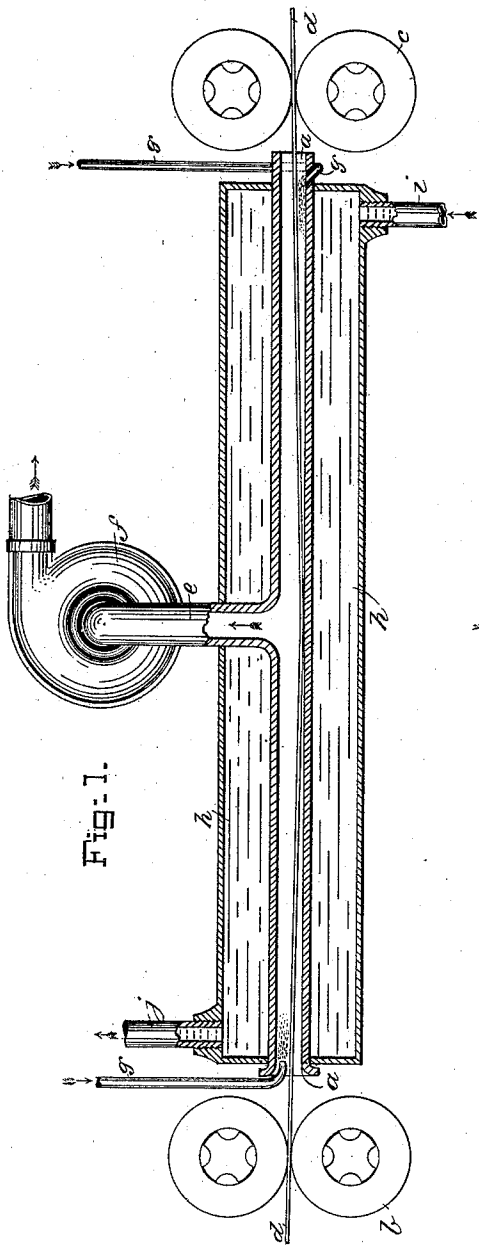


(No Model.)

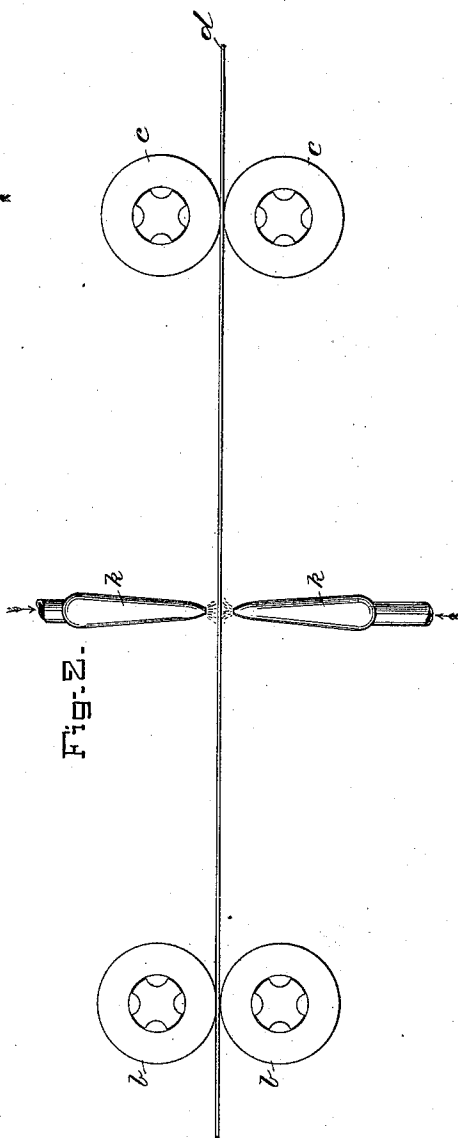
T. V. ALLIS.
HOOP OR BAND ROLLING MILL.

No. 463,266.

Patented Nov. 17, 1891.



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INVENTOR:

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WITNESSES:

W. J. Morgan
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UNITED STATES PATENT OFFICE.

THOMAS V. ALLIS, OF NEW YORK, N. Y.

HOOP OR BAND ROLLING MILL.

SPECIFICATION forming part of Letters Patent No. 463,266, dated November 17, 1891.

Application filed January 7, 1890. Serial No. 336,200. (No model.)

To all whom it may concern:

Be it known that I, THOMAS V. ALLIS, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented new and useful Improvements in Hoop or Band Iron Rolling Mills, of which the following is a specification.

My invention relates to rolling-mills for making long strips, hoops, bands, or other such forms of iron and steel, in which mills a terminal pair of rolls called "bull-head" rolls are employed for smoothing and planishing the strips, said rolls being placed at such distance from the last pair of reducing-rolls as will allow low time for the strip to cool down during the passage from one pair of rolls to the other to the proper temperature for smoothing.

The object of this invention is to provide for cooling the strips more rapidly and during a shorter distance to enable the mills to be run at much higher speed than it is practicable to run them with the present mode of cooling, because the distance through which it is feasible to run the strips between these rolls cannot be increased to any great extent, and, besides, it is desirable to make the distance shorter instead of longer, to economize space.

The invention consists in a cooler suitably arranged between said rolls for passing the strips through and cooling them artificially in shorter time and in a shorter distance, all as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 represents in outline the last pair of reducing-rolls and the bull-head rolls in side view and a longitudinal section of one form of cooler as it may be arranged, with part of a strip of metal issuing from the reducing-rolls and passing through the cooler and thence through the bull-head planishing or finishing rolls. Fig. 2 is a similar view showing a different form of cooler.

In the present mills for rolling strips, hoops, or bands the smoothing and planishing rolls are located at a distance from the last pair of reducing-rolls, through which, in passing, the piece will cool down by the natural action of the air upon it to that degree of heat which

permits the surfaces to be smoothed to best advantage, avoiding the effects of scale and the spotted appearance which results from the metal being finished too hot. This is feasible in trains running at the comparatively low speed at which they are now run, the said distance not being so great as to interfere with the running of the strips in the proper course without twisting or kinking between the pairs of rolls, and it is mainly for this that the speed of the rolls is limited, for except for this difficulty they might be run much faster; but if with higher speed the smoothing-rolls were placed farther away to allow the metal the same time to cool the strip could not be guided properly. I therefore propose to combine with the last pair of reducing-rolls and the smoothing and planishing rolls an artificial cooler, that the strips may pass through and be cooled in less time, and thus enable the rolls to run at much greater speed without having to place the smoothing-rolls farther away, thus enabling the production of a greater quantity of finished material in a given time and even allowing the smoothing-rolls to be located nearer the others, to economize space in the plant.

In Fig. 1 I represent the cooler as consisting of a guide-tube *a*, arranged between the last pair of reducing-rolls *b* and the smoothing and planishing rolls *c*, so that the strip *d* may pass through it freely, with a branch tube *e*, leading from it to a suction-fan *f*, which may be used to induce a strong draft of air along the strip each way, and thus effect the cooling. If desired, compressed air may be delivered into the ends of tube *e*, from any suitable source, through small supply-tubes *g*, to expand in contact with the strip, and thus have more powerful cooling effect, and the cooling-tube *a* may be inclosed in a fluid-jacket *h*, having supply and exhaust pipes *i j* for a continuous stream.

In Fig. 2 I represent pipe-nozzles *k*, discharging a jet of compressed air on each side of the strip between the rolls *b* and *c*, which jets will have a powerful effect in cooling the strips, so that with the smoothing-rolls at the same distance from the others as at present used, or closer, the train may be run very much

faster and the strips cooled equally as much as at the present slower speed and common mode of cooling.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a cooling apparatus with the strip-reducing rolls and the smoothing or planishing rolls and being intermediate thereto, substantially as described.
2. The combination of a cooling apparatus consisting of means for inducing or projecting air upon the strips with the strip-reducing rolls and the smoothing or planishing rolls and being intermediate thereto, substantially as described.

3. The combination of a cooling apparatus consisting of means for inducing or projecting air upon the strips and a fluid-jacket, with the strip-reducing rolls and the smoothing and planishing rolls and being intermediate thereto, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of January, 1890.

THOMAS V. ALLIS.

Witnesses:

W. B. EWELL,

W. J. MORGAN.