

(No Model.)

2 Sheets—Sheet 1.

H. McDONALD.
SHIELD FOR METAL ROLLS.

No. 268,259.

Patented Nov. 28, 1882.

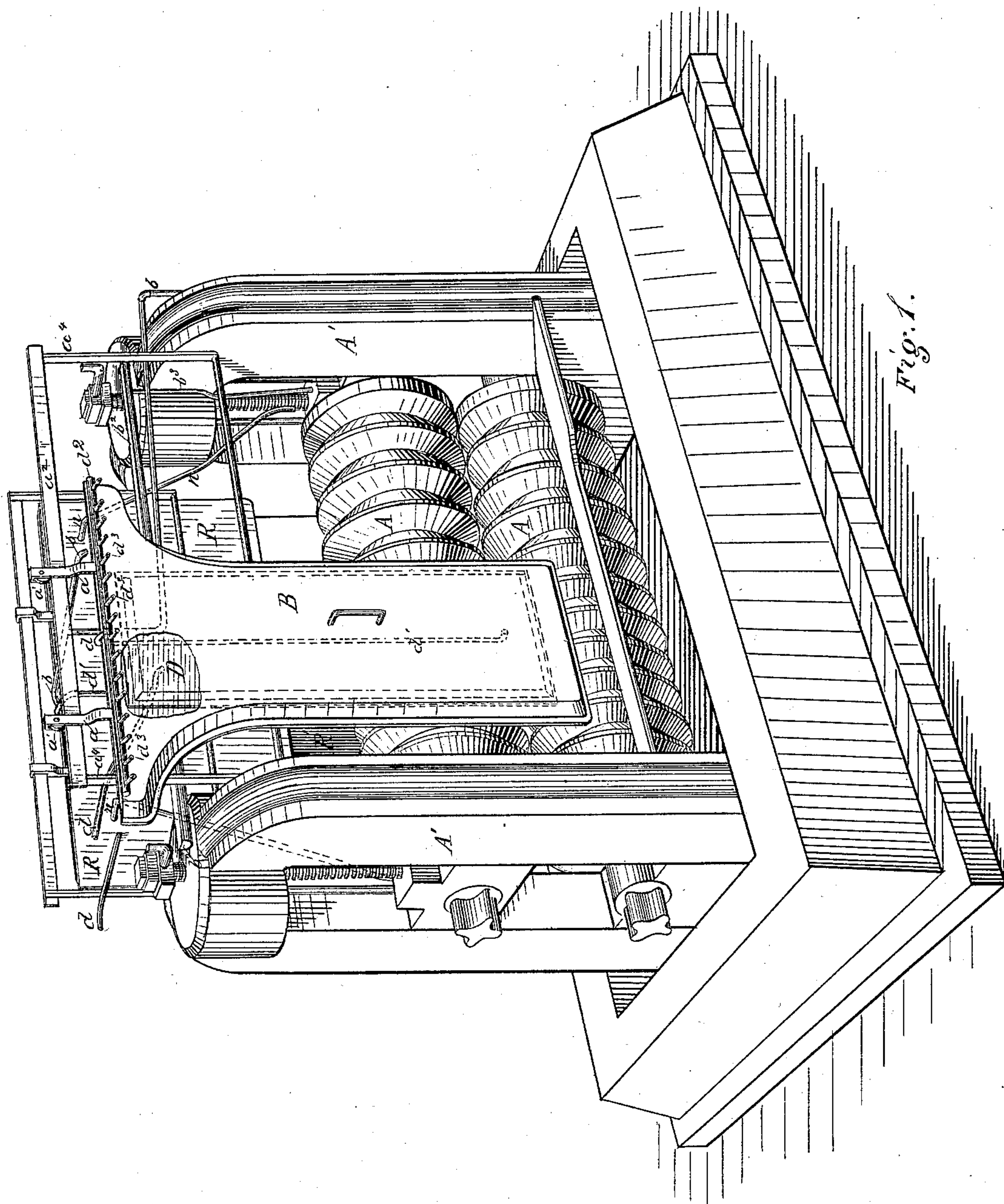


Fig. 1.

Witnesses
C. L. Parker
R. H. Whittlesey

Inventor Hugh McDonald,
By Attorney George H. Christy.

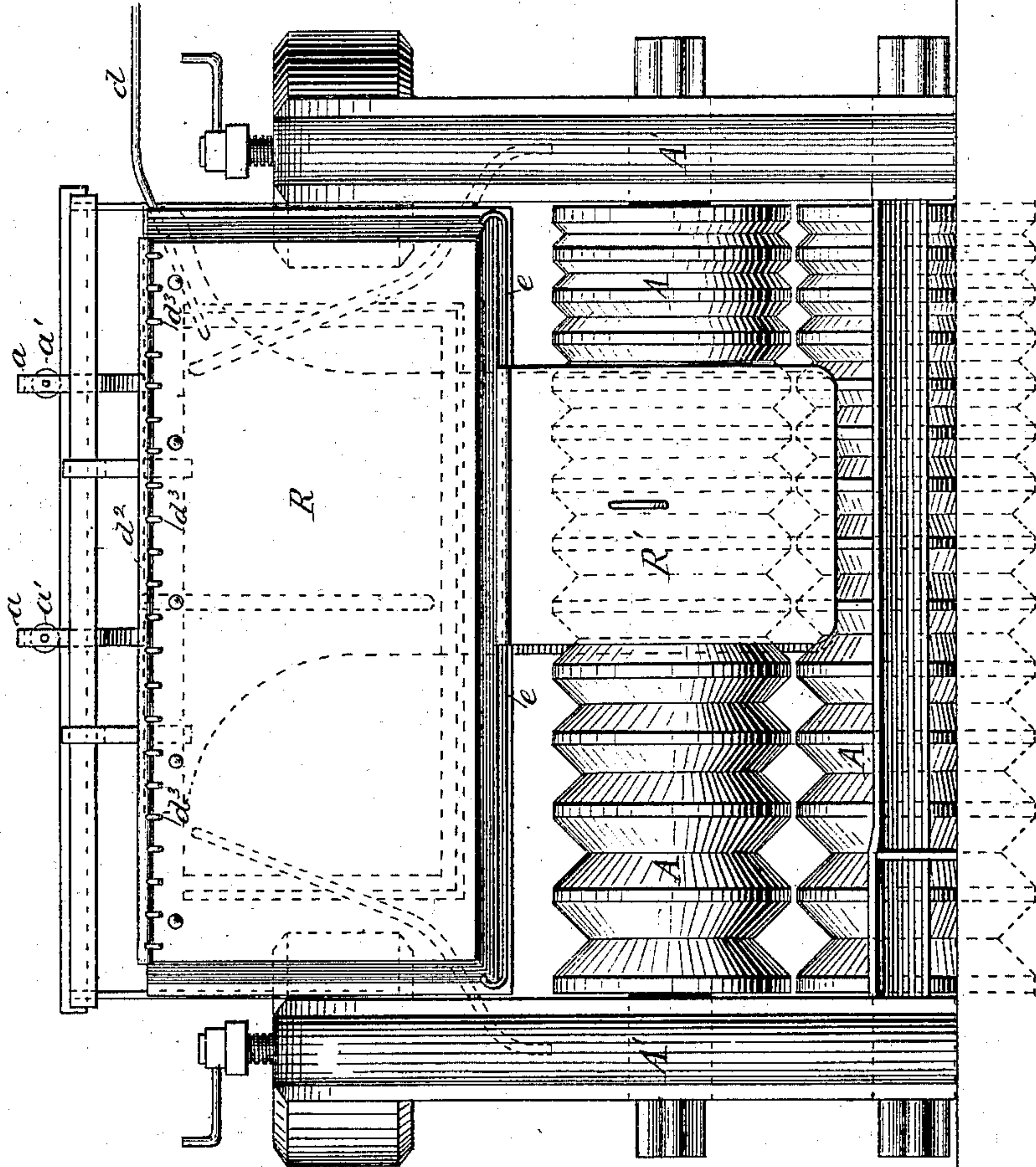
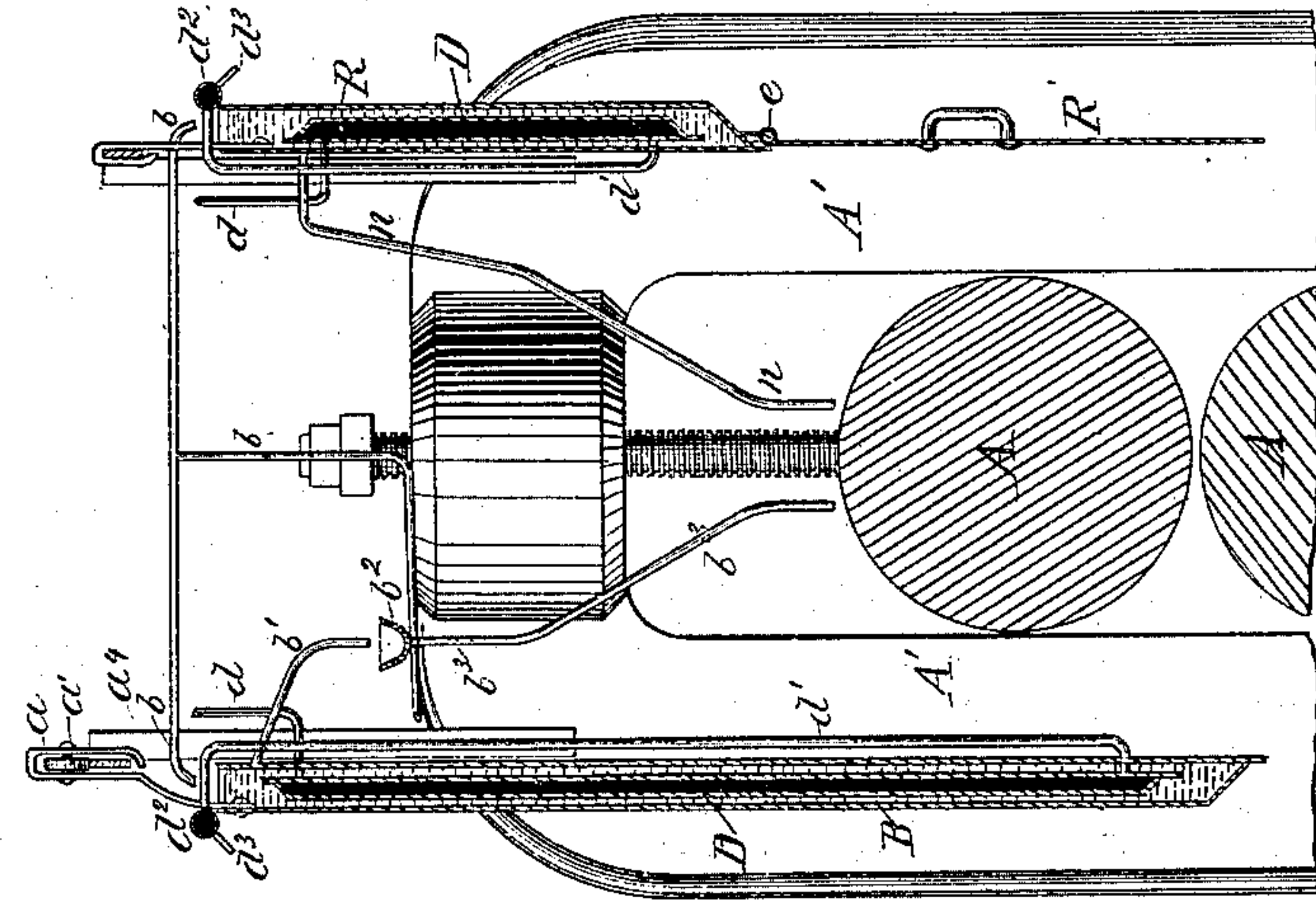
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

HUGH McDONALD, OF ALLEGHENY, PENNSYLVANIA.

SHIELD FOR METAL ROLLS.

SPECIFICATION forming part of Letters Patent No. 268,259, dated November 28, 1882.

Application filed May 28, 1880. (No model.)

To all whom it may concern:

Be it known that I, HUGH McDONALD, of Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Shields for Metal Rolls; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1, Sheet 1, is a perspective view of a pair of rolls from the front or feeding side, and with my present improvements applied thereto, but with a part of the exterior case of the shield broken away. Fig. 2, Sheet 2, is a view in elevation on the rear or delivery side, and Fig. 3 is a transverse vertical section in the plane of the line *xx* of Fig. 2.

Much personal discomfort, as is well known, is experienced by workmen in connection with the working of highly-heated metals, both in the furnace and in the rolls, and this discomfort is so great as sometimes to disable the workman, particularly in hot weather, and also tends to interfere with or prevent that degree of exactness or precision in doing the work which is essential to the best results. Shields for furnaces have been devised; but so far as I am aware roll-shields are entirely new.

By my present invention I combine with a pair of metal rolls, such as are in ordinary use for the rolling of heated metals, a movable shield or barrier so proportioned in breadth relatively to the length of the working-faces of or the working-points on the rolls that the workman by adjusting it one way or the other at pleasure may uncover a portion of such working-face or one or more of such working-points, and at the same time may secure for himself a considerable degree of protection as against the excessive heat to which he would otherwise be subject; and I also make such a shield of such superior construction as best to adapt it to the end in view. And while my present improvements are adapted for use on or in connection with any form, construction, or style of rolls for working or reducing heated metals by the rolling operation, and having two or more working-points or lines of feed, I have, for convenience of illustration, shown them in the drawings as combined with a pair

of grooved breaking-down rolls, *A A*, which are mounted in any suitable housings, *A'*.

A shield particularly adapted for use on the feeding side of the rolls is shown at *B*. As represented, it consists of a hollow water-box made substantially as described in patent granted to me April 6, 1880, No. 226,181, and is supported by like hangers *a* and friction-rollers *a'* on a raised track, *a²*, which is supported by posts *a⁴*, attached to the housings. The shield has such breadth less than the length of the working-faces of the rolls as may be desired with reference to giving the workman the desired amount or degree of protection, and by preference extends up or nearly up to or a little above the height of his head, and downward about to or a little below the plane of feed or "part" of the rolls. By the means above designated the shield is rendered movable or adjustable along in front of the rolls, so that the roller may stand in front of the shield and feed the bar, billet, pile, or bloom into the desired pair of grooves, and when on the next or some subsequent pass he has to change his position, so as to cause the bar, billet, &c., to enter a groove farther along, he can at the same time shift the position of the shield accordingly; also, the shield should be proportioned in its width and adjustments so that it may uncover any one of the grooves in the rolls through which a pass is to be made. The hollow water-shield I believe to be the best for the purpose, and any suitable water-supply may be provided for the purpose—as, for example, a water-pipe, *b*, discharging directly into the upper open end of the shield, as in the patent above referred to, and the surplus water or overflow may be led off through a pipe, *b'*, which, in the varying positions of the shield, may discharge into a trough, *b²*, from which a pipe or pipes, *b³*, may discharge onto the boxes or bearings of the rolls to keep them from being overheated; or the water may be otherwise led off for any useful purpose; but where it is desired to apply cold water directly to the rolls the trough may be arranged directly over the rolls, with jet holes or pipes in its bottom, arranged at suitable intervals for discharging the water onto the rolls; but other means may be employed for supplying and discharging water, since in these respects I do not limit myself in my invention to any

particular means. In fact, as hereinafter stated, the water may be entirely dispensed with.

In connection with this shield B, I have also shown means for supplying cold air in jets to the workman while occupying his usual position, substantially as set forth in the patent above referred to. Such means consist of an air-chamber, D, inclosed in the water-space of the shield, supplied with air under pressure through a pipe, d , and discharging the air, after being cooled by the water which surrounds D, through pipes d' d'' and jet-pipes d^3 . This feature may be used or not, at pleasure. On the other side of the rolls, which is the delivery side, or the side on which the "catcher" stands, a similarly-made shield may be used, provided the catcher can be relied on to see that at all times it is shifted out of the way of the through-coming bar, billet, &c.; but in order to avoid this risk I have thought best to make the upper part of the shield R on this side stationary and extending along the entire length of the rolls, with its upper edge at about the same height as before, and with its lower edge at such height as will not interfere with the passing back of the bar, billet, &c., over the top of the upper roll. This part R of the shield differs in no respect from that already described, except in shape and in the fact that it is not movable. It may be supplied with water in like manner, and the pipes n provide for carrying off the overflow to the boxes. If desired, the air-chamber D, with its connections, as already described, may be added, the same being lettered, as already set forth. Parallel with the lower edge of this part R of the shield, and in close proximity thereto, is a track rail or rod, e , on which is hung the other part, R', of the compound shield, but in such manner as to be movable or adjustable along on the rod e . The width of this (which I term an "apron-shield") and the rule for its adjustment are substantially as above set forth with reference to the shield B. As shown, it consists of a single metallic plate; but it may have the water-box or other desired construction; but in order that no damage may be done in case it is not at any time so adjusted as to be out of the way of the through-coming bar, billet, &c., I prefer to unite the apron-shield R' to its rod or track e by a hinge or other equivalent connection, so that in the case supposed it may readily swing out of the way. The principal protection thus secured to the roller and catcher arises as follows: Drafts of air caused by the wind or otherwise and heated by the hot bar, billet, &c., instead of passing from the roller or feeding side to the catcher or from the catcher side to the roller will be caught by the protecting-shield of the roller or catcher, as the case may be, and be deflected or turned upward between the shields and pass off above the heads of the workmen. In fact, so much of the heated air as comes between the two shields will have a draft upward instead of being radiated out horizon-

tally to the roller and catcher positions; or, if only one shield is used, the workman standing by the side of it will thereby be protected as against heat, which would otherwise be radiated from back of it, as also against drafts or currents of heated air coming from the other side of the rolls; and also the shield B on the roller's side will protect him as well against hot scale, cinder, sparks, &c., which are thrown back in the rolling operation.

In so far as relates to the general combination of a protecting shield or barrier with a pair of rolls I do not limit myself to any particular construction or form of shield or mode of hanging or connecting the same, since useful results may be secured by the use of other known forms of shields, such as a plate or sheet of metal with or without fibrous or plastic facing on one or both sides, or a water-spray, or such as a double plate with any suitable interposed lining or filling, or even with only an air-space between the plates. Some such shields are already known in the art, and to some others I lay claim in other applications already filed or to be filed. Nor do I limit myself to the combination of a shield with only a single pair of rolls, since I include within the term "pair of rolls" a set of rolls such as are employed in a three-high or four-high mill, or such as are in common use in a universal mill. A single pair of rolls forms a part of a set in all such mills.

I claim herein as my invention—

1. In combination with a pair of metal working or reducing rolls, an apron-shield, R', suspended between the rolls and the ordinary position of the catcher on the delivery side, and free to swing outward in case it is engaged by the through-going bar, substantially as set forth.

2. In combination with a pair of rolls having each a series of operative rolling parts or faces, a roll-shield, B, of known suitable material, made less in width than the length of the rolls and adjustable in the direction of the length of the rolls, whereby the workman may cover or uncover at pleasure different parts of the operative rolling-surfaces, substantially as and for the purposes set forth.

3. In combination with a pair of rolls, a compound shield, R R', of suitable known material, of which the upper part, R, fixed in position, shall extend downward to a little above the level of the top of the upper roll, and the other part, R', shall be movable at pleasure in the direction of the length of the rolls, substantially as set forth.

4. In combination with a pair of rolls, a movable shield, B, on one side of the rolls and a compound shield, R R', on the other side, substantially as set forth.

In testimony whereof I have hereunto set my hand.

HUGH McDONALD.

Witnesses:

R. H. WHITTLESEY,
C. L. PARKER.