Nov. 12, 1940. C. A. BOLLINGER ET AL 2,221,468

APPARATUS FOR HANDLING STRIP METALS

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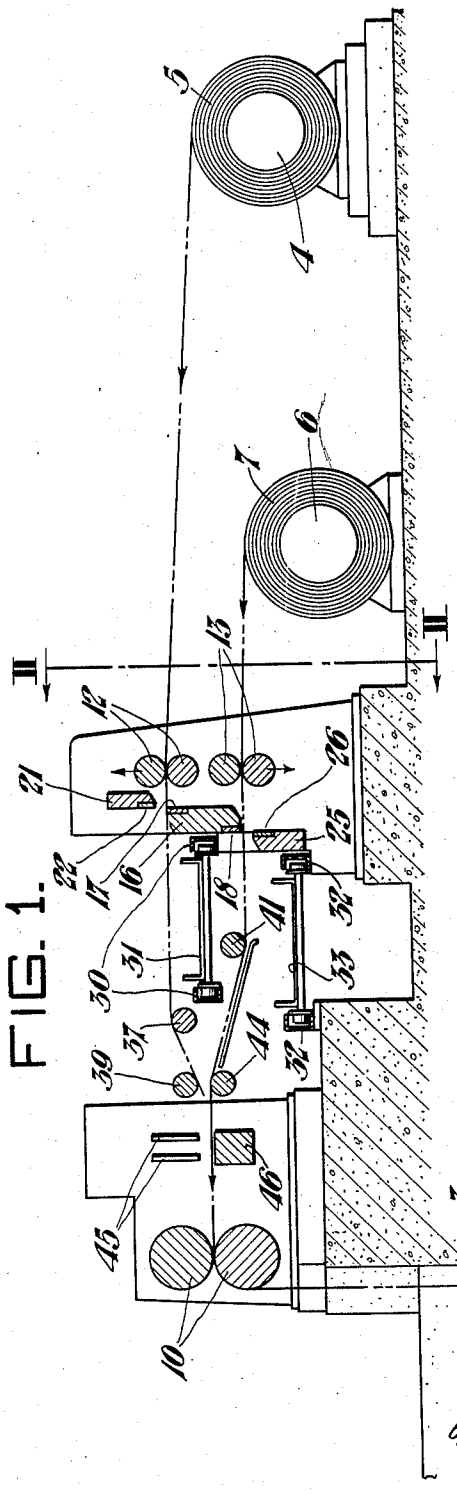


FIG. 1.

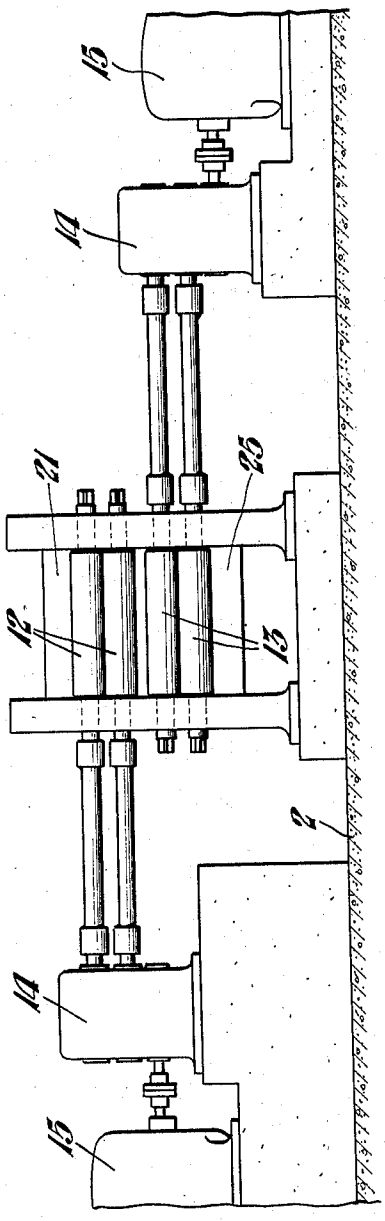


FIG. 2.

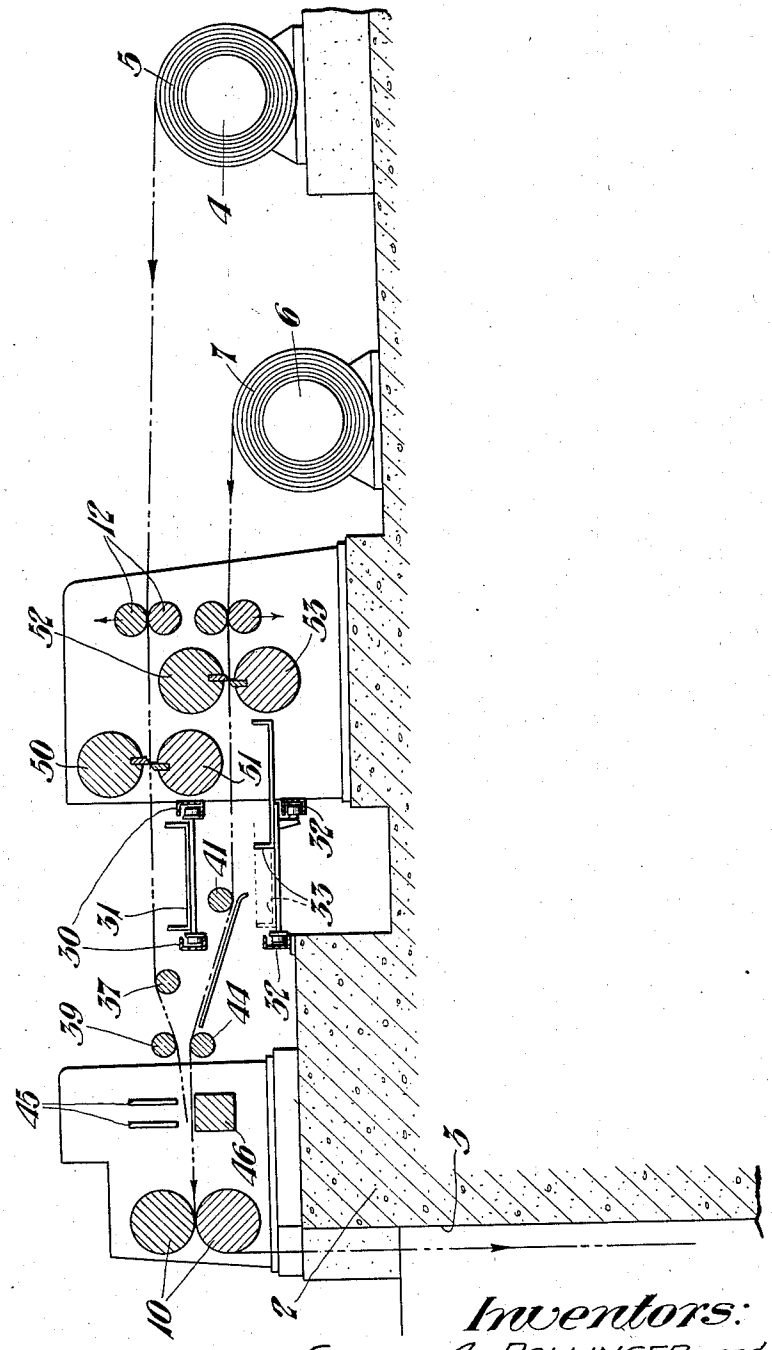
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FIG. 3.



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APPARATUS FOR HANDLING STRIP METALS

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4 Claims. (Cl. 29—33)

This invention relates to the manufacture of strip metal, and more particularly to the handling thereof when in very substantial lengths.

In the manufacture of strip metals, such as strip steel, in very substantial lengths it is necessary to keep the same on coils and to direct the strip into various types of processing apparatus, one example of which is an electro-tinning line. In such a type of processing, the strip is fed continuously through the processing medium and it is undesirable to interrupt the feed thereof between the trailing end of one coil and the leading end of the succeeding coil. It has, therefore, been proposed, and is now commonly practiced, to weld or stitch the trailing end of one coil to the leading or advance end of the next succeeding coil.

So far as we are aware, the most commonly used equipment consists of a plurality of uncoilers, a single type of shear, and single type pinch rolls. With such arrangements, considerable time is lost during the shearing operation which is necessary to square the adjacent ends of the coils and also while positioning said ends for welding or stitching. In order that such a loss of time will not be excessive, looping pits are provided for storing sufficient lengths of strip so that the joining operation may be carried on continuously. This advantage has been impractical because the joining operation and steps incident thereto require too much time to enable the utilization of a looping pit of sufficient depth.

It is among the objects of the present invention to feed succeeding strips of metal in joined relationship in a minimum of time.

Another object is the provision of a method and apparatus of the class described wherein the only loss of time will be that which is required to advance the trailing end of the strip from the shear to the welder and during the immediately subsequent welding operation.

The invention, then, comprises the features hereinafter fully described and as particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative of but several of a number of ways in which the principles of the invention may be employed.

In said annexed drawings:

Figure 1 is a side elevation of the apparatus of the invention, some of the instrumentalities thereof being shown in section;

Figure 2 is a view on the line II—II of Figure 1; and

Figure 3 is a view similar to that of Figure 1 but disclosing a modification.

Referring more particularly to the drawings, the numeral 2 designates a concrete foundation within which there is a looping pit 3. In accordance with prior art practices, (and referring particularly to Figure 1) on the left-hand side of the looping pit 3 there is disposed the usual conveying or processing instrumentalities (none of which is shown).

Disposed on the foundation 2 at a point remote from the looping pit 3 there is mounted an uncoiler 4 upon which there is carried a coil 5 of strip metal which is to be further processed. Intermediate the looping pit 3 and the uncoiler 4 there is disposed a second uncoiler 6 which occupies a position substantially lower than the uncoiler 4. This uncoiler 6 carries a coil 7 of strip metal which may be identical with the coil 5 referred to hereinbefore. Immediately adjacent the looping pit 3 and mounted on the foundation 2 there is disposed a pair of suitably driven pinch rolls 10 which are adapted to feed the strip metal of either the coil 5 or the coil 7 either directly into the conveying or processing instrumentalities (not shown) or into the looping pit 3.

As previously pointed out, it is desired to direct the strip of either the coil 5 or the coil 7 through the conveying or processing instrumentalities and to attach the second or succeeding coil (as the case may be) to the trailing end thereof with but a minimum loss of time.

According to the teachings of the present invention, there is disposed between the uncoiler 6 and the looping pit 3, (and most adjacent the latter) a pair of suitably driven pinch rolls 12 providing a horizontal pass. This pair of pinch rolls 12 is adapted to receive the strip metal of the coil 5 and feed the same forwardly to the pinch rolls 10, which are closely adjacent the looping pit 3. In order that the strip metal of the coil 5 may be fed forwardly to the pinch rolls 10, the upper of the pair of pinch rolls 12 is movable upwardly away from the lower roll thereof in order to permit the entry of the strip.

Disposed immediately below the pinch rolls 12 and occupying a common vertical plane, there is disposed a corresponding set of suitably driven pinch rolls 13 which are constructed and arranged to handle the strip metal of the coil 7 on the uncoiler 6 in the same manner that the pinch rolls 12 are constructed and arranged to handle the strip 5 from the uncoiler 4. Accordingly, the lower of the pair of pinch rolls 13 is

adapted for movement downwardly away from the upper roll thereof.

The pinch rolls 12 and 13 are independently driven in any suitable manner as, for example, through the adjacently disposed pinion stand and connected prime move assemblies, designated at 14 and 15, respectively, in Figure 2.

Between the pinch rolls 10 and the pinch rolls 12 and 13, respectively, there is disposed a stationary shear block 16, the upper and lower edges of which are in alignment with the lines of pass formed between the pinch rolls 12—12 and 13—13, respectively. The edge of the shear block 16 which is most adjacent the pinch rolls 12 is provided with an upper shear blade 17, while the most remote lower edge of the shear block 16 is provided with a lower shear blade 18. Disposed immediately above the stationary shear block 16, and between it and the pinch rolls 12, there is a suitably operated movable shear block 21 having on its edge most adjacent the stationary shear block 16 a shear blade 22 which cooperates with the upper shear blade 17 carried by the shear block 16. A movable shear block 25 is disposed beneath the shear block 16 on the side most remote from the pinch rolls 13 and is provided with an upper shear blade 26 for cooperation with the lower shear blade 18 carried by the shear block 16. From the foregoing, it will be seen that strip metal from the coil 5 passing between the pinch rolls 12 may be sheared by the shear blades 22 and 17, while strip metal from the coil 7 passing between the pinch rolls 13 may be sheared by the shear knives 26 and 18.

Disposed immediately adjacent the stationary shear block 16 on its side which is remote from the pinch rolls 12 and 13, there is mounted a trackway 30 which supports a scrap buggy 31, the latter being adapted to move at right angles with respect to the path of travel of the strip metal from either of the coils 5 or 7. It will be noted that the scrap buggy 31 is disposed beneath the line of pass of the pinch rolls 12 but above the line of pass of the pinch rolls 13, whereby the scrap buggy 31 is adapted to receive shear scrap resulting from the operation of the shear blades 22 and 17.

Immediately below the trackway 30 and below the line of pass of the pinch rolls 13, there is disposed a trackway 32 upon which there is mounted a scrap buggy 33. This scrap buggy 33 is adapted to move in a direction which is parallel to the scrap buggy 31, and being below the line of pass of the pinch rolls 13, is adapted to receive and remove scrap from the operation of the shear blades 26 and 18.

Referring more particularly to the left-hand portion of Figure 1 of the drawings, it will be noted that immediately above and below the line of pass of the pinch rolls 10 there is disposed a roll, as at 39 and 44, respectively.

The strip metal from the coil 5, after it emerges from between the pinch rolls 12 and the shear blades 22 and 17, is fed downwardly by a roll 37 which is disposed below but tangentially of the line of pass of the pinch rolls 12. From the roll 37 the strip metal of the coil 5 is fed under the roll 39 and into the pass formed by the pinch rolls 10.

The strip material of the coil 7, after passing through the pinch rolls 13 and shear blades 26 and 18, passes under the roll 41 which is disposed above but tangentially of the line of pass of the pinch rolls 13. From under the roll 41 the strip metal of the coil 7 is directed over the roll 44 and thence in the line of pass formed by the pinch rolls 10.

Between the upper roll 39 and the upper of the pinch rolls 10, there is disposed a pair of suitable welding instrumentalities, generally designated at 45. Between the roll 44 and the lower of the pinch rolls 10 there is disposed a welding machine anvil, generally designated at 46. The welding instrumentalities 45 may consist of a conventional single seam welder, conventional double seam welder, or any other suitable welding or fastening device.

Referring to Figure 3 of the drawings, we have shown a modified form of the invention as comprising a pair of upper and lower rotary drum shears 50—51 and 52—53, respectively, in lieu of the upper and lower guillotine shears provided by the instrumentalities 16—21 and 16—25. This modified type of shear (i. e. the rotary drum type) will be more desirable where it is necessary to cut up, for salvaging purposes or otherwise, a considerable length of "heavy-end" or scrap material.

Due to the construction and arrangement, as described hereinabove, a continuous operation may be carried on through the processing equipment as sufficient stock of strip metal may be stored in the looping pit 3 to provide for the small time delay while welding or otherwise fastening the adjacent edges of the coils. If desired, the apparatus of the invention may be used without employing a looping pit; but in such event it will be necessary to stop for a short interval while securing the edges of the strips together. Also, the welding instrumentalities 45 and 46 may be entirely eliminated and the strips merely fed in succession rather than as secured together.

It is one of the features of the present invention that if at any time during the processing of a strip from a coil carried on either the uncoiler 4 or the uncoiler 6 it should become desirable to shear up a portion of the strip, this can be readily accomplished, thereby eliminating the necessity of processing off-gage strip, cobbled strip, etc. whereby the processing equipment is protected from such damage as marked rolls or dulled shear blades.

In operation:

Let it be assumed that the coil 7 on the uncoiler 6 is being processed on the line and is being pulled between the pinch rolls 10 from the uncoiler; through the pinch rolls 13 which have been opened up by suitable air cylinders, or otherwise; through the shear blades 26 and 18 which are separated; under the deflector roll 41 and over the deflector roll 44. When a coil 5 is placed on the uncoiler 4, the leading end of the strip thereof may be fed up either mechanically or manually to the pinch rolls 12, which are then brought together by suitable air cylinders, or otherwise, to further advance it. As the leading end of the strip is moved forwardly, it may be sheared to obtain a "square" end, remove scrap, or to shear up end portions of the coil which it is not desired to process further on the line. This sheared material is collected from the scrap buggy 31, which is retracted and emptied in any suitable manner (not shown). The squared end of the good, or unremoved, portion of the strip may then be fed over the upper deflector roll 37; under the lower deflector roll 39 and between the welding instrumentalities 45 and 46. This end of the strip may be allowed to rest on the welding mechanism until the trailing end of the

strip metal of the coil 7 is reached, and sheared "square". The trailing end of the strip metal of the coil 7 may then be advanced to the welding instrumentalities 45 and 46 by the pinch rolls 10; the pinch rolls 13 and sheer blades 26 and 28 being still retracted. After the trailing end of the strip metal of the coil 7 is welded to the advance end of the strip metal of the coil 5, the pinch rolls 10 are operated to advance the strip forwardly into the looping pit 3 or, if desired, direct into any processing or conveying instrumentality. In either event there will be but a small delay during the welding or fastening operation.

While we have shown and described several specific embodiments of the present invention, it will be seen that we do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claims.

We claim:

1. Apparatus for handling strip metal comprising an uncoiling device, a pair of separable pinch rolls for receiving and advancing a strip, a second uncoiling device, a pair of separable pinch rolls disposed above said first-named pinch rolls and adapted to receive and advance a strip advanced from said second uncoiling device, shearing means for each set of said pinch rolls, and a retractable scrap buggy for each of said shearing means.

2. Apparatus for handling strip metal comprising an uncoiling device, a pair of separable pinch rolls for receiving and advancing a strip, a second uncoiling device, a pair of separable pinch rolls disposed above said first-named pinch rolls and adapted to receive and advance a strip advanced from said second uncoiling device, shearing means for each set of said pinch rolls, means for deflecting strip material from the line of pass of each of said pinch rolls into a common path of travel, pinch rolls adapted to receive and advance the strip material from either of said deflector means, and a looping pit adjacent said last-named pinch rolls.

3. Apparatus for handling strip metal comprising an uncoiling device, a pair of separable pinch rolls for receiving and advancing a strip, a second uncoiling device, a pair of separable pinch rolls disposed above said first-named pinch rolls and adapted to receive and advance a strip advanced from said second uncoiling device, shearing means for each set of said pinch rolls, means for deflecting strip material from a line of pass of said pinch rolls into a common path of travel, pinch rolls adapted to receive and advance the strip material from either of said deflector means, and strip-fastening means between said deflector means and said last-named pinch rolls.

4. Apparatus for handling strip metal comprising an uncoiling device, a pair of separable pinch rolls for receiving and advancing a strip, a second uncoiling device, a pair of separable pinch rolls disposed above said first-named pinch rolls and adapted to receive and advance a strip advanced from said second uncoiling device, shearing means for each set of said pinch rolls, means for deflecting strip material from a line of pass of said pinch rolls into a common path of travel, pinch rolls adapted to receive and advance the strip material from either of said deflector means, a looping pit adjacent said last-named pinch rolls, and strip-fastening means between said deflector means and said last-named pinch rolls.

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