(No Model.)

Z. V. PURDY.

ROLLS FOR SHAPING AND PERFORATING IRON.

No. 453,161. Patented May 26, 1891.

Fig. 1.

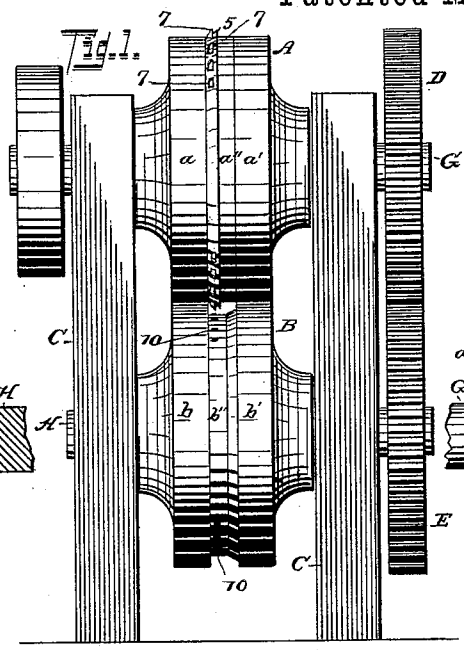


Fig. 2.

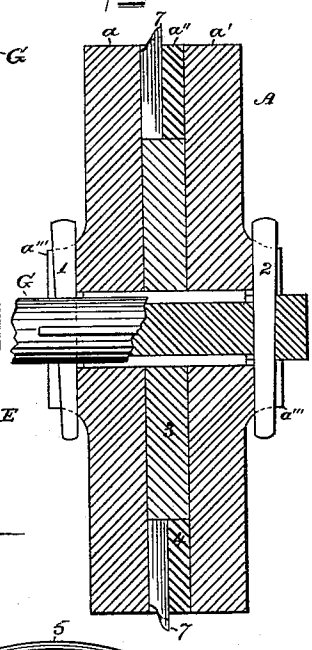


Fig. 4.

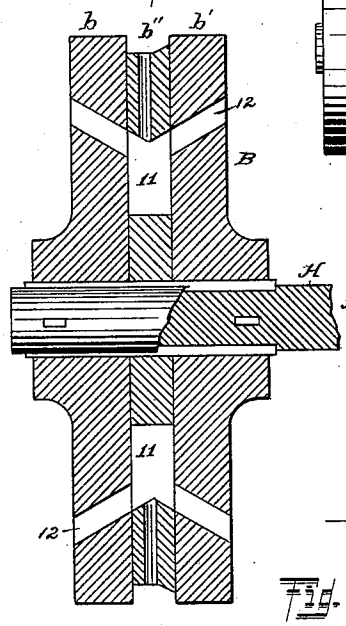


Fig. 5.

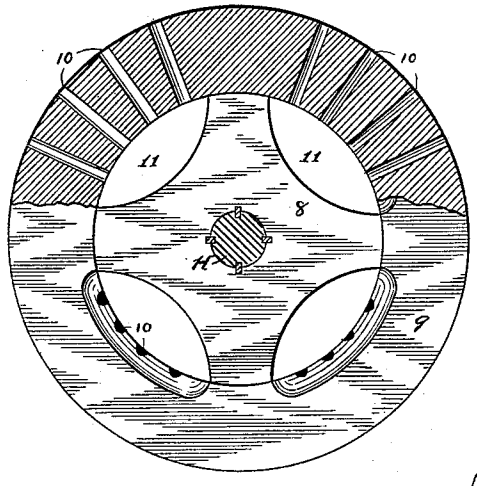


Fig. 3.

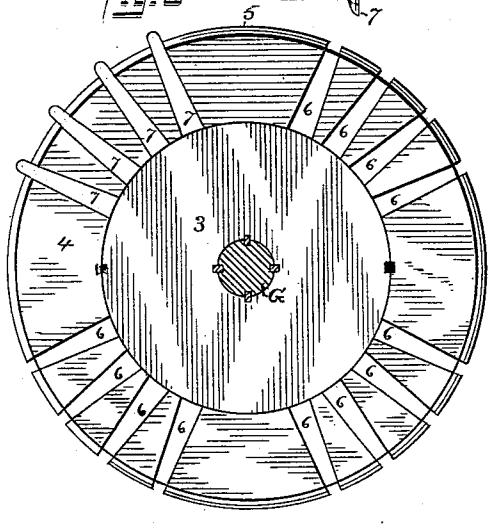
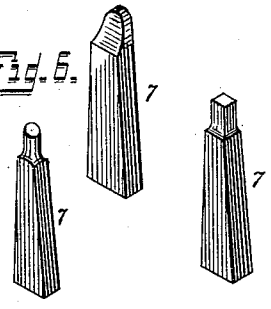


Fig. 6.



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ZACHARIAH V. PURDY, OF VIENNA, VIRGINIA.

ROLLS FOR SHAPING AND PERFORATING IRON.

SPECIFICATION forming part of Letters Patent No. 453,161, dated May 26, 1891.

Application filed August 1, 1890. Serial No. 360,621. (No model.)

To all whom it may concern:

Be it known that I, ZACHARIAH V. PURDY, a citizen of the United States, residing at Vienna, in the county of Fairfax and State of Virginia, have invented certain new and useful Improvements in Rolls for Shaping and Perforating Iron; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

When iron is to be punched at relatively fixed distances apart, it is conveniently and expeditiously done by passing it between "punching-rolls," which may at the same time be used to roll the iron into any desired shape, so that the rolling and punching operations are performed simultaneously by the same set of rolls. Such punches, however, wear more rapidly and are more liable to be broken than the ordinary reciprocating punches, and it is therefore necessary to renew or replace them from time to time; also, when holes of different sizes or shapes are to be punched it becomes necessary to replace the punches before used with others of size and shape adapted to the work to be performed. So, also, when different-sized bars are to be rolled or bars of the same size rolled into different shapes, it is necessary with the ordinary construction of rolls to replace the rolls before used with others adapted to the size or shape of the bar to be rolled. It follows, therefore, that if the rolls be made solid or integral a different roll or set of rolls will be required for every different variety of work, and that if the punches be made integral with the roll or permanently set into the same a different roll will also be required for every different size of holes to be punched.

The object of my invention is to provide a set of rolls in which the operative parts alone may be changed, replaced, or renewed without changing the entire roll; and to this end it consists, first, in forming the rolls in separate sections and keying the same upon revoluble shafts, so that the sections may be separately and independently renewed or replaced; second, in forming the operative sections of the rolls in separate and separable parts adapted to be independently replaced or renewed; third, in the manner of seating and supporting the punches to enable them to be conveniently inserted and removed; fourth, in the construction of the female parts of the punching-dies and in the means for discharging the punched-out metal from the rolls, all as will be hereinafter fully described, and particularly pointed out in the claims hereto appended.

In the accompanying drawings, which illustrate my invention and form a part of this specification, Figure 1 shows in elevation a pair of rolls constructed according to my invention and mounted in a frame in operative relation. Fig. 2 shows a section, on an enlarged scale, through the punching-roll. Fig. 3 is a face view of the punch-carrying section of the punching-roll. Fig. 4 shows a section through the female member of the punching-die. Fig. 5 is a face view, partly in section, of the female member of the punching-die; and Fig. 6 shows in perspective different forms of interchangeable punches.

A B designate, respectively, the upper and lower rolls, which are mounted in a suitable frame C and caused to revolve together by intermeshing gears D E on the shafts or journals of the two rolls, all as usual, power being applied in the usual or any suitable manner. As represented in the drawings, power is applied through a band-pulley F.

I will first describe the upper roll and its several parts and afterward the lower roll and its several parts.

The roll A, then, is made up of three separate sections $a\,a'\,a^2$, which are bored out axially to receive a shaft G, upon which they are splined or feathered, so as to rotate therewith, the projecting ends of said shaft forming journals, which run in suitable bearings in the frame C. The sections $a\,a'\,a^2$ are snugly fitted to form close joints and are tightly keyed together by keys 1 2, which pass through the shaft G on the outer sides of the outer sections $a\,a'$. The outer faces of the sections $a\,a'$ may be plane surfaces; but I preferably form them with central bosses or hubs a^3, which are notched to form seats for the keys 1 2, whereby the latter are made to coact with the splines or feathers 3 to pre-

vent independent rotation of the roll-sections upon the shaft. The central section a^2 may be termed the "operative section," inasmuch as the rolling and punching operations are performed thereby, the outer sections a a' serving merely as holding-plates to hold the central or operative section a^2 in place. The central section a^2 is made in two parts, one of said parts being a flat circular disk (marked 3) having a thickness corresponding with the width of the iron to be rolled or punched, and having a cylindrical or approximately cylindrical circumferential surface. This disk is splined upon the shaft G, as already explained. The other part (marked 4) of the section a^2 comprises a flat ring, which surrounds and snugly fits the part 3, the two parts 3 4 together forming a complete disk of substantially the same size as the sections a a', so as to form with the latter a complete roll. On its peripheral surface the ring 4 has such configuration as is necessary to make the desired impression upon the iron to be rolled. In one or both side faces of the ring 4 are formed radial channels 6, somewhat wider at the inner than at the outer end, to receive and hold correspondingly-shaped punches 7, the inner ends of which rest upon and are supported by the inner disk 3, the outer or punching ends projecting out the requisite distance beyond the outer face of the ring 4. The channels 6 are all of the same width and depth, and the bodies of the punches 7 are all of the same size, to make them interchangeable. The punches then, being properly seated in the channels 6 and the sections of the roll keyed together, will be securely held in position. When they are broken or worn, or when it is desired to replace them with others of different size or shape, the sections of the roll are unkeyed and separated far enough to allow the punches to be taken out of their seats and others inserted in their places, after which the roll is again keyed up when it is ready for use.

It is to be understood that while the ring 4 is required to hold the punches the latter are by no means necessary to the operation of the ring—that is to say, when iron is to be rolled and shaped without being punched a ring adapted to the work to be performed is used and which is formed without the channels or punch-seats 6. When iron is to be punched without being rolled or shaped, a ring 4, having a plain peripheral surface and formed with channels or punch-seats 6, is used. When iron is to be both rolled and punched at the same time, a ring 4, having the proper peripheral configuration and channels or punch-seats 6, is employed, together with the proper punches.

From the foregoing it will be seen that the ring 4 is the operative part of the roll and the only part that requires to be changed to adapt the roll to perform different kinds of work, and that, being but a small part of the complete roll, it is cheaply and conveniently made and may be renewed or replaced at a small fraction of the expense incident to renewing or replacing the entire roll. This renders it practicable to keep on hand a variety of interchangeable rings and to execute with a small plant a variety of work wholly impracticable with solid or integral rolls constructed as heretofore.

The roll B is constructed similarly to the roll A—*i. e.*, in sections splined and keyed upon a revoluble shaft H, which is in gear with the shaft G of roll A through gear-wheels D E on the two shafts. The outer sections b b' of the roll B differ in nowise from the corresponding sections a a' of the roll A, and therefore require no further description. The central section b^2, like the section a^2 of roll A, is also made in two parts, an inner or central part 8, which is splined upon the shaft, and an outer or annular part 9, which surrounds and fits the part 8. The section b^2 is, however, smaller in diameter than the outer sections b b' to form a circumferential channel in the roll, the relative sizes of the central and outer sections being such as to form a channel of suitable depth, according to the thickness of the iron to be rolled, and the peripheral surface of the ring 9 bears such configuration as is necessary to give the desired impression or to roll the bar to the desired shape. To adapt the roll B to co-operate with the roll A and its punches 7 in punching metal, radial openings or passages 10 are formed in or through the ring 9, which passages correspond in size, shape, and position or arrangement with the punches 7 and form the female dies into and through which the metal is punched. The inner ends of the die-openings 10 open into pockets 11, formed in the central disk 8 by cutting away portions thereof, as represented in Figs. 4 and 5 of the drawings. To provide for the automatic discharge from the roll of the punched-out pieces of metal, outwardly-inclined openings 12 are formed through the sections b b', which openings form passages, through which the blocks of metal escape from the pockets 11 when the latter in the course of rotation reach the lowest position. To facilitate this discharge of the blocks of metal, the inner face of the ring 9 is beveled opposite the pockets, so that the blocks may find no lodgment thereon, but will at once roll off into and through the openings 12.

While I describe the sections a^2 and b^2 of the rolls as being each made in two parts, it is to be understood that they may each be made in one part, in which case the mechanical operation of the rolls will be the same, the construction described being preferred merely on account of simplicity in manufacturing and economy in operating.

Having now described my invention, I claim—

1. A roll for punching iron, made in three transversely-divided sections keyed upon a revoluble shaft, the central section being

made in two parts, an inner annular part and an outer annular part fitting upon and removable from said inner annular part and having in one or both of its side faces radial grooves or channels 6 to receive and hold punches 7, substantially as shown and described.

2. A female die for punching iron, the same comprising a section of a roll keyed upon a revoluble shaft, said roll-section being made in two parts, a central part or core and an outer annular part fitting upon and carried by said core and having radial openings or passages 10, which form the dies, substantially as shown and described.

3. A female die for punching iron, the same comprising a section of a roll made in two parts, a central part or core keyed upon a revoluble shaft and an outer annular part fitting upon and carried by said core and having radial die-openings 10, the said core being cut out to form pockets or receptacles 11, into which the punched-out metal is discharged from the die-openings, substantially as shown and described.

4. A female die for punching iron, the same comprising a section of a roll having radial die-openings 10 and pockets or receptacles 11, into which the punched-out metal is discharged from the die-openings, in combination with holding-sections keyed upon the shaft at either side of the die-section and having openings 12, through which the punched-out metal is discharged from the said pockets or receptacles, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ZACHARIAH V. PURDY.

Witnesses:

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JAMES S. BENNETT.