

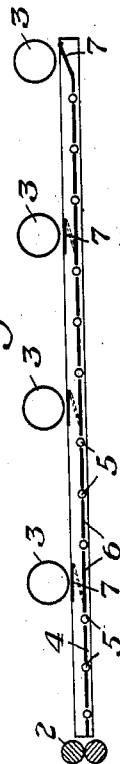
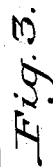
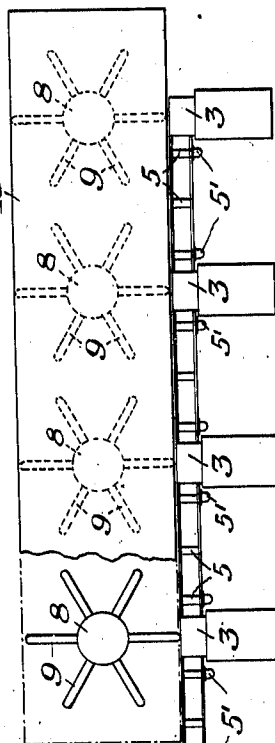
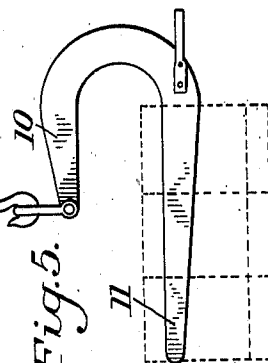
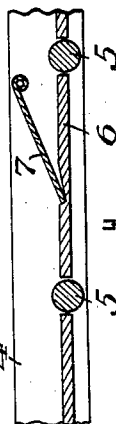
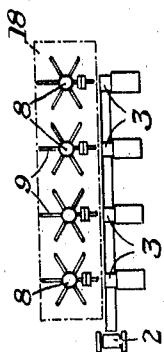
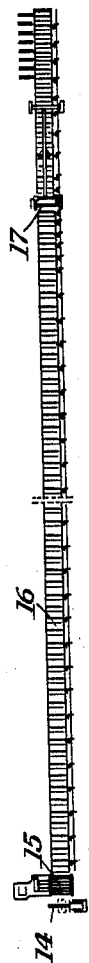
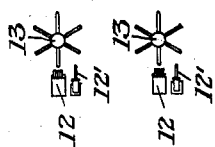
Sept. 22, 1925.

1,554,551

F. C. BIGGERT, JR., ET AL

STRIP MILL

Filed Feb. 12, 1923



INVENTORS

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UNITED STATES PATENT OFFICE.

FLORENCE C. BIGGERT, JR., OF CRAFTON, AND KIRTLAND C. GARDNER, OF CORAOPOLIS HEIGHTS, PENNSYLVANIA, ASSIGNORS TO UNITED ENGINEERING AND FOUNDRY COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STRIP MILL.

Application filed February 12, 1923. Serial No. 618,636.

To all whom it may concern:

Be it known that we, FLORENCE C. BIGGERT, Jr., and KIRTLAND C. GARDNER, both citizens of the United States, residing, respectively, at Crafton and at Coraopolis Heights, both in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Strip Mills, of which the following is a full, clear, and exact description.

The present invention relates broadly to rolling mills, and more particularly to strip mills, the term "strip" being used in its generic sense as covering shapes having a substantially rectangular section, or a section of such nature that the material is adapted to be wound into a helix or series of superimposed coils.

At the present time it is customary for strip mills to deliver strips from the last stand of rolls at a speed of from 600 to 1000 feet per minute. As the strips leave such rolls at a comparatively high temperature, it will be apparent that the proper disposition thereof is a matter of some concern. In some cases it is desirable to store the strips; in other cases it is desirable to pickle the strips; and in still other cases it may be desirable to straighten the rolled strips and shear the same into lengths. In any case, it frequently happens that the rolling mill delivers strips so rapidly that they are only handled with considerable trouble.

By the present invention there is provided a mill, and a method of operating the same, whereby the output of the mill may be easily cared for and whereby the handling of the strips is greatly facilitated.

In the accompany drawings, there is shown, for purposes of illustration only, and in more or less diagrammatic manner, a mill lay-out embodying this invention, it being understood that the drawings do not define the limits of the invention and that changes may be made in the construction and operation disclosed therein without departing from the spirit or scope of our broader claims.

In the drawings,—

Figure 1 is a top plan view illustrating one form of mill lay-out embodying this invention;

Figure 2 is a top plan view, on an en-

larged scale, of the coiling mechanism illustrated in Figure 1;

Figure 3 is a side elevation of a portion of the mechanism shown in Figure 2;

Figure 4 is a detail view, on an enlarged scale, of one of the guides for the coiling devices; and

Figure 5 is a side elevation of a suitable carrier for the coiled strips.

In carrying out the present invention, there may be provided adjacent the last stand of rolls 2 of a strip mill of any desired type, a plurality of coiling devices 3, any one of which may be operated independently of the others. These coiling devices may be of any desired construction adapted to receive the strip as delivered from the last stand of rolls and form the same into a series of superimposed coils. Such coiling devices may be constructed as disclosed in the co-pending application of Florence C. Biggert, jr., Serial No. 555,890, filed April 21, 1922, or the co-pending application of Lane Johnson, Serial No. 604,488, filed December 2, 1922.

As illustrated more particularly in Figures 3 and 4, the strips are adapted to pass from the last stand of rolls 2 onto a feed table 4, which feed table may comprise a series of antifriction rollers 5, suitably spaced, and a series of intermediate plates 6. Certain of the rollers 5 may be driven by motors 5', if desired. The coiling devices 3 may be disposed in superimposed relation to the feed table 4, and the strips may be successively directed into different coiling devices by the use of movable gates or deflectors 7 adapted to be dropped downwardly into engagement with the plates 6 for deflecting the strips from the feed table. It will be apparent that with the deflectors in the position illustrated in Figure 3, the coiling device illustrated at the extreme right-hand end of the feed table will receive the strip.

In operating a mill in accordance with this invention, the coiling devices will be successively brought into use for handling successive strips from the rolling mill. In this manner it will be unnecessary to interfere with the continuous rolling of strips. As each coil is completed, it may be moved axially from its respective coiling device

onto a suitable receiving and storage means. This means may conveniently be in the form of a series of rotatable standards 8, each having projecting radially therefrom a plurality of arms 9, which arms in one position will extend in substantially axial alinement with the coils in the coiling devices whereby such coils may be easily transferred as desired. Each arm 9 may be advantageously constructed to hold a plurality of coils, and as the arms become filled, the standards 8 will be rotated to advance the filled arms and bring empty arms into operation.

As the arms reach a position at approximately 180° from that in which they are charged, they are adapted to have the coils removed therefrom. A convenient mechanism for removing the coils comprises a crane hook 10 having a horizontally extending arm 11 of a length sufficient to support all of the coils carried by any one of the arms 9. These coils may then be bodily transferred from the receiving and storage means to a warehouse wherein they may be stored for shipment as raw material; or they may be carried to re-coiling devices in which they will be loosely re-coiled to effect removal of the scale and permit access thereto of the pickling solution. In Figure 1, two re-coiling devices 12 adapted to be used for this purpose are shown. Cooperating with each of the re-coiling devices is a standard 13 similar to the standards 8 before described and adapted to receive the coils from the re-coiling devices. The coils from the crane hook 10 may initially be placed on suitable mandrels or supports 12' from which the strips pass to the re-coiling devices. During re-coiling, it will be apparent that the strips are coiled in the opposite direction, whereby the scale on the surface is effectively broken up. At the same time, the coils are formed in slightly spaced relationship whereby the surfaces are more or less exposed to permit the action thereon of the acid solution in the pickling tank.

In other cases, the coiled strips may be taken directly from the receiving and storage means at the delivery end of the mill and placed upon a suitable support 14 from which they may be passed through a leveler 15 to a feed table 16. The feed table, in a known manner, may deliver the strips to a shearing device 17, by means of which they may be cut to the desired lengths.

It will be apparent that this invention enables a strip mill to be operated substantially continuously, and provides means for expeditiously handling the output from such mills whereby it may be stored for sale, re-coiled for subsequent treatment, or straightened for shearing into lengths.

In some cases, in order to prevent undue heat radiation from the coiled strips on the

arms 9, there may be provided a suitable cover plate 18 disposed above the standards 8.

The specific construction of the storage means illustrated herein is made the subject matter of a copending application in the name of Kirtland C. Gardner, Serial No. 620,541, filed February 21, 1923.

The advantages of the present invention arise from the provision of a strip mill having novel means for handling the output of the mill, whereby the delivered strips may be handled more easily and expeditiously than heretofore with mills of this character.

We claim:

1. In a strip mill, the combination with the last stand of rolls, of a plurality of coiling devices, a storage means cooperating with each of said coiling devices and adapted to receive coiled material therefrom, and means for causing the strip delivered by the last stand of rolls to pass to any one of said coiling devices, substantially as described.
2. In a strip mill, the combination with the last stand of rolls, of a plurality of coiling devices, a rotatable storage means cooperating with each of said coiling devices, and means for causing the strip delivered by the last stand of rolls to pass to any one of said coiling devices, substantially as described.
3. In a strip mill, the combination with the last stand of rolls, of a plurality of coiling devices, storage means cooperating with each of said coiling devices and adapted to hold a plurality of coils, and means for causing the strip delivered by the last stand of rolls to pass to any one of said coiling devices, substantially as described.
4. In a strip mill, the combination with the last stand of rolls, of a plurality of coiling devices, a storage means cooperating with each of said coiling devices, means for causing the strip delivered by the last stand of rolls to pass to any one of said coiling devices, transfer means and re-coiling means adapted to receive the coils from said transfer means, substantially as described.
5. In a strip mill, the combination with the last stand of rolls, of a plurality of coiling devices, a storage means cooperating with each of said coiling devices, means for causing the strip delivered by the last stand of rolls to pass to any one of said coiling devices, transfer means and means adapted to receive the coils from said transfer means and perform an operation thereon, substantially as described.

In testimony whereof we have hereunto set our hands.

FLORENCE C. BIGGERT, Jr.
KIRTLAND C. GARDNER.