J. Bryan.

Rolling Metals.

No. 18,674. Patented Nov. 24, 1857.

Fig. 3.

Fig. 2.

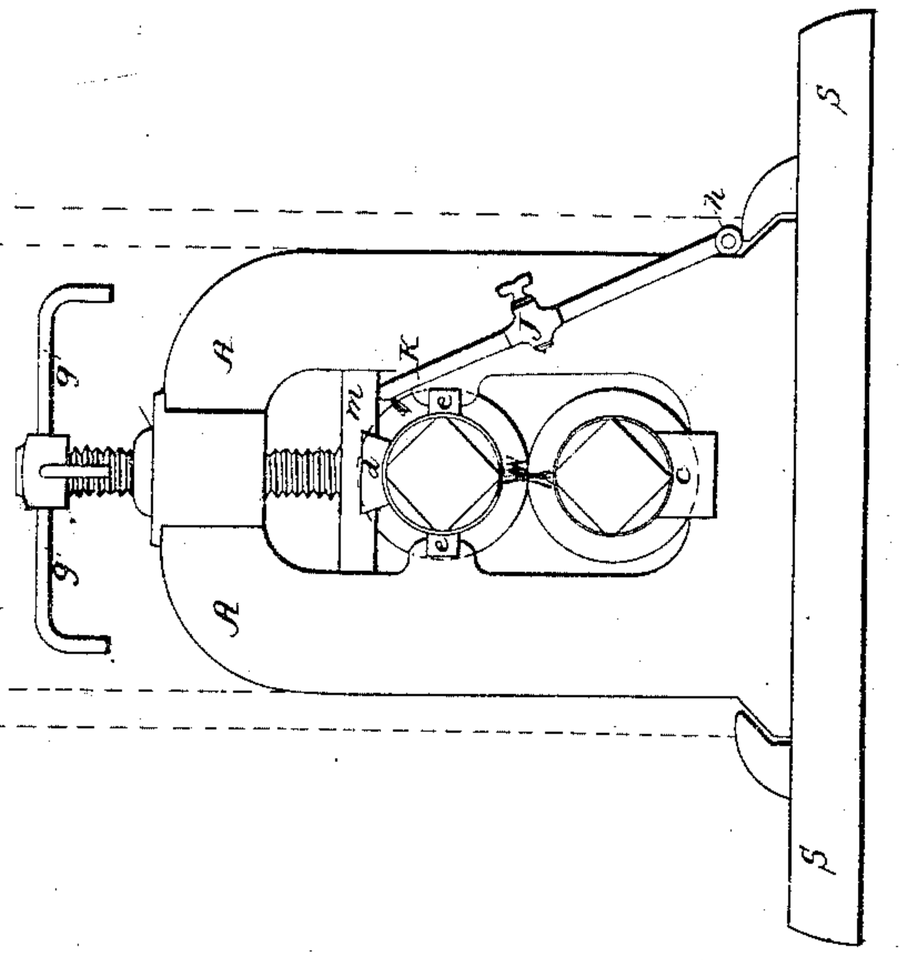


Fig. 4.

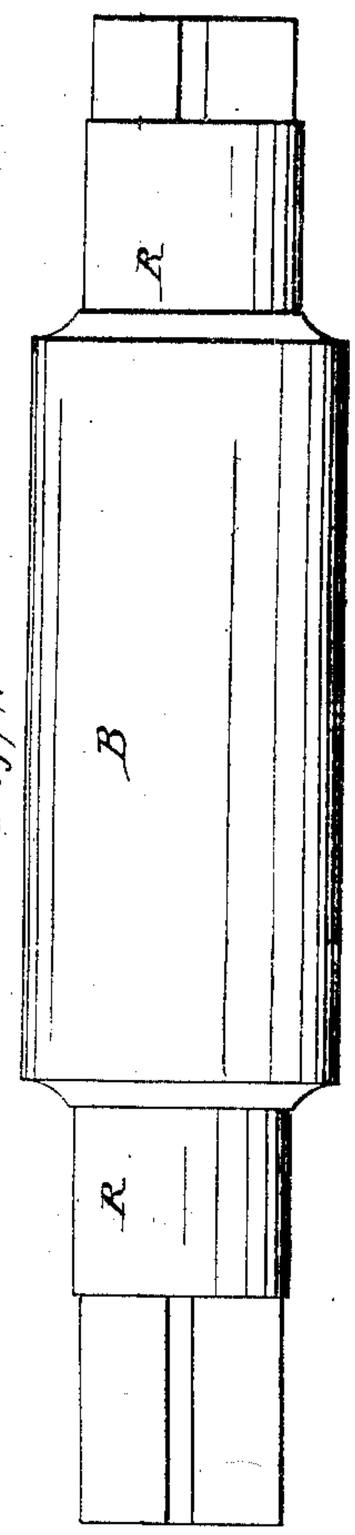
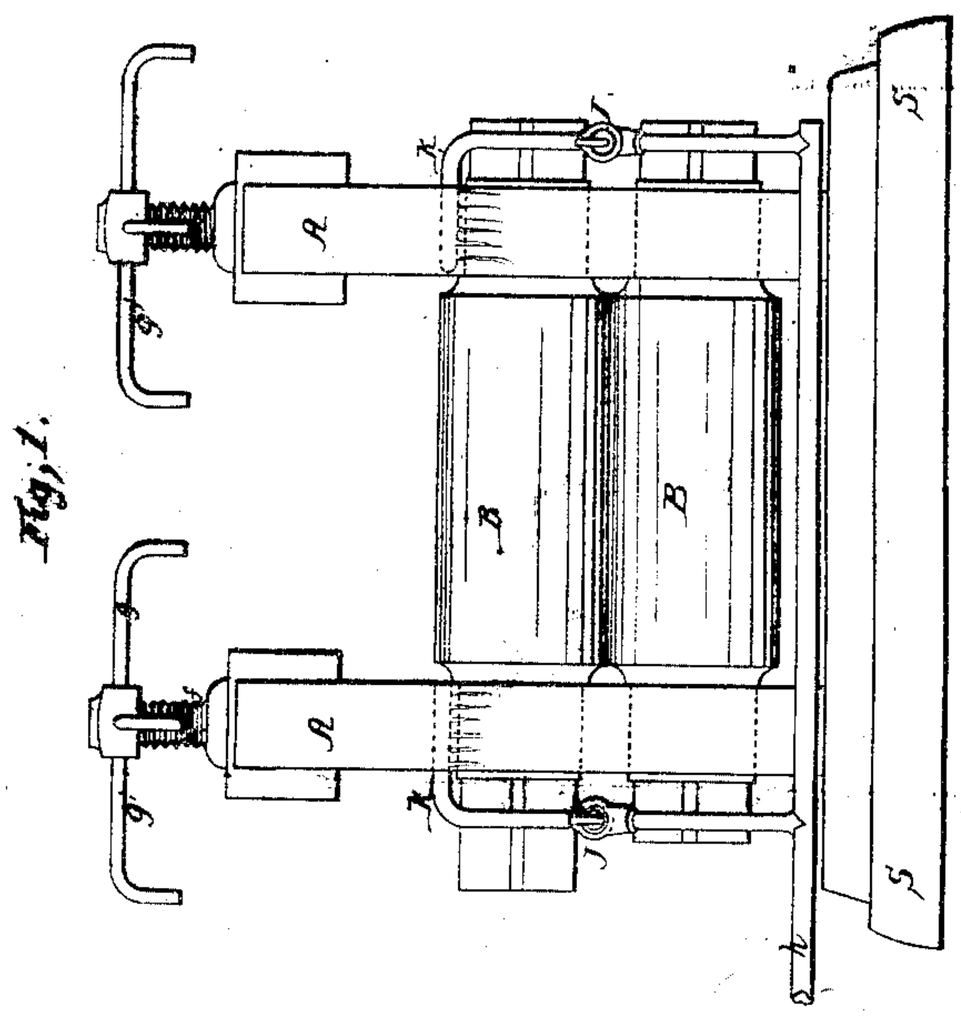


Fig. 1.



UNITED STATES PATENT OFFICE.

JOHN BRYAN, OF COVINGTON, KENTUCKY.

APPLICATION OF HOT WATER TO JOURNALS OF ROLLING-MILLS.

Specification of Letters Patent No. 18,674, dated November 24, 1857.

To all whom it may concern:

Be it known that I, JOHN BRYAN, of Covington, in the county of Kenton and State of Kentucky, have invented a new and useful Improvement to Prevent the Breaking of Rolls for Rolling Metal When the Metal is in a Heated State When Being Rolled; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon and made to form part of this specification.

Similar letters refer to like parts of the improvement.

The object of my improvement is to keep the journals of the rolls as near as possible the same temperature as the body of the rolls when rolling metals in a heated state without rendering the rolls liable to break, and the improvement consists in the use and application of heated water to the journals of rolls when the rolls are being used for rolling metals in a heated state (which hot metals cause the rolls to heat) for the purpose of keeping the temperature of the journals of the rolls as near the temperature of the heated portion or body of the roll as possible to prevent the rolls from breaking at that part when the journals are united to the body of the rolls by the reaction of the particles of the metal at that particular point when the journals and body of the rolls are different temperatures, which is the case when the journals are kept cold.

In rolling out wrought iron, and particular sheet metal of all kinds which is required to be in a heated state during the operation of rolling as usual, to render it as easy to roll as possible, but which heats the rolls so much as to render it necessary to stop operation for the rolls to cool off particularly in rolling sheet metals, as it requires too much power to operate the rolls when in a heated state and subjects them to breaking for reasons before mentioned owing to the great stress on the rolls when in operation and for the want of some suitable method—that would heat the journals of the rolls without burning by the heat attracted to the journals from the body of the rolls together with that produced by the friction on the journals of the rolls by their own operation.

It is a common thing among rollers to use cold water on the journals of the rolls to prevent them from heating to obviate the difficulties above mentioned and prevent burning the lubricating material, but the use of cold water causes the journals to break off with the immense stress they are subject to particularly in rolling sheet metals owing to the journals being made comparatively cold while the body of the roll is quite hot which produces a reaction in the particles of the metal of the rolls where the journals or neck of the rolls are united to the body of the roll, or that portion of it used and made hot in rolling the iron, and many have tried to obviate the difficulty of the rolls breaking as mentioned above by using as little cold water as possible, in connection with some good lubricating mixture or material, but never met with any success worthy of practical notice, as the rolls have continued to break as readily as ever when a sufficient quantity of cold water in connection with the lubricating mixture was applied to produce any beneficial result. Thus owing to the heating of the journals of the rolls as above mentioned particularly in rolling sheet metal, it prevents the operators from working continually, losing from a $\frac{1}{3}$ to $\frac{1}{4}$ of their time more or less, which results in a great loss to the owners of the mill on account of not being able to work continually, and requires as much again power to do the same quantity of work and causes the journals of the rolls to wear out rapidly together with the bearing boxes in which they run, and requires an undue quantity of lubricating material for the journals when in operation to counteract the heat sufficient to prevent it from burning and have a proper effect on the journals in lubricating, and then with all the quantity and care emits an offensive odor by being unduly heated and sometimes burned, which sickens the operators, and the worst of all is the rolls break as and for reasons before mentioned, which they will not do with an effectual use and application of heated water, and when the heated water is used it does not require over one twentieth part as much lubricating material for the journals by actual experience as it does when the heated water is not used, and the best lubricating material employed that is known to the arts.

To enable others skilled in the art to make an application of my improvement I will proceed to describe the manner of ap-

plying it by referring direct to the accompanying drawings of which—

Figure 1 represents a front view of a pair of sheet rolls. Fig. 2 is an end view of the same. Fig. 3 is a sectional view of one of the housing in which the rolls work and Fig. 4, is a roll drawn to itself for illustrating the effect of the application of the improvement.

There is nothing new in the structure of the rolling machinery, but is only represented to show the manner of applying and operating the improvement.

A A represents the housing in which the rolls B, B, work and which are furnished with bearing boxes *c*, *d*, and *e*, *e*, as represented in Fig. 2. The box *d* on the top of the roll is let into the cross piece (*m*) which cross piece (*m*) is prevented from coming out by recessing the housing as represented in Fig. 3.

f f and *g*, *g*, are the set screws and handles employed for adjusting the rolls B, B, apart. The power for operating the rolls is applied to the end of one of them, which causes the other to revolve by the friction produced by the contact of the two rollers, and by the metal being rolled.

h, *h*, is a pipe passing along and above the foundation plate *s*, *s*, and below the lower roll, from which there are branch pipes *k*, *k*, projecting up and furnished with stop cocks to regulate the flow of water and the pipes *k*, *k*, are bent at the ends, and the bent parts are projected over the journals of the top roll and perforated with holes, out of which the heated water flows on the journals as is fully represented in Fig. 1, the quantity admitted to the journals being regulated by the stop cocks J, and the water runs from the journals of the upper roll to the journals of the lower roll and produces the desired effect on the journals of the lower roll, as well as the journals of the upper roll.

(W) is the flow of water from journal to journal represented in Fig. 2. The pipe *h*, *h*, leads from a heating apparatus for heating the water to the rolls, and it has been found that the hotter the water is used the better it produces the effect intended, but I do not confine myself to any particular temperature of water for applying to the journals of the rolls but consider my improvement to embrace all temperatures that will produce the effect I claim with the use of heated water.

In applying the improvement I have taken the water from the boiler employed in the mill for generating steam for supplying the engine used for working the machinery by attaching the pipe to the boiler and laying it over the mill at any place where the heated water is required and apply it to the journals of the rolls in the manner before specified.

Fig. 4 represents a roll showing its journals together with the general form of the roll, which are subject to breaking from the body of the roll where the journals are united to the roll at R, R, when any of the ordinary methods of lubricating are used, which requires the journals to be kept comparatively cold for the lubricating to have the proper effect while the body of the roll is hot which causes a reaction in the particles of metal at the points R by the journal being comparatively cold which causes it to contract while the body B of the roll to its ends is hot, which causes it to expand, and thereby produce a reaction as before stated that results in breaking the rolls as before mentioned. But with the use and application of hot water the evil is remedied by keeping the temperature of the journals of the rolls as near as possible the temperature of the body of the roll, as before stated and which heated water serves as a lubricator at the same time and does not require in connection with it, over one twentieth part of the lubricating material that is used in the best known methods of lubricating the journals of rolls employed for rolling iron in a heated state.

Having thus fully described and set forth the nature and object of my invention, I would state that I am aware that, cold water has been used as a lubricator for journals; and although I do not know that hot water has ever been used for this purpose, viz: lubricating, yet I make no claim to it as such in this application. But

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

Equalizing the temperature of rollers and their journals, that are used in rolling hot iron, or other heated work, by means of hot water applied to said journals, for the purpose of making the fiber of the metal of which the rolls and journals are made, more uniform at their point of junction, and thus lessen the liability of their breaking or separating at that point, as herein described.

JOHN BRYAN.

Witnesses:
M. Benson,
Geo. Phillips.