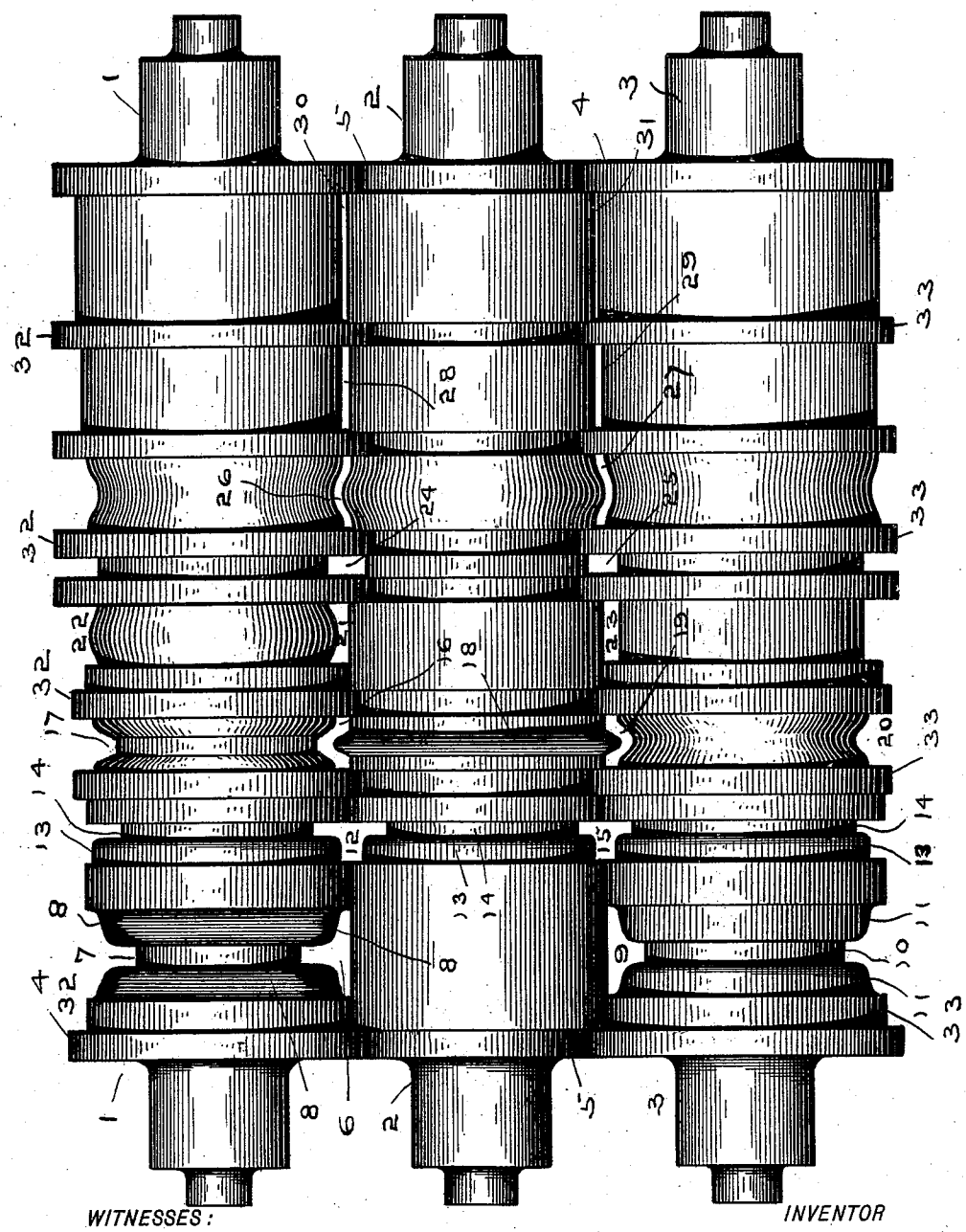
(No Model.)

F. P. MAUS.

ROLLS FOR REDUCING RAILWAY RAILS, &c.

No. 532,424. Patented Jan. 8, 1895.



WITNESSES:

H. D. Healy.

M. L. Hitchcock

INVENTOR

Frederick P. Maus,

By V. H. Lockwood

His ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK P. MAUS, OF GREENFIELD, ASSIGNOR OF ONE-HALF TO FLORENCE B. WHITEHEAD, OF INDIANAPOLIS, INDIANA.

ROLLS FOR REDUCING RAILWAY-RAILS, &c.

SPECIFICATION forming part of Letters Patent No. 532,424, dated January 8, 1895.

Application filed August 2, 1893. Serial No. 482,209. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK P. MAUS, of Greenfield, county of Hancock, State of Indiana, have invented certain new and useful Improvements in Rolls for Reducing Railway-Rails and I-Beams; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, in which like figures refer to like parts.

My invention relates to new and improved rolls for reducing old iron and steel rails into merchant bars, bands, flats and other forms and is designed more especially for the reduction or rerolling of the web and flanges of railroad rails which heretofore have never been successfully reduced, although numerous attempts have been made in that direction.

Heretofore the web and flanged portion of old railroad rails has been thrown away as scrap to be remelted like old iron, or one flange has been cut off leaving an angle iron. Practically therefore this part of an old rail has never been fully utilized. The head has always been cut off and used as a billet, but the rest of the rail was scrap unless treated in the manner above described. Where it has been converted into an angle iron by cutting off one flange, that flange, that is one-third of this part of the rail, was wasted. Nobody has ever heretofore utilized the whole of this portion of old rails by re-rolling, which is the only practical way of utilizing the same. No set of rolls has ever been devised, so far as I am aware, that would reduce by re-rolling this portion of the rail into a serviceable billet or form. No rolling mill has been made, so far as I know, provided with a pass or a series of passes so formed as to hold a piece of steel of the peculiar shape of the web and flanged portion of a railway rail positively, in the proper position that the bottom of the web will be split, thus separating the flanges, whereby the web can be gradually worked down in line with the flanges to form a slab or shape as desired, without there being any overlapping or breaking whatsoever. This is apparent when it is remembered that the web and flanges are T-shaped, and very thin, and vary in thickness, since old rails vary from fifty to one hundred pounds per yard. The difficulty has been that from the lightness of the web and flanges, in re-rolling they would overlap and crease, and, when completely reduced, would be very inferior owing to this overlapping and creasing, as these defects in steel will not weld together, thus making the product perfectly worthless for a number of uses to which a perfect product might be put. The reduced rails when reduced to bars, bands or other forms by my rolls are without overlaps and are a perfect, finished and merchantable product in themselves and may be used as such and are suitable for all general purposes.

My improved rolls are designed as before mentioned for the reduction of only the web and flanges of the rail, the head itself being removed in any ordinary way and forming a billet or bar itself and may be rolled down into any desired form, while the web and flange portion of the rail only is designed to pass through my improved rolls for reduction to suitable forms.

The drawing represents in elevation a set of three rolls which are supported and turned in the usual way. The rolls are so formed as to give sixteen passes, only a portion of them, however, being used to reduce the web and flange portion of the rail to any one of the finished products hereinbefore mentioned.

In detail, 1, 2 and 3 designate respectively the top, middle and bottom rolls of the set, and are provided with collars 4 formed on their ends, which bear in grooves at 5 on the end of the middle roll and serve to keep the rolls in their proper relative position. Between the rolls 1, 2 and 3 are sixteen passes through which the rails may be fed, but they are only fed through a part of such passes for each of the several products. After the head of the rail has been removed by a suitable machine, the flange and web portion makes the first pass through the rolls.

The first pass 6 is formed by a groove 7 in the roll 1, the face of this groove being adapted to bear on and partly break down the top of the web of the lower half of the rail as it passes through, with the base of the rail flanges bearing against the periphery of the middle roll 2.

Between the rolls 2 and 3 is the second pass

9 that is formed by a groove 10 in the roll 3, whose face, on the passage of the rail, is adapted to bear against and further break down the web of the rail, the flanges and the bottom of the rail again bearing against the periphery of the roll 2.

The third pass 12 is between the rolls 1 and 2 into which the flanges are passed edgewise. The partly broken down web of the rail is held by the corresponding ribs 13 on the rolls 1 and 2, while the flanges pass edgewise between the grooved portions 14 of such rolls. Such grooved portions bear on the edges of the flanges and partly break them down. The flanges of the rail are further broken down at the fourth pass 15 between the rolls 2 and 3 where the web of the rail is again held between the ribs 13 on such rolls, while the flanges pass between the grooved portions 14 of the rolls 2 and 3, the grooved portions again bearing on and further breaking down the flanges of the rail, at which point the partly broken down flanges and web will be in cross section in the form of a T.

The fifth pass 16 is made between the rolls 1 and 2, by a groove 17 with a straight bottom formed around the periphery of the roll 1, and having beveled sides. The bottom and sides of this grooved portion of the roll bear upon the web of the rail at the same time that the fuller or rib 18 formed on the roll 2 bears centrally on the bottom of the rail, splitting and spreading the web and forcing out the angle of the web and flange to fill the pass, thereby rolling out any defect that may have been in the angle of the flanges and web. The sixth pass is somewhat similar to the fifth and is between the rolls 2 and 3, the bottom of the groove 20 in the roll 3 being more of a U-shape. The web and flange of the rail are pressed out into a corrugated form. The next or seventh pass 21 is to further compress or flatten the already broken down web of the rail and this is done through the circular form of the widened rib 22 in the upper roll 1. The edges of the flanges of the rail are forced or spread outward by their bearing on the periphery of the roll 1 and by this time the broken down rail is almost flat.

By the eighth pass 23 between the rolls 2 and 3 the rail is reduced to a flat bar, and this is again broken down edgewise between the rolls 2 and 3 in the ninth pass 24 and may be further broken down between the rolls 2 and 3 at the tenth pass 25, and after any of the last three passes are made a merchantable bar is the result. Should, however, it be desired to make either plates or flats from the rails, after the sixth pass 19 the partly broken down rail would make the pass 26 between the rolls 1 and 2 and the rail would be rolled out into a curved shape by the passes 26 and 27, being finally flattened at the next pass 28 between the rolls 1 and 2 and can be rolled to any degree of thinness through the last three passes, 29, 30 and 31.

32 are collars formed on the rolls 1 and 3 and form the sides of the several passes, a part of these collars engaging and turning in grooves formed around the periphery of the middle roll 2, these serving together with the outside collars and grooves to keep the rolls in their proper relative position and to hold the steel so that the work being done will be perfect in size and shape.

It will be seen from the foregoing that the flange and web portion of a rail may be thus rerolled or reduced into a bar, plate, flat or other form without there being any overlapping whatever, the sides of the different passes always holding that part of the rail which is not being broken down, the ribs 8 and 11 accomplishing this purpose in the first and second passes.

The most important feature of my improved rolls is the fuller or rib 18 on the central roll and the corresponding grooves and collars on the two outer ones for the final breaking down of the web and flanges. The four passes before these are to prepare the rail for the final operation and the passes afterward are those which are most generally used for finishing the broken down rail into merchantable sizes and shapes.

Through the fuller or rib 18 on the middle roll and the corresponding grooves on the outer ones, the partly broken down rail must necessarily take a U-shaped form without lapping, for as the fuller strikes the bottom of the rail exactly in its center and in a vertical line with the web, as the web is being broken down the fuller will be forced up in the web while the flanges of the rail will be forced outward, thereby dividing the web as it is being compressed or broken down on either side of such fuller, so that after these two passes have been made the rail, while having a U or corrugated shape, is of about the same thickness at all points and it is very easy to roll it out into any desired form.

In reducing old rails through my rolls where the bolt holes are in the end of the rails, by notching the web of the rails into these, the holes will be rolled out of the finished product. As before mentioned the greatest trouble of rerolling the web and flanges of old rails has been the overlapping of the several parts and thus turning out an inferior product, which has a very limited use and a good part of which will be entirely wasted, it being impossible to utilize this to any great extent, and to obviate this defect is the main object of my invention.

Numerous modifications may be made in the form of the passes of my rolls and the number, as two rolls may be used instead of three, but this would not be a departure from the spirit of my invention for in any event the principle and operation would be the same; and besides rerolling old rails as above described this same process will admit me to reroll I beams after the same have been

cut in two lengthwise into T forms, it being simply necessary to make the passes of sizes suitable for such work, the principle being identically the same.

Having fully described the construction and operation of the rolls, what I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In the process of reducing the web and flange portion of a railway rail or similar form, the step which consists in simultaneously breaking down the web and centrally splitting or grooving the flange and web by a wedge-action from the bottom whereby the web will not be lapped while being broken down, substantially as shown and described.

2. The process of reducing the web and flange portion of a railway rail or similar form which consists in breaking down the web and centrally splitting or grooving the flange and web by wedge action so as to cause the two halves of the split web to diverge, and then increasing the divergence until said sections are brought into the same plane, substantially as described.

3. The process of reducing the web and flange portion of a railway rail or similar form, which consists in gradually squaring the edges of the flanges and breaking down the web, centrally splitting or grooving the flange and web from the bottom, gradually flattening the same, and finally working the material into any desired form, substantially as shown and described.

4. In a pair of rolls for reducing the web and flange portion of a railway rail or similar form, a pass formed by a V-shaped groove in one roll so shaped as to receive, hold and break down the web portion thereof, and a V-shaped fuller on the other roll adapted at the same time to centrally split or groove the web and flange portion of the rail from the bottom whereby the web will not be lapped while it is being broken down, substantially as shown and described.

5. A set of rolls for reducing the web and flange portion of a railway rail or similar form, provided with a series of passes adapted to gradually square the flanges and break down the web, a series of passes formed by grooves in one roll so shaped as to receive and break down the web and fullers in the other roll adapted at the same time to centrally split or groove the web and flange portion of the roll from the bottom, and a series of passes adapted to work the material thus produced into any desired form, substantially as shown and described.

In witness whereof I have hereunto set my hand this 13th day of July, 1893.

FREDERICK P. MAUS.

Witnesses:
H. D. NEALY,
G. W. MCDONALD.