

(No Model.)

W. R. SCHÜRMANN.
Roll.

No. 242,058.

Patented May 24, 1881.

Fig. 1.

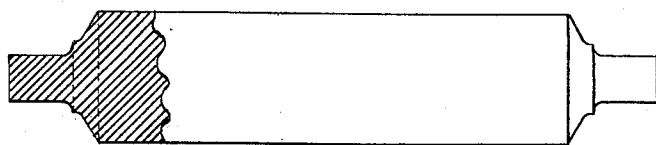


Fig. 2.

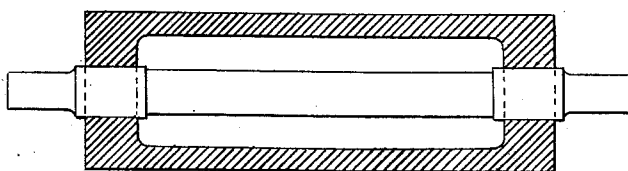


Fig. 3.

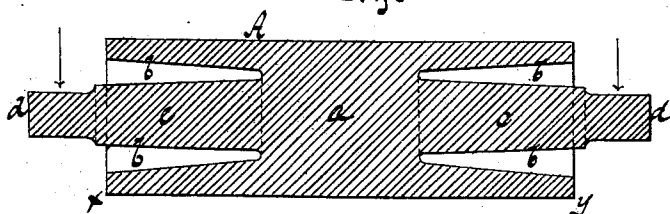


Fig. 4.

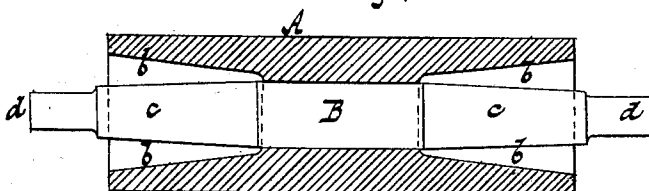


Fig. 5.

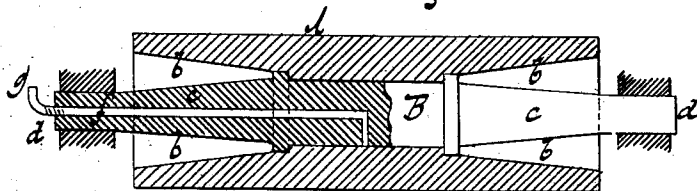
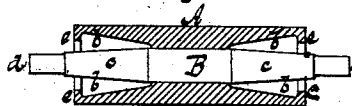


Fig. 6.



Witnesses

Otto Hufeland
William Miller.

Inventor
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by Van Santvoord & Hauff
his atty

UNITED STATES PATENT OFFICE.

WILHELM R. SCHÜRMANN, OF DÜSSELDORF, GERMANY.

ROLL.

SPECIFICATION forming part of Letters Patent No. 242,058, dated May 24, 1881.

Application filed March 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILHELM RICHARD SCHÜRMANN, citizen of the German Empire, residing at Düsseldorf, have invented new and useful Improvements in Rolls, of which the following is a specification.

This invention consists in a roll provided with recesses in its ends extending round its axle, so that in rolling plane or curved surfaces the pressure on the taps or journals of the roll is reduced, and the roll will touch the article to be rolled with a uniform pressure throughout its entire length.

This invention is illustrated in the accompanying drawings, in which Figure 1 represents a partly-sectional side view of a roll such as is now in common use. Fig. 2 is a longitudinal section of another roll at present in common use. Figs. 3, 4, and 5 are sections of my improved roll. Fig. 6 is a section of a modification of the same.

Similar letters indicate corresponding parts.

Rolls of the present construction, whether made solid, with the journal ends cast on, as shown in Fig. 1, or whether made with a separate axle, as shown in Fig. 2, are liable to a deflection of their body by the extra pressure to which the journals are exposed during the operation of rolling, in addition to the pressure produced by the weight of the roll. If such rolls are made exactly cylindrical, they will, during the operation of rolling, bear hardest on the material to be rolled toward their ends and least toward their middle, thereby producing inaccuracies which it is very desirable to avoid. In order to accomplish this object, the rolls have been made slightly arched or convex in the working-line of their surfaces so as to compensate for the deflection during the operation of rolling, the convexity being proportioned as near as possible to the mean pressure which is brought to bear upon the journals of the rolls. Such rolls will work correctly as long as the pressure during the operation of rolling is equal to this mean pressure; but if the pressure varies the rolls will not produce any accurate or correct work. These difficulties are sought to be obviated by my invention.

In Fig. 3 I have shown a roll made solid with the journal ends and constructed accord-

ing to my invention. By referring to this figure it will be seen that the middle portion, *a*, of the roll A is made solid, while the ends of the roll have their interior surfaces, *b*, tapered in a uniform outward direction from the ends of the roll to the point of contact between the axle and the central longitudinal thickened body of the roll, said axle having the tapering projections *c*, the ends of which are turned down to form the journals *d*. The working-surface of my roll is made perfectly cylindrical. If we now suppose that the roll is supported throughout its entire length, *x y*, and that the journals *d* are exposed to pressure acting in the direction of the arrows shown opposite to them, and if the solid portion *a* be made infinitely small, the pressure on the journals will cause a deflection of the two projections *c c* only, leaving the working surface of the roll in condition to touch uniformly throughout its entire length; but since, for practical reasons which are apparent, the solid middle portion, *a*, must be made sufficiently large to produce a firm connection between the various portions of the rolls, this middle portion will have the tendency to deflect; but this deflection will be compensated for by the increased compression to which the recessed ends of the roll are subjected. In paying due regard to the length of the body of the roll and to the mean distance between its journals, the required length of the solid portion *a* can be easily found by calculation, so that the forces tending to deflect this middle portion will be counteracted by the opposing forces, and the material to be rolled will be exposed to a uniform pressure throughout the entire length of the rolls.

For rolls with journals of the ordinary length the solid portion *a* must be made about equal to one-third of the entire length of the body A of the roll. This proportion may be adopted in most cases, and if a very slight deflection is not an object, the length of the solid portion *a* may even be increased beyond one-third of the entire length of the body.

My rolls can also be made to work together with the cylindrical rollers of the old construction, which, when their journals are exposed to pressure, have a tendency to a concave deflection of their working-line, because my rolls,

if not too thick in metal, are able to adapt themselves closely to the concave rolls, even if they should be provided with an inwardly-projecting rim or re-enforcement, *e*, as shown in Fig. 6.

5 Instead of making the body of my roll and projections *c c* out of one piece, as shown in Fig. 3, it is preferable in most cases, particularly for chilled-iron rolls, to put in an axle, *B*, made of steel or any other material of sufficient strength and elasticity, as shown in Fig. 4.

10 If it is desired that the roll shall revolve on its axle, I provide the axle with a channel, *f*, and bent tube, *g*, for the introduction of a suitable lubricating material. (See Fig. 5.) In either of these cases both ends of each roll are tapering, as shown, so as to form the tapering recesses *c c* round the axle *B*.

15 A pressure-roll has heretofore been constructed of a metal tube or shell, through which passes a shaft having heads or bearings at a distance of about one-fourth the length of the roll from its ends, which fit the interior of the tube or shell at corresponding points, thus supporting it at points on opposite sides of the center, the remainder of the shaft being of less diameter than the interior of the tube, so as to permit its central portion to spring inside of said tube between the heads or bear-

ings, and the ends of said shaft have been made to taper; but a roll constructed in this manner does not constitute my invention, and is not claimed by me.

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

1. A roll thickened at its center and centrally sustained by direct contact with the axle, said roll having hollow ends, the interior surfaces of which are uniformly tapered in an outward direction from the point of contact with the axle and the ends of the roll, substantially as described.

2. An improved roll constructed with a central longitudinal thickened body centrally sustained by the axle, and having the inner surfaces, *b*, of its hollow ends tapered uniformly in an outward direction from the point of contact between the ends of the roll and the longitudinal thickened center body of the roll, substantially as shown and herein described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

W. R. SCHÜRMANN.

Witnesses:

WM. LANGE,
E. BORGS.