No. 800,950. PATENTED OCT. 3, 1905.

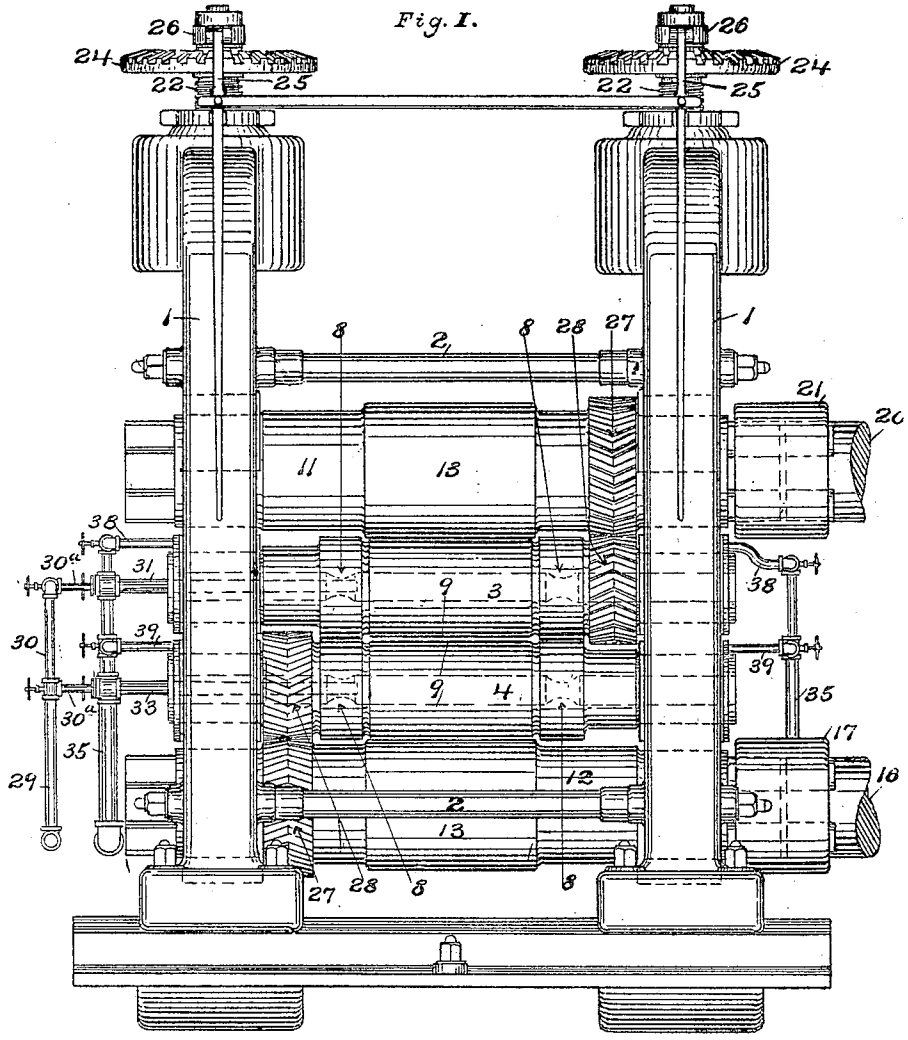
D. M. SOMERS.

ROLLING MECHANISM.

APPLICATION FILED MAR. 24, 1904.

3 SHEETS—SHEET 1.

Fig. I.



Witnesses

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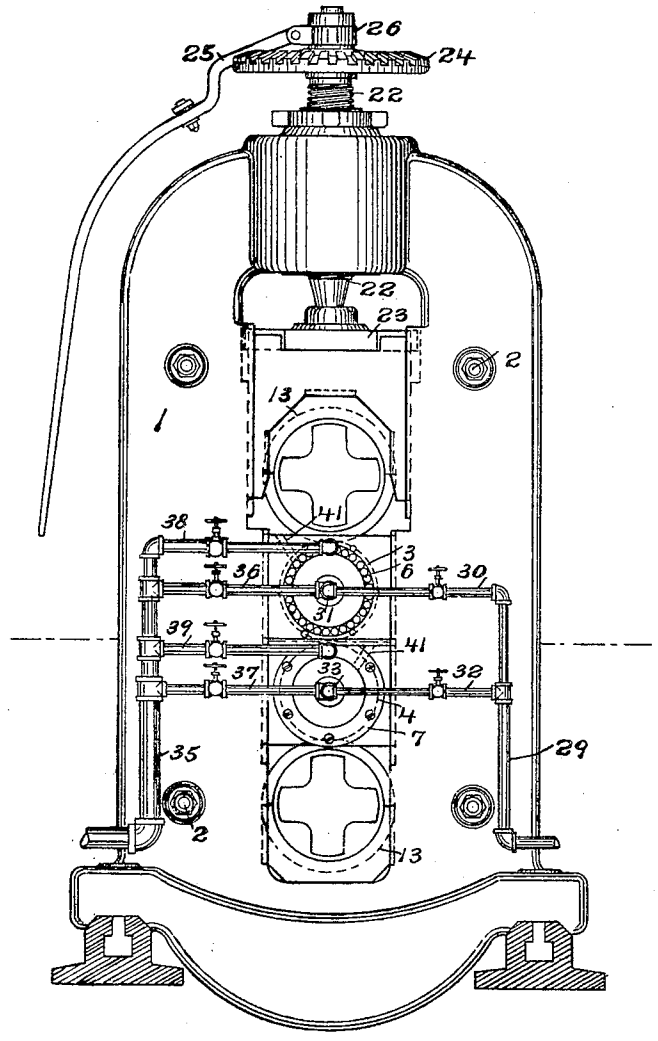
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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3 SHEETS—SHEET 3

Fig. 3.

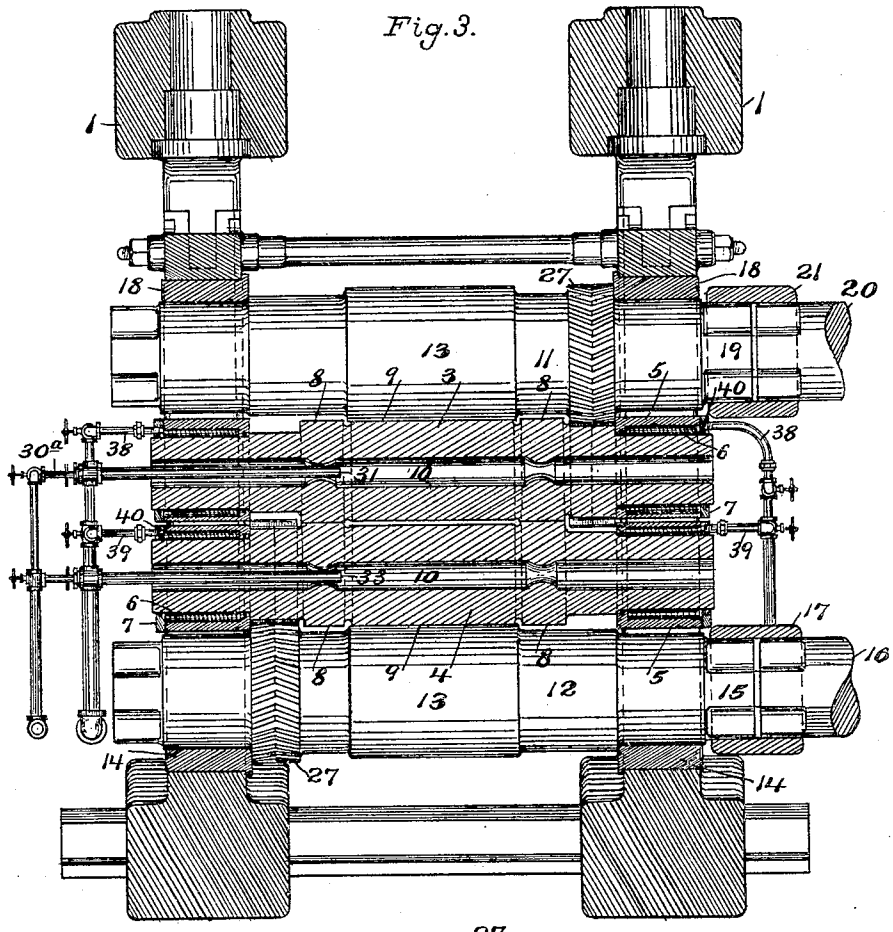


Fig. 4.

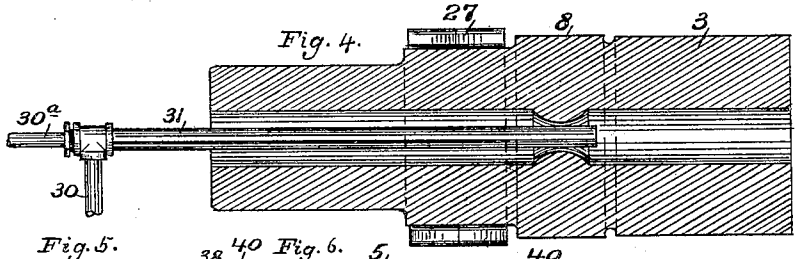


Fig. 5.

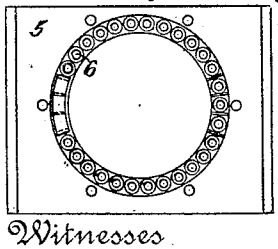


Fig. 6.

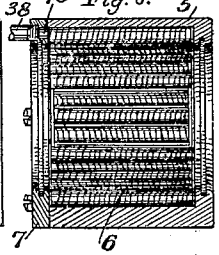


Fig. 7.

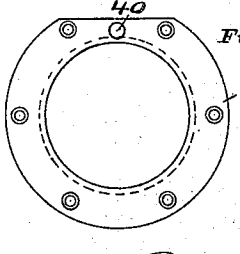
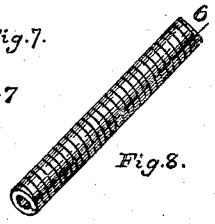


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

DANIEL M. SOMERS, OF NEW YORK, N. Y.

ROLLING MECHANISM.

No. 800,950. Specification of Letters Patent. Patented Oct. 3, 1905.

Application filed March 24, 1904. Serial No. 199,830.

To all whom it may concern:

Be it known that I, DANIEL M. SOMERS, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Rolling Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in rolls of the class generally employed in rolling iron and steel, and more particularly to the rolls known as "hot rolls," which are employed for rolling sheet metal.

The invention has for its object to produce a simple, cheap, and efficient rolling mechanism in which powerful pressures may be readily and economically obtained.

A further object of the invention is to produce an improved rolling mechanism embodying an efficient and economical means for heating the rolls and for cooling their bearings during their operation.

With this and other objects in view the invention consists in certain constructions and certain parts, improvements, and combinations which will hereinafter be more fully described, and set forth in the claims.

In the drawings, in which like characters of reference indicate the same parts, Figure 1 represents in side elevation a form of rolling mechanism embodying the invention. Fig. 2 is an end elevation of the construction shown in Fig. 1. Fig. 3 is a central elevation of the construction shown in Fig. 1, certain parts being omitted; and Figs. 4, 5, 6, 7, and 8 are detail views.

In the drawings, which illustrate a preferred embodiment of the invention, the frame in which the rolls (to be hereinafter described) are mounted is formed by pairs of slotted standards 1, these standards being connected by tie-rods 2. The frame illustrated is the usual form of frame, and any other form of frame may be adopted, if desired. The construction embodies a pair of working rolls 3 4, these rolls being mounted in boxes 5, which are located in the slotted standards above referred to. In the preferred construction these boxes will be provided with antifriction-bearings of any approved type. As shown, these bearings are formed by coil-rollers 6, one of which is shown in perspective in Fig. 8, this being a well-known form of bearing. The boxes are tightly closed by circular caps 7, the caps being secured to the box by screws or in any other suitable manner.

The rolls 3 4, herein termed "working rolls," may be cylindrical in form; but in the preferred construction they will be provided with bearing and working surfaces. The bearing-surfaces may be variously arranged; but in the construction illustrated these bearing-surfaces are formed by collar portions 8, arranged at the end of the rolls, these collar portions being of slightly greater diameter than the working surfaces of the rolls, which lie between the collar portions. These working surfaces 9 being slightly less in diameter than the bearing-surfaces, an opening is formed between them for the passage of the material, this opening being slightly less than the thickness of the material to be rolled. In the preferred construction, furthermore, the rolls will be chambered, as at 10, thereby providing hollow interiors, the purpose of which will be hereinafter referred to. Coöperating with each of these working rolls is a pressure-roll, the roll coöperating with the working roll 3 being marked 11 and the roll coöperating with the working roll 4 being marked 12. Should the working rolls 3 4 be cylindrical in outline, the pressure-rolls will also be cylindrical; but when the working rolls are shaped as indicated in the drawings these rolls 11 12 will be provided with broad bearing-surfaces 13, which run in contact with the working surfaces on the rolls 3 4. These pressure-rolls may be variously mounted and operated. In the construction shown the lower roll 12 is mounted in boxes 14, which rest in the bottom of the slots in the standards, and this lower roll is provided with a driving-head 15, located outside of the standard. This driving-head is secured to a driving-shaft 16 by means of a coupling 17, the construction being a usual one. The upper roll 13 is mounted in boxes 18, which are located in the slots in the standard before referred to, and this roll is also provided with a driving-head 19, secured to a driving-shaft 20 by means of a coupling 21, this coupling arrangement being identical with that of the lower roll.

It will be noted that the boxes of the rolls 3 4 are not in contact either with each other or with the boxes of the pressure-rollers above and below them, so that the entire weight of the system of rolls is carried by the lower pressure-roll 13.

The rolls are set into and held in close con-

tact, this being effected by any suitable or desired mechanism. In the construction shown each of the standards 1 has a screw 22 threaded into its top, this screw operating against a pressure-block 23, as is usual. The upper end of each screw has secured to it a wheel 24, operated from a lever 25, secured to the top of the screw by a collar 26, this construction being of the usual type.

Each pressure-roll drives the working roll with which it coöperates, the means by which this is effected being of any desired form. Preferably, however, each of these pressure-rolls 13 will be provided with gears 27, these gears meshing with gears 28, suitably mounted or formed on the working rolls, as clearly appears in Fig. 3.

While the mechanism embodying as its essential features the driving and working rolls might be employed under some conditions without heating the working rolls, in the preferred construction these rolls are heated, and preferably also this heating will be accomplished by burning a hydrocarbon fuel in the interior of the rolls—as, for instance, producer-gas. For this purpose air and gas pipes are provided, which may be located and supported in any desired manner. In the construction shown there is provided a gas-pipe 29, this pipe being provided with a branch 30, which leads to a burner-pipe 31 in the chamber 10 in the interior of the roll 3. The pipe 29 also has a branch 32, which leads to a burner-pipe 33 in the chamber 10 of the roll 4. An air-pipe 35 is also provided, this pipe being provided with branches 36 and 37, which lead to burner-pipes 31 and 33, above referred to.

When the interior of the rolls is heated, it is desirable to prevent the bearing-surface of the rolls from being overheated, and this may be efficiently accomplished by introducing a cooling fluid thereinto. While any means may be employed for this purpose, in the construction shown air is employed for this purpose, the air being obtained from the air-main 35, before referred to. To this end this main is provided with branches 38 and 39, which lead into the perforations 40 in the caps 7 of the bearings before described. In the preferred construction air-exit openings will be provided, which may be suitably located. As shown, these air-openings pass through the boxes in which the rolls are located, said openings being shown in dotted lines in Fig. 2 and being marked 41.

The construction so far described supplies air to the boxes on one side of the machine. A second main 35 (see Fig. 1) is provided on the other side of the machine, this main being also provided with branches 38 and 39, the construction of both sides of the machine being duplicates.

While the construction illustrated and described embodies the invention in its preferred form, it is to be understood that changes and modifications may be made therein without departing from the invention. The invention is not, therefore, to be restricted to the specific construction illustrated and described.

What is claimed is—

1. The combination with a pair of working rolls, of a pressure-roll located to one side of and in contact with one of the working rolls, means whereby the pressure-roll drives this working roll, a pressure-roll located to one side of and in contact with the other working roll, and driving means whereby this pressure-roll drives this working roll, the axes of the rolls being located in substantially the same plane, substantially as described.

2. The combination with a pair of working rolls, of a pressure-roll of greater diameter than the working rolls located on the outside of and in contact with one of the working rolls, means for driving said pressure-roll, means whereby the pressure-roll drives said working roll, a pressure-roll of greater diameter than the working rolls located on the outside of and in contact with the other working roll, driving means for this second pressure-roll, and means whereby this second pressure-roll drives this working roll, substantially as described.

3. The combination with a pair of working rolls, each roll having a bearing-surface and a working surface thereon, the bearing-surfaces of the rolls running in contact, of a pressure-roll located on the outside of and in contact with one of said working rolls, driving means for this pressure-roll, means whereby this pressure-roll drives the working roll, a pressure-roll located on the outside of and in contact with the other working roll, driving means for this second pressure-roll, and means whereby this second pressure-roll drives this working roll, substantially as described.

4. The combination with a pair of working rolls, each working roll having a bearing-surface at each end and a working surface between the bearing-surfaces, the bearing-surfaces of the rolls running in contact, of a pressure-roll of greater diameter than the working roll located on the outside of and in contact with one of said working rolls, driving means for this pressure-roll, means whereby this pressure-roll drives this working roll, a pressure-roll of greater diameter than the working roll located on the outside of and in contact with the other working roll, driving means for this second pressure-roll, and means whereby this second pressure-roll drives this working roll, substantially as described.

5. The combination with a pair of working rolls, each of said rolls having a working surface and a bearing-surface of greater radius than its working surface, of a pressure-roll located on the outside of and in contact with one of said working rolls, driving means for this pressure-roll, means whereby this pressure-

roll drives this working roll, a second pressure-roll located on the outside of and in contact with the other working roll, driving means for this second pressure-roll, and means whereby this second pressure-roll drives this working roll, substantially as described.

6. The combination with a pair of working rolls, each of said working rolls having a bearing-surface at each end and a working surface of less radius than the bearing-surfaces located between the bearing-surfaces, of a pressure-roll of greater diameter than the working rolls located to one side of and in contact with the working surface of one of the working rolls, means for driving this pressure-roll, means whereby this pressure-roll drives this working roll, a pressure-roll of greater diameter than the working rolls located outside of and in contact with the working surface of the other working roll, driving means for this pressure-roll, and means whereby this second pressure-roll drives this working roll, substantially as described.

7. The combination with a pair of working rolls, each of said rolls having a bearing-surface at each end and a working surface between and of less diameter than the bearing-surfaces, the bearing-surfaces of the rolls running in contact, a pressure-roll located on the outside of and in contact with one of the working rolls, said pressure-roll being of greater diameter than its working roll, driving-gearing between said pressure-roll and its working roll, means for driving the pressure-roll, a second pressure-roll located on the outside of and in contact with the working surface of the other working roll, said pressure-roll being of greater diameter than its working roll, driving-gearing between said second pressure-roll and its working roll, and driving means for said second pressure-roll, the axes of the several rolls being located in substantially the same plane, substantially as described.

8. The combination with a frame, of a pair of working rolls mounted therein, each of said rolls having a bearing-surface at each end and a working surface between and of less diameter than the bearing-surfaces, the bearing-surfaces of the rolls running in contact, a pressure-roll located on the outside of and in contact with one of the working rolls, said pressure-roll being of greater diameter than its working roll, driving-gearing between said pressure-roll and its working roll, said gearing being located inside the frame, means for driving the pressure-roll, a second pressure-roll located on the outside of and in contact with the working surface of the other working roll, said pressure-roll being of greater diameter than its working roll, driving-gearing between said second pressure-roll and its working roll, said driving-gearing being located inside the frame, and driving means for said second pressure-roll, the axes of the several rolls being located in substantially the same plane, substantially as described.

9. The combination with a pair of working rolls, of bearing-boxes for each roll, antifriction-bearings in said boxes, means for heating the interior of the working rolls, means for introducing a cooling fluid into the bearing-boxes, and driving means for the rolls, substantially as described.

10. The combination with a pair of working rolls, of means for heating the rolls, closed bearing-boxes for each roll, antifriction-bearings in said boxes, means for introducing cooling fluid into the bearing-boxes, means for permitting the escape of said fluid whereby a circulation is kept up through the boxes, and driving means for the rolls, substantially as described.

11. The combination with a pair of working rolls, of bearing-boxes for each roll, antifriction-bearings in said boxes, means for burning hydrocarbon fuel in the interior of the rolls, means for introducing a cooling fluid into the bearing-boxes, and driving means for the rolls, substantially as described.

12. The combination with a pair of working rolls, of means for burning hydrocarbon fuel in the interior of the rolls, closed bearing-boxes for each roll, antifriction-bearings in said boxes, means for introducing cooling fluid into the bearing-boxes, means for permitting the escape of said fluid whereby a circulation is kept up through the boxes, and driving means for the rolls, substantially as described.

13. The combination with a pair of centrally-chambered working rolls, of bearing-boxes for said rolls, antifriction-bearings in the boxes, a gas-pipe, connections from the gas-pipe to burners in the interior of the rolls, an air-pipe, connections from this pipe to the burners in the interior of the rolls, connections from the air-pipe to the interior of the bearing-boxes, means for permitting the escape of air from the boxes, and driving means for the rolls, substantially as described.

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

DANIEL M. SOMERS.

Witnesses:
W. H. KENNEDY,
G. GALEANI.