turning the discs.

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