(No Model.) 3 Sheets—Sheet 1.

F. COLLEY.

MACHINE FOR ROLLING GIRDER RAILS.

No. 410,821. Patented Sept. 10, 1889.

Fig. 1.

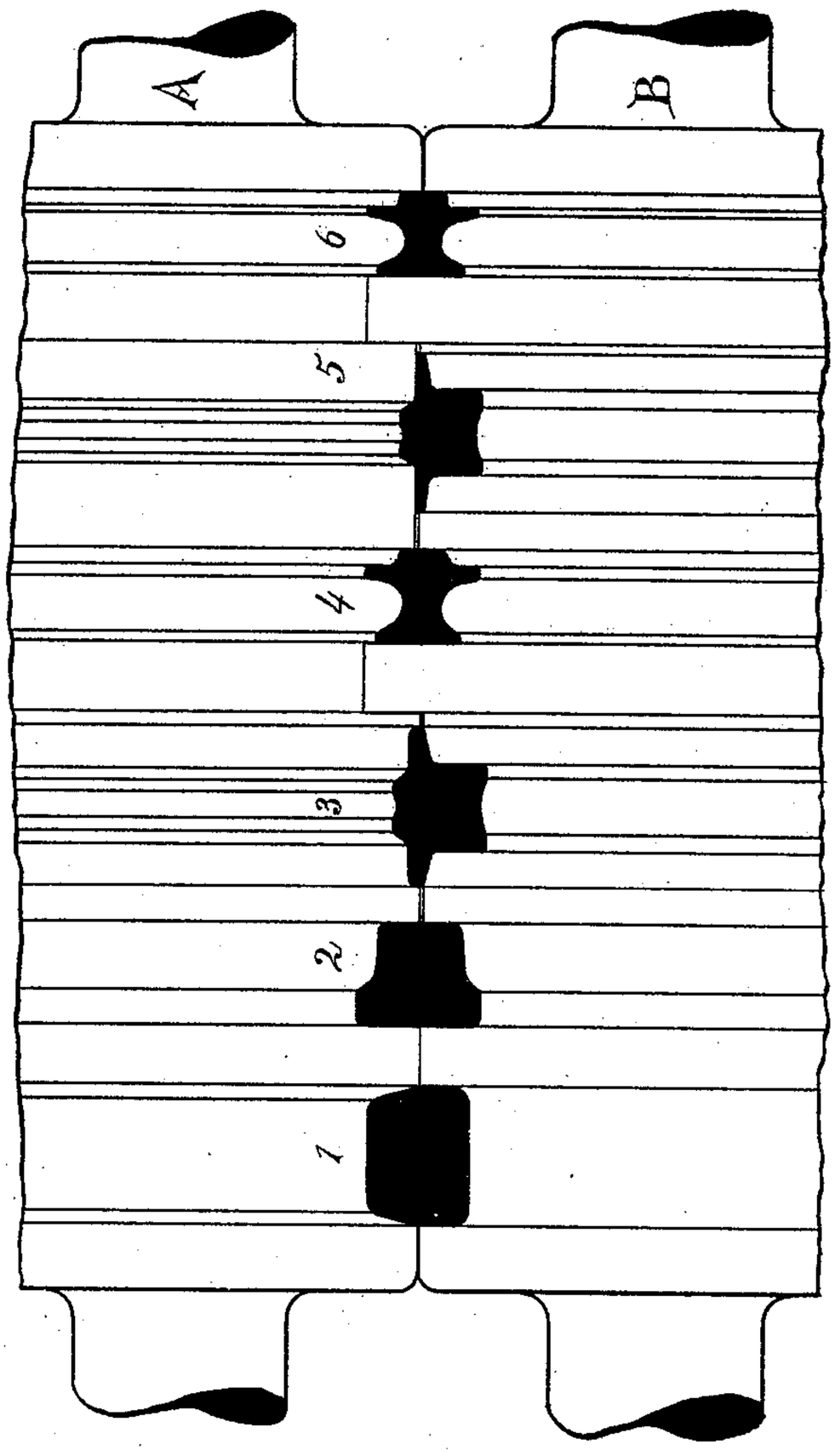

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Fig. 2

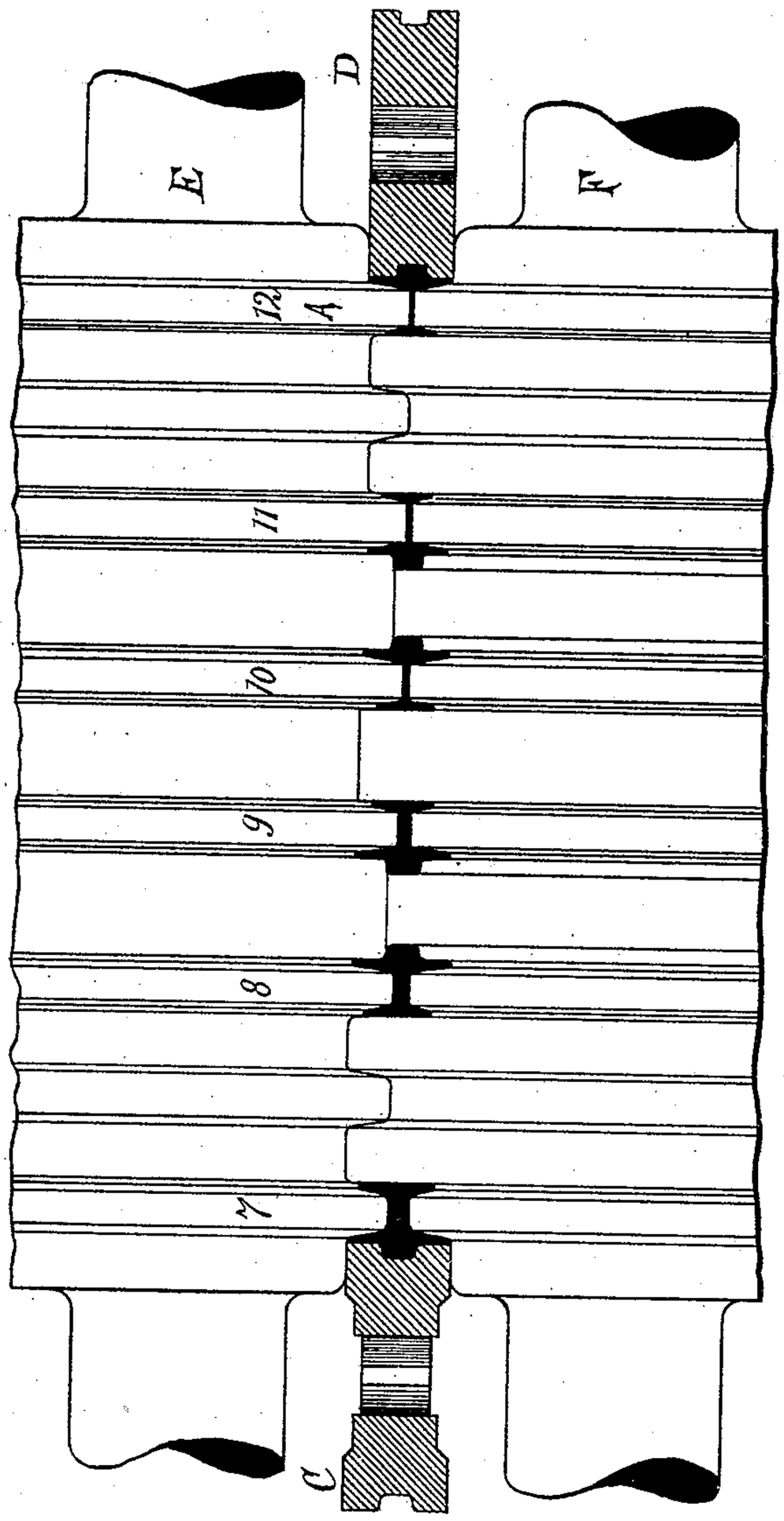


Fig. 4

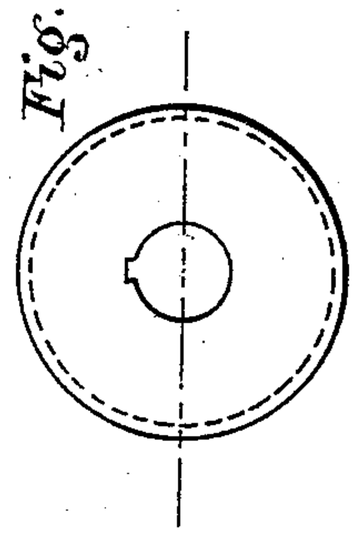
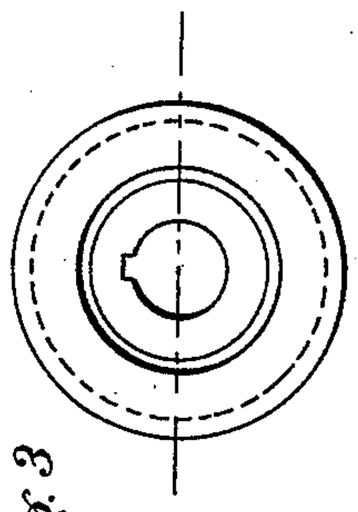


Fig. 3



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(No Model.) 3 Sheets—Sheet 3.

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MACHINE FOR ROLLING GIRDER RAILS.

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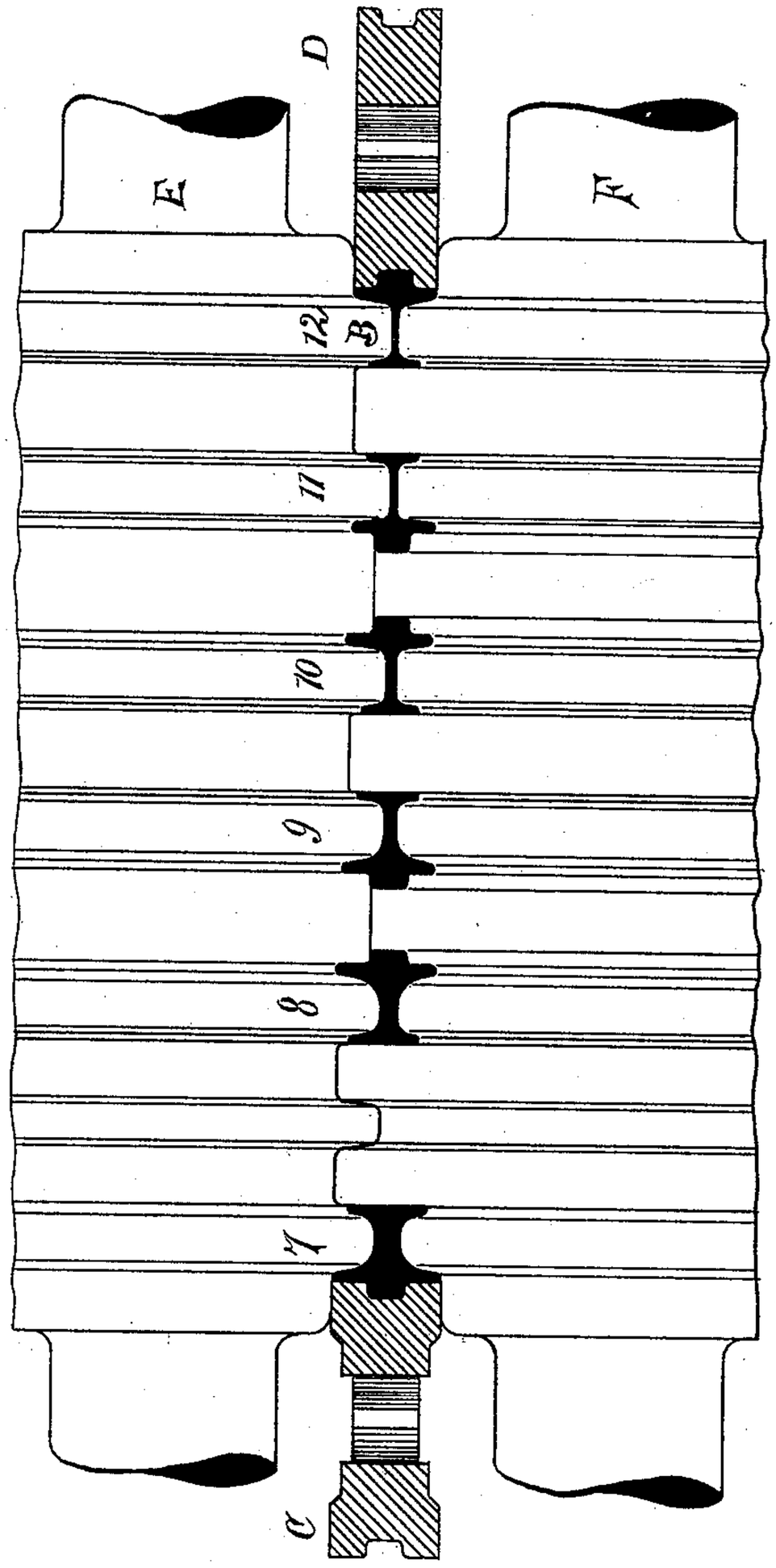
Fig. 5



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UNITED STATES PATENT OFFICE.

FREDERICK COLLEY, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE JOHNSON STEEL STREET RAIL COMPANY, OF KENTUCKY.

MACHINE FOR ROLLING GIRDER-RAILS.

SPECIFICATION forming part of Letters Patent No. 410,821, dated September 10, 1889.

Application filed April 2, 1888. Serial No. 269,266. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK COLLEY, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Rolling Girder-Rails, which improvement or invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to facilitate the rolling of girder-rails, particularly of such shapes as are difficult to roll by ordinary methods, and to increase the product in a given time by reducing the number of passes in which to complete the rails.

The invention will first be described in detail, and then particularly set forth in the claim.

In the accompanying drawings, Figure 1 illustrates in side view a pair of roughing-rolls. Fig. 2 is a similar view of a pair of finishing-rolls fitted with a pair of horizontal side rolls shown in cross-section. Figs. 3 and 4 illustrate in plan the side rolls shown in Fig. 2. Fig. 5 illustrates in side view another pair of finishing-rolls.

In said figures the several passes are numbered from 1 to 6, inclusive, in Fig. 1, and in each of Figs. 2 and 5 from 7 to 12, inclusive, respectively.

The hot metal is first passed successively through passes 1 to 6, and then through the passes of either Fig. 2 or Fig. 5, as may be desired, depending upon the shape of the finished rail required. Each set of rolls in Figs. 2 and 5 is complete in itself, producing the finished rail of the section 12^A or 12^B, respectively, and either set may be served with the rough-rolled bar taken from the rolls, Fig. 1. In said figure the passes 1 and 2 are ordinary flat and edging passes, respectively. Passes 3 and 5 are dummy passes, and 4 and 6 edging-passes. It will be observed that at the first dummy pass No. 3 the head of the rail is roughed out. If using the ordinary process of rolling, it would be difficult to thus at once commence forming the head of the rail in the early dummy passes, as the whole scope of the dummy action must be used to get the necessary spread of metal to secure the width of head needed in the finished rails. From pass 6 the rail is entered into pass 7 of either set of rolls, Figs. 2 and 5. In this pass the dummy action is secured by a horizontal side roll C, let in between the necks of the main rolls, while the main rolls are reducing the metal otherwise. The metal or rail is then rolled on edge consecutively to the last pass No. 12, where it is again acted upon, if desired, by another horizontal roll D, similarly placed between the necks.

The side roll C is essential to the quick reducing of the section of metal. The side roll D may or may not be essential for quick reduction, but is of great advantage for the following reasons: In all girder-rails the head portion must be of good finish, as it is the running surface of the rail. The rest, being buried in the road-bed, is not so important as to finish. Ordinarily this head portion is finished in the main rolls proper, and these, being made of cast-iron, are subject to rapid wear; but by securing the finish in the side roll D not only can the same (being small) be made of forged steel or other superior metal too expensive for the main rolls, but it can be quickly and economically dressed up, (as can also be the side roll C,) and thus the dressing up of the main rolls be largely reduced and better finish secured.

Two sections of rail are shown as being finished from one set of roughing-rolls common to both sets of finishing-rolls, thus showing the large scope gained by the use of the side rolls, and the rail is finished in twelve passes, where ordinarily thirteen passes are used. The use of the side roll C thus equals a gain of one pass less, and by putting heavier draft on the passes the saving might, in large mills, be still greater. The advantage in increased product is therefore very great.

The roll C is in fact a reducing-roll, and forms, with the main rolls, what may be described as a "three-part" dummy pass. The roll D is a finishing-roll, forming a three-part finishing pass. The one roll can, if desired, be used without the other. Both rolls are so located between the main rolls that they can be added to an ordinary roll-train without special mechanism, the only essential point being that the body of the main roll be cut away to permit of entry

and rotation of the side roll; and, further, it will be observed that the side roll is used for some special and fixed shape, which dispenses with the need of horizontal adjustment for changing the shape of the pass—points of great importance in rolling-mill work, where simplicity is essential.

By the adaptation of one side roll to work in conjunction with a pass at the end of an ordinary set of rolls is secured a pass which acts in two horizontal planes and one vertical plane. This localizes the action of the side roll and increases its adaptation to special and awkward shapes, which often require a local action on some special portion of the pass. By the use of the side rolls for a fixed purpose they become available for use at the end of an ordinary set of rolls; but they would not be available for this purpose were adjustment an essential, for it is evident that the adjustment that might be needed for what may be termed the "side-roll" pass would affect all the other passes in said rolls, and would thus render the use of a side roll impossible.

Details of the location of the side rolls in the carriages are not herein shown, such being reserved for a separate application for Letters Patent.

The side rolls C D are rotated by the metal passing through the main rolls, and need no special mechanism to drive them.

The adaptation of this invention to one shape of rails is shown—namely, a center-bearing girder-rail; but it is evident that it is equally well adapted to side-bearing rails or any other shaped rails, and that it has special advantages for the rolling of undercut sections of rail that could not be rolled in the passes of a small pair of rolls acting in the ordinary manner of rolls.

I am aware that many devices have been suggested and used for specially driving rolls in different planes. I am also aware that rolls (four in all) operating simultaneously on the two vertical and two horizontal sides have been in use, such rolls being specially designed for the general purposes of rolling and with a special view to adjustability in both planes, and such I do not claim, but limit my invention to one horizontal side roll, in combination with a groove in the main rolls, undercut on one side to receive such side roll, the same being fixed for doing specific work by its shape alone, and driven not by driving mechanism, but by the passage of the metal which it reduces or finishes, as the case may be, through the pass while being rolled.

Having thus fully described my said improvement in rolling girder-rails, as of my invention I claim—

In combination with the end passes, one or both, of a set of main rolls, a horizontal side roll set in vertical bearings, said main rolls having passes cut away on one side to permit of the entry of said side roll, substantially as set forth.

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