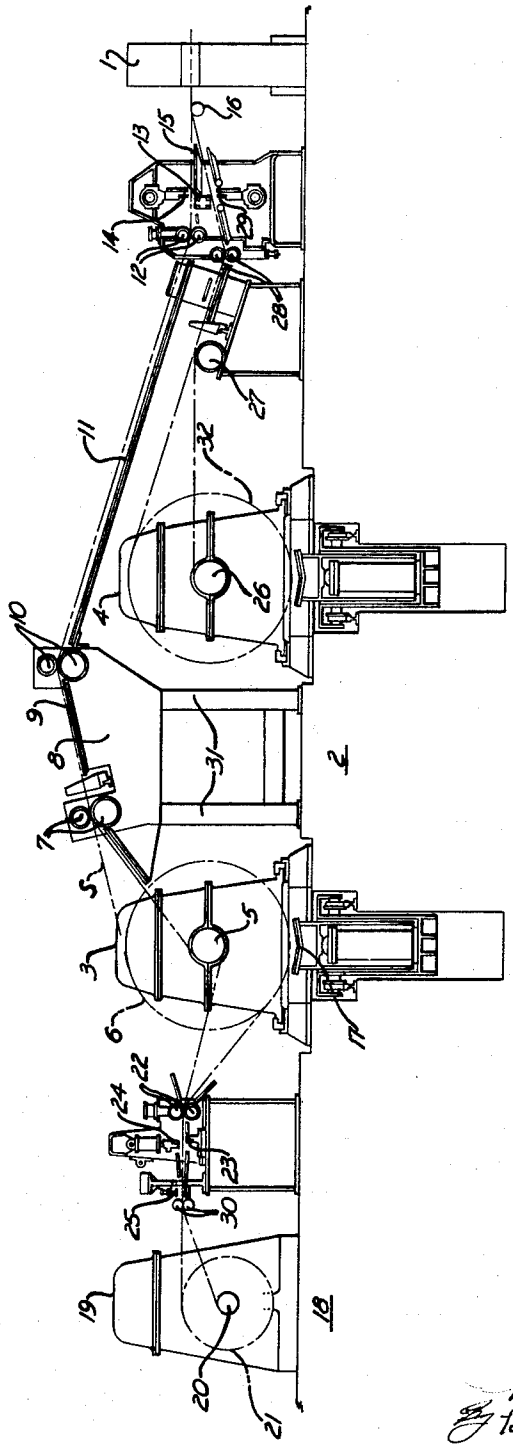
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APPARATUS FOR PROCESSING STRIP MATERIAL

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APPARATUS FOR PROCESSING STRIP MATERIAL

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4 Claims. (Cl. 242—56)

This invention relates to cutting and handling long, thin strip material, such as extended lengths of steel strip or the like, for separation and handling of prime and reject sections of said strip.

This application is a division of my co-pending application Serial Number 863,036, filed December 30, 1959, now U.S. Patent No. 3,084,425, granted April 9, 1963.

In the processing and treatment of ferrous strip material, it is common to roll the strip, thereby forming long, continuous ribbons of strip material which frequently have a length measured in many thousands of feet. The strip is ordinarily wound into coils for the purpose of handling it and moving it from one part of the mill to another. Frequently, a length of steel strip is cold rolled in thin gauge on a reversing mill in which the strip is passed back and forth through the mill until the desired reduction in gauge has been accomplished. In such mills, a coil of the strip is placed on one side of the mill and is then drawn through, being coiled on the other side. When the strip has transferred in this way to the other side, the mill is then reversed and the strip is drawn back through the mill to the first side. The ends of the strip are held on each side to enable the strip to be pulled through the mill. The reversing is repeated as many times as necessary until the desired reduction in gauge of the center portion of the strip is accomplished. Since the ends of the strip are held throughout the rolling process, the extreme ends never pass through the rolls at all. Other sections, at each end of the strip on the mill, are generally of heavier gauge for the reason that these are the sections which pass through the working rolls of the mill when it is in the process of stopping, reversing, and taking a new bite on the strip. Accordingly, the strip delivered from the reversing mill ordinarily has a central section which is of the desired gauge and has two end sections which are somewhat heavier than desired gauge. These end sections are ordinarily discarded as scrap before passing the strip through a strip treatment line for further treatment, such as cleaning, coating, annealing, or shearing.

Heretofore, it has been customary to transfer coils, including off-gauge reject sections, to a strip treatment line. The strip has been started into the line where the initial off-gauge section is chopped into short lengths which are then balled or baled for charging to melting furnaces as scrap. Ordinarily, the leading end of strip from a coil is passed through a shear which cuts the scrap into small sections until the prime center portion of the coil is reached. That section is then fed to the strip treatment line in the usual manner until the trailing end of heavy gauge is reached, at which time the shear is again operated to chop the reject strip into small sections for scrap which are disposed of in the same manner.

I provide means for holding coils of strip material having prime and reject sections, shear means to cut said strip and dissever said prime and reject sections and means to wind said reject sections into coils. I, preferably, provide coil holding means adjacent the entry end of a strip treatment line and shear means intermediate the coil holding means and said strip treatment line. I prefer to place reject strip winding means adjacent the coil holding means, preferably placing said reject coil winding means remote from the entry end of the strip treatment line. I further prefer to place strip cutting means intermediate the reject strip winding means and the coil holding means in position to cut strip extending from the coil holding means to the reject strip winding means. I further, preferably, provide strip joining means intermediate the reject strip winding means and the coil holding means.

I prefer to place coils of strip material at a coil holding station and deliver reject material therefrom to a reject strip winding station and prime material to said strip processing line. I further prefer to wind said reject material into coils at said strip winding station, preferably joining a plurality of reject sections end to end to form a coil of reject material of extended lengths.

In the accompanying drawing, I have illustrated apparatus embodying and useful in the presently preferred practice of my invention placed at the leading end of a strip treatment line.

A welder **1** is provided in which successive sections of strip to be fed to the strip treatment line are welded end to end for passage through the line. If the line with which the invention is employed is not one in which a welder is required to join the strips end to end, then the first element of the line may be installed in place of welder **1**. Strip is supplied to the line from a coil unwinding station indicated generally at **2**. Coil holders **3** and **4** are provided at coil unwinding station **2**. Coil holder **3** has a mandrel **5** upon which a coil indicated in outline **6** may be mounted. The leading end of a coil mounted on mandrel **5** is passed to the strip treatment line through pinch rolls **7** mounted upon a framework **8**. The strip then passes through guides indicated at **9** and between pinch rolls **10** to guides **11** which lead it to pinch rolls **12**. A double cut shear having a fixed knife **13** and a movable knife **14** is positioned behind pinch rolls **12** to receive strip therefrom. The strip is then directed by table **15** across the top of a guide roll **16** to welder **1**, following which it passes through the strip treatment line. Coils are brought to coil under **3** upon a carriage **17** recessed in the mill floor.

A reject coiling station **18** is provided on the opposite side of coil unwinding station **2** from the strip treatment line. It comprises a coil holder **19** having a mandrel **20** on which a coil of reject strip material **21** is wound. Reject strip material is fed from coil **6** between pinch rolls **22** to a shear having a fixed blade **23** and having movable blade **24**. A welder **25** is also provided to join reject strip sections end to end. A pair of pinch rolls **30** receives the strip from welder **25**.

Coil holder **4** is provided with a like carriage to supply coils to it. A coil is indicated in outline **32** mounted upon a mandrel **26** of coil holder **4**. Strip from coil holder **4** to be fed to the strip treatment line is passed over deflector roll **27**, between pinch rolls **28**, then between fixed shear blade **13** and movable blade **29** in the double cut shear. The strip then passes over roll **16** to welder **1**.

In operation, a coil is placed upon mandrel **5** and the outer or leading end, which is of a gauge heavier than desired, is passed between pinch rolls **22** to the shear blade **24** which is then moved down to cut and square the strip. The strip is then passed between pinch rolls **30** and wound upon mandrel **20**. When the entire section of heavy gauge reject material has been unwound and passed beyond the shear, blade **24** is again operated cutting the strip to dissever the initial end of reject material and the following prime material. The prime section is then withdrawn from between pinch rolls **22** and is threaded through pinch rolls **7** along guides **9** and **11** and between pinch rolls **10** to welder **1** where it is welded end to end with the previous strip in the treatment line. The prime section is then fed directly and continuously to the strip treatment line from coil holder **3**.

In the meantime, the leading end of reject strip on a

coil upon coil holder 4 is passed between legs 31 of framework 8 and beneath the coil upon coil holder 3. The reject off-gauge strip is passed through pinch rolls 22, the end thereof is squared by the shear. The end of the strip is then advanced to welder 25 and welded to the end of the previous section of reject strip. When the entire section of reject strip has passed between shear blades 23 and 24, the shear is operated to dissever the reject and prime sections and the prime section is recoiled upon coil holder 5. The end is then fed through pinch rolls 28. When the end of the prime strip is reached from the coil on coil holder 3, shear blade 14 is operated to cut the prime strip from the trailing end reject strip section. The leading end of prime strip on coil holder 4 is then welded thereto and strip is fed to the strip treatment line with virtually no interruption. In the meantime, the reject strip section on coil holder 5 is withdrawn and threaded through pinch rolls 22 and is then welded end to end with the reject material already wound at reject coiling station 18. When this has been done mandrel 5 will be empty and a new coil is provided at coil holder 3. The leading reject section is then removed from this coil in the manner previously described. The prime section is then threaded through the apparatus to pinch rolls 22. When the end of the prime section of the coil on coil holder 4 is reached, the strip is cut to dissever the prime material from the trailing end reject material. The prepared strip end being held at pinch rolls 22 is then joined end to end with the previous section of prime strip and the feed to the line again comes from the coil on coil holder 3. In this manner, the feed to the strip treatment line may be maintained substantially continuously.

When a feed coil of reject material is formed at reject coiling station 18, the coil is banded and removed. It can then be easily handled by a crane hook or conveyor in the conventional fashion, being readily transportable to heating furnaces for charging as scrap.

From the foregoing, it will be apparent that I have invented new and useful strip processing means capable of handling strip more expeditiously and conveniently than heretofore. The scrap is disposed of with a minimum of effort and expense. In many instances, a more desirable form of scrap is provided than conventionally. While I have illustrated and described a present preferred embodiment of my invention, it is to be understood that I do not limit myself thereto and that the invention may be otherwise variously practiced within the scope of the following claims.

I claim:

1. Apparatus for processing coiled strip material having prime and reject sections comprising an element constituting the entry end of a strip treatment line, coil holding means adjacent said element for holding coils from which strip is adapted to pass to said element, strip cutting means intermediate the coil holding means and said element for shearing strip extending from the coil holding means to said element, reject strip coiling means for receiving reject strip from said coil holding means, said coil holding means being disposed intermediate said element and said said coiling means, and second strip cutting means intermediate the coil holding means and the reject strip coiling means for cutting strip extending from the coil holding means to the reject strip coiling means.

2. Apparatus for processing coiled strip material having prime and reject sections comprising an element constituting the entry end of a strip treatment line, coil holding means adjacent said element for holding coils from which strip is adapted to pass to said element, strip cutting means intermediate the coil holding means and said element and positioned to cut strip being delivered from the coil holding means to said element, reject strip coiling means in position to receive strip from said coil holding means, said coil holding means being disposed intermediate said element and said coiling means, second strip cutting means positioned to cut strip being delivered from the coil holding means to said coiling means, and strip joining means disposed intermediate said element and said coiling means for joining reject sections end to end.

3. Apparatus for processing coiled strip material having prime and reject sections comprising an element constituting the entry end of a strip treatment line, reject strip coiling means in spaced relationship from said element, coil holding means intermediate the reject strip coiling means and said element, strip cutting means disposed intermediate said coil holding means and said coiling means and positioned to cut strip extending from said coil holding means to said reject strip coiling means, and second strip cutting means intermediate said coil holding means and said element positioned to cut strip extending from said coil holding means to said element.

4. Apparatus for processing coiled strip material having prime and reject sections in advance of passage of prime material through a strip treatment line comprising an element constituting the entry end of a strip treatment line, coil holding means adjacent said element arranged to receive coils of said strip material, said coil holding means being positioned for passage of said strip material therefrom to said element, reject strip coiling means arranged to receive strip from said coil holding means, said coil holding means being disposed intermediate said element and said coiling means, strip cutting means positioned intermediate said coil holding means and said coiling means to cut strip being unwound from said coil holding means to dissever said prime and reject sections, and strip joining means intermediate said coil holding means and said strip coiling means whereby sections of reject strip material may be joined end to end to form a continuous ribbon before coiling.

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