No. 676,695. Patented June 18, 1901.

D. H. LENTZ.

MACHINE FOR PREPARING RAILS FOR REROLLING.

(Application filed Feb. 2, 1899.)

(No Model.)

2 Sheets—Sheet 1.

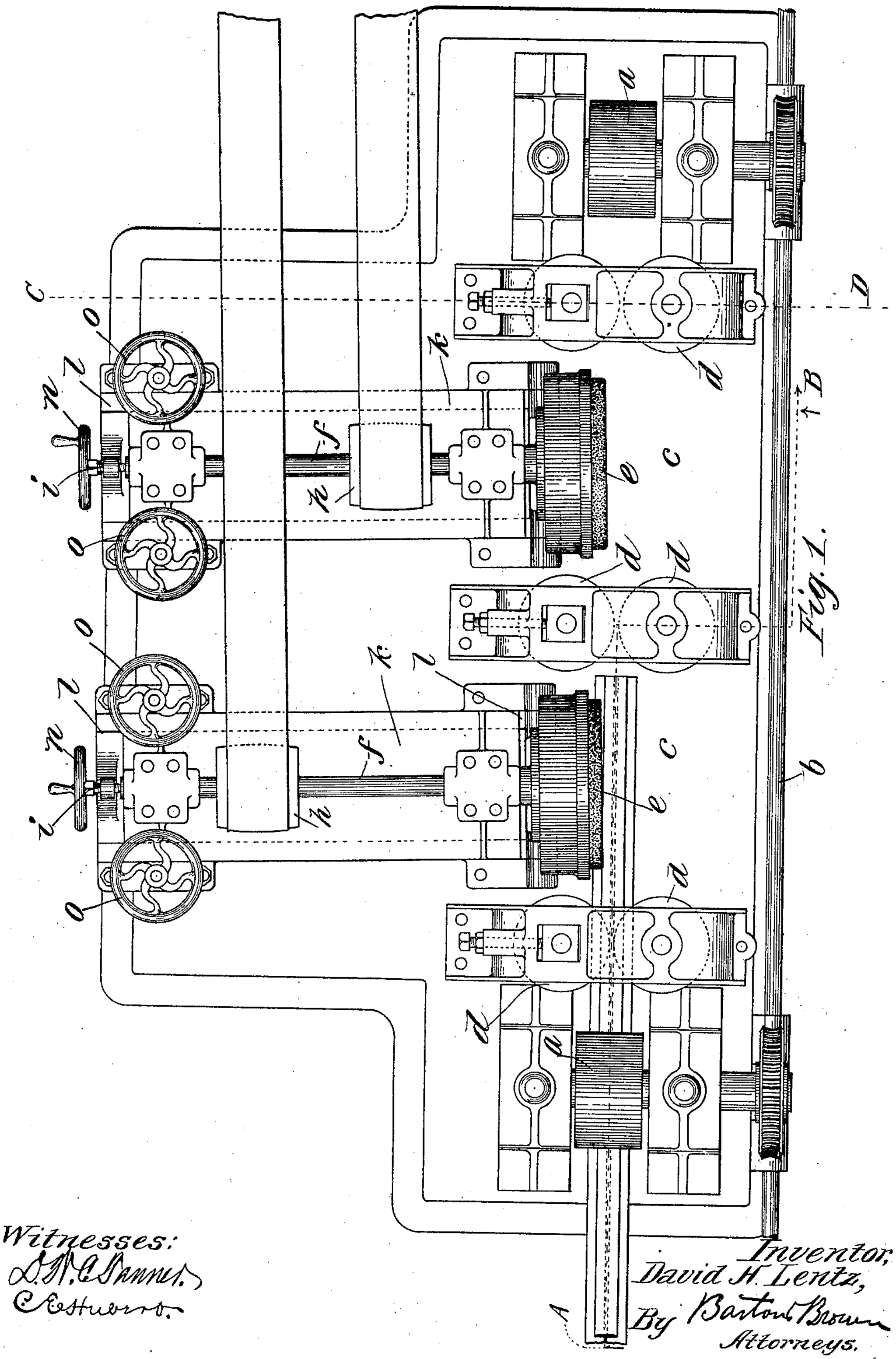

Fig. 1.

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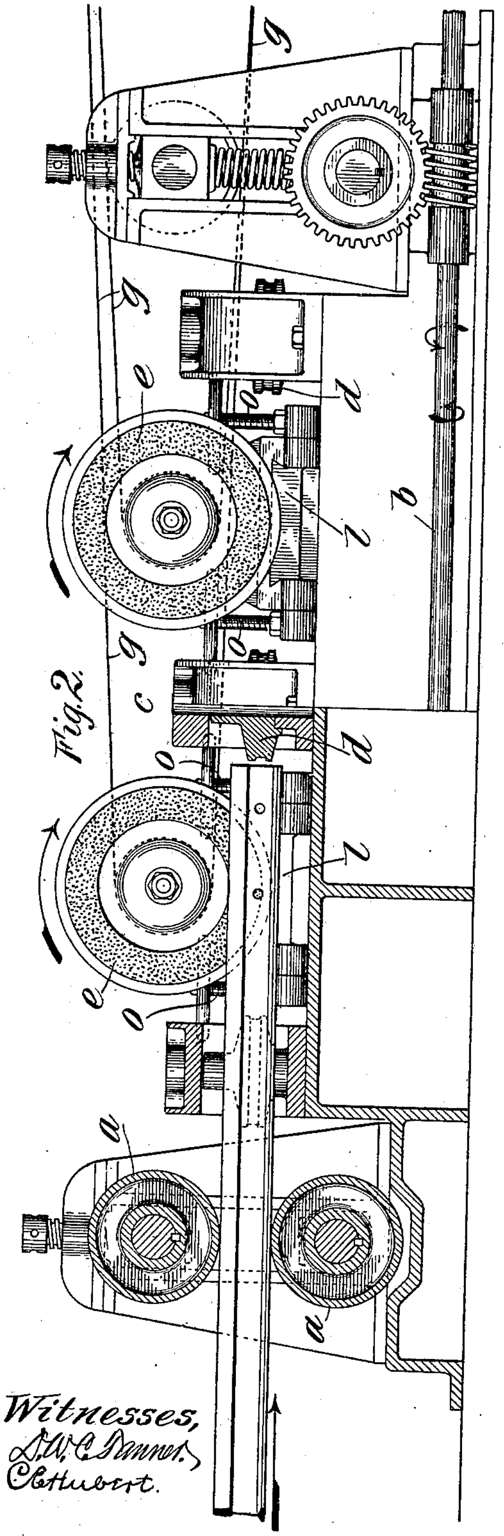

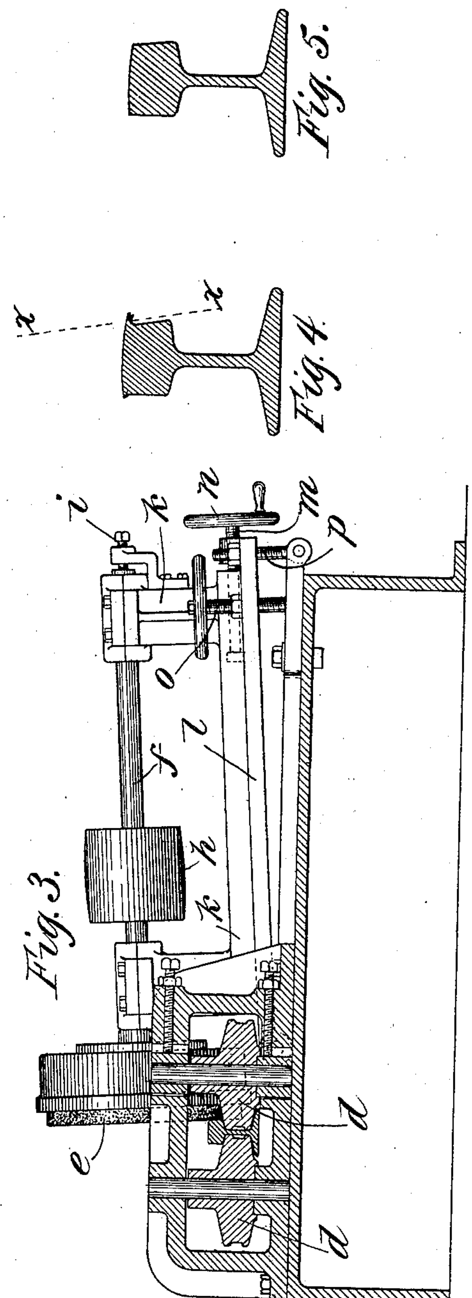

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UNITED STATES PATENT OFFICE.

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MACHINE FOR PREPARING RAILS FOR REROLLING.

SPECIFICATION forming part of Letters Patent No. 676,695, dated June 18, 1901.

Application filed February 2, 1899. Serial No. 704,253. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. LENTZ, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented a certain new and useful Improvement in Machines for Preparing Rails for Rerolling, (Case No. 8,) of which the following is a full, clear, concise, and exact description.

My invention relates to a machine for preparing rails for rerolling, and has for its object the commercial fitting of old rails having shouldered or semidetached portions as they come from the track for the operation of rerolling.

The industry of rerolling or renewing old steel rails is of comparatively recent origin, which, perhaps, accounts for the fact that some railways have neglected to have their old rails renewed when moderately worn, but have kept them in service until they have been badly distorted and pounded out of shape. One result of long and severe usage is that a portion of the metal in the head of the rail is shouldered out of place and forms a fin, usually along the outer edge of the rail, which projects from one-sixteenth to one-half of an inch. The temperature to which a rail is subjected in the furnace must in any practical renewing process be considerably below that necessary to effect a good weld. Consequently a rail having the fin along its edge developed to any appreciable extent could not, or rather should not, be rerolled in that condition. If it were, the displaced metal would not be welded again on the body of the head, but would be "plastered," so to speak, along its surface, so that the rerolled rail while passable in appearance would be weak at the edges, with numerous hidden cracks. Were such a rerolled rail again put into service large pieces of metal would soon become loosened and shell out, causing deep depressions along the edge of the rail and leaving the latter in as bad or worse condition than before it was rerolled. Obviously if it be attempted to renew such old rails the logical thing to do is to remove the fin entirely before rerolling; but the difficulty here is that the fin is made from the chilled steel at the surface of the head of the rail, and the pounding action of the wheels has made it so hard and polished that an ordinary saw or steel cutter will make scarcely any impression on it. If it be attempted to remove the fin by chipping with a cold-chisel, this method is soon found to be useless, for the tool becomes heated and dulled after a few strokes. Moreover, the fin cannot be successfully broken off. Attended by such difficulties, then, the project of renewing badly-worn rails has frequently been abandoned as impracticable, and the rails were in consequence relegated to the scrap-heap.

It is the object of this invention to reclaim these old rails and by providing means for easily and effectively removing the fins to put them in condition for successfully undergoing a rerolling process. It occurred to me that the fin might be ground away by suitable corundum or emery grinders, and accordingly I have devised the machine which forms the subject-matter of this application and which is well adapted for the purpose in view. This machine consists of one or more grinding-wheels the grinding-faces of which are preferably arranged transversely to the axis of rotation. These are driven at a high rate of speed, and means are provided for carrying the rail slowly past them in the direction of its length, so that the side of the head of the rail will be engaged successively by said grinding-faces. Means may be provided for varying the distance between the path in which the rail travels and the grinding-surfaces of said grinding-wheels, to regulate the depth of cut, and to accommodate rails of different sizes. Means are provided in my improved machine for adjusting the face of the grinder at various angles to work upon rails of different shapes wherein the sides of the head are not parallel and vertical, but more or less inclined.

My invention further contemplates means for supporting the rail against lateral displacement while it is being ground, together with various other features which will hereinafter be particularly set forth, and pointed out specifically in the claims.

I will describe a grinding-machine constructed in accordance with my invention by

reference to the accompanying drawings, wherein—

Figure 1 is a plan view of the machine. Fig. 2 is a side elevation thereof, partly in section, on line A B of Fig. 1. Fig. 3 is a sectional elevation on line C D of Fig. 1. Fig. 4 indicates the cross-section of a worn rail before its passage through the grinding-machine. Fig. 5 is a similar view illustrating the effect of the grinding.

The same letters of reference are used to designate the same parts wherever they are shown.

The rail to be ground is entered between the upper and lower rollers *a a* (illustrated at the left in Figs. 1 and 2) and is fed forward by the rotation of the lower roller, which may be driven slowly by an arrangement of worm-gear connected with a driven shaft *b*. As the rail reaches the grinding-table *c* it is caught and held tightly against lateral displacement or chattering by the idler-rollers *d d*, of which three pairs may be provided, as shown. These rollers are preferably so formed that they will engage only the web of the rail near the fishing-angles, so that they will not interfere with the maker's name, which usually appears in raised letters along the central portion of the web. One of the rollers of each pair is preferably so mounted that it may be adjusted toward or from the other to accommodate rails of varying sizes. The speed at which the rail is fed past the grinding-wheels is to a certain extent automatically regulated, since the rail is held so firmly against lateral displacement by the guiding-rollers *d d* that no hump on the side of the rail may pass the grinder until the latter has evenly taken its predetermined cut along the edge. Thus if the grinder strikes an enlarged part of the fin the feed-rollers will merely slip upon the rail, and the latter will not be pushed forward until this hump has been ground away.

Two grinding-wheels *e e* are illustrated as arranged in tandem upon the grinding-table *c*, the corundum or emery faces of which are adapted successively to engage the side of the head of the rail as the latter is carried forward and past them by the driven rollers. These grinding-wheels are illustrated as mounted upon the ends of shafts *f f*, which may be driven by driving-belts *g g*, passing over pulleys *h h*, fixed upon the said shafts. The longitudinal thrust of the shafts *f f* may be sustained by the set-screws *i i*, mounted upon the grinder-frame *k* at the opposite ends of the shafts from the grinding-wheels *e e*, these set-screws also permitting slight longitudinal adjustment of the shafts.

The shafts are journaled to rotate in bearings provided in the grinder-frames or standards *k k*. The latter are mounted to slide to and fro along the bed-plates *l l*, whereby the faces of the grinders may be adjusted toward or from the line of travel of the rail to accommodate rails of different sizes, to compensate for the wearing away of the corundum grinding-surfaces, and to regulate the depth of cut. This movement of each standard or grinder-frame *k* in its bed-plate may be effected by means of an adjusting screw-shaft *m* engaging with the grinder-frame, operated by a hand-wheel *n*.

The grinding-surface of each grinding-wheel is preferably disposed in a plane transverse to the shaft *f*, on which it is mounted. In the drawings the grinding-surface is illustrated as disposed in a plane at right angles with the axis. The shafts *f f* then are arranged substantially at right angles with the line of travel of the rail. In practice it is better not to place these shafts at exact right angles with the rail, but inclined a little, as shown in Fig. 1, so that the annular grinding-surfaces will touch the rail only on one side of the vertical diameter of such grinding-surface, letting the rail clear it on the other side of such diameter. By this adjustment, as will be seen by reference to Fig. 2, the grinding action upon the rail is all in one direction, preferably upward.

Since many railway-rails are formed with the sides of the head slanting at an angle instead of vertical, as in other cases, I have provided means for adjusting the faces of the grinders at varying angles. This may be done by employing the construction shown most clearly in Fig. 3, wherein the bed-plate *l* of each grinder-frame is hinged at one end to swing about the same, throwing the face of the grinder into a slanting position. Hand-screws *o o* are provided at the rear end of each bed-plate for the purpose of effecting this adjustment, and hinged bolts *p p*, with their threaded nuts, serve to lock the parts in any position to which they may be adjusted.

In some cases a single grinding-wheel may be sufficient; but generally it is more satisfactory to employ two or more such wheels, each cutting a little deeper than the one immediately preceding it. Thus the first grinder may cut as deeply as is indicated by the line *x x* of Fig. 4, and the second grinder may finish the cut, leaving the edge of the rail as indicated in Fig. 5. Usually the fin is developed only upon the outer edge of the rail, but occasionally it may be desirable to grind the other edge also, although it is very seldom that the inner edge need be touched.

In an application, Serial No. 25,545, filed August 1, 1900, the method of preparing old steel rails for further use that is herein disclosed is set forth.

It will be apparent to those skilled in the art that the machine illustrated is but one embodiment of an invention which may take a great variety of forms, and I do not wish to be limited to the precise construction set forth; but,

Having described one machine for carrying out my ideas, I claim as new and desire to secure by Letters Patent the following:

1. In a machine for preparing old rails for

rerolling, the combination with a grinding wheel or disk *e* mounted to engage the head of the rail, of feeding-rolls *a a* adapted to convey the said rail past the grinding-wheel and guiding-rollers *d d* disposed in position to engage the web of the rail and adapted to support said rail during its travel past the grinding-wheel, substantially as described.

2. In a machine for preparing old rails for rerolling, the combination with a grinding wheel or disk *e* mounted to engage the head of the rail, of means for securing its lateral and angular adjustment with respect to the said head, feeding-rollers *a a*, guiding-rollers *d d* mounted in position to engage the web of the rail and support it against lateral displacement, and means for adjusting both sets of rollers, whereby the machine is adapted for operating upon rails of different sizes, substantially as described.

3. The combination with a grinding-wheel and means for driving the same, the grinding-surface of said wheel being disposed in a plane transverse to its axis of rotation, driven rollers arranged in a line substantially at right angles to the axis of rotation of said grinding-wheel, said rollers being adapted to carry a rail in the direction of its length past said grinding-wheel, whereby the side of the head of the rail may be engaged with said grinding-surface throughout the length of the rail, guiding-rollers arranged upon either side of the line of travel of the rail and adapted to prevent lateral displacement of the rail while it is being ground, means for adjusting the grinder toward or from the line of travel of the rail, and means for inclining the face of the grinder at varying angles, substantially as described.

4. The combination with a plurality of grinders arranged one behind the other, of means for supporting a rail and carrying the same past said grinders, whereby such wheels may successively engage and grind the rail, a pair of guiding-rollers adapted to maintain the rail against lateral displacement while it is being ground, means for adjusting said guiding-rollers toward or from one another, and means for varying the distance between each of said grinders and the line of travel of the rail, substantially as and for the purpose set forth.

5. A machine for preparing a worn rail for rerolling, which consists of a grinding-wheel, having its grinding-face located perpendicular to the axis of rotation of the wheel, the said wheel being disposed so as to place the said grinding-surface in a plane diverging slightly from the plane coincident with the length of the rail, means for driving the same, feeding-rollers adapted to carry the rail past the grinding-wheel, whereby the fin is removed from one edge of the rail, guiding-rollers adapted to hold the rail against lateral displacement, a grinder-frame or standard whereon the guiding-wheel is mounted, a bed-plate whereon the grinder-frame may slide to and fro, means for adjusting the position of the grinder-frame upon the bed-plate, and means for tipping the bed-plate at different angles whereby the face of the grinder may be adjusted at varying angles to the head of the rail, substantially as described.

6. The combination with a rail-support, of means for conveying the rail in the direction of its length, a grinding-wheel, means for driving the same, means for moving the grinding-wheel transversely to the rail, the said wheel being provided with a grinding or abrading surface located in a plane transverse to the axis of rotation of the wheel, the said wheel being placed to have the said grinding-surface in a plane diverging slightly from the plane coincident with the length of the rail, substantially as described.

In witness whereof I hereunto subscribe my name this 30th day of January, A. D. 1899.

DAVID H. LENTZ.

Witnesses:
D. W. C. TANNER,
W. W. W. LEACH.