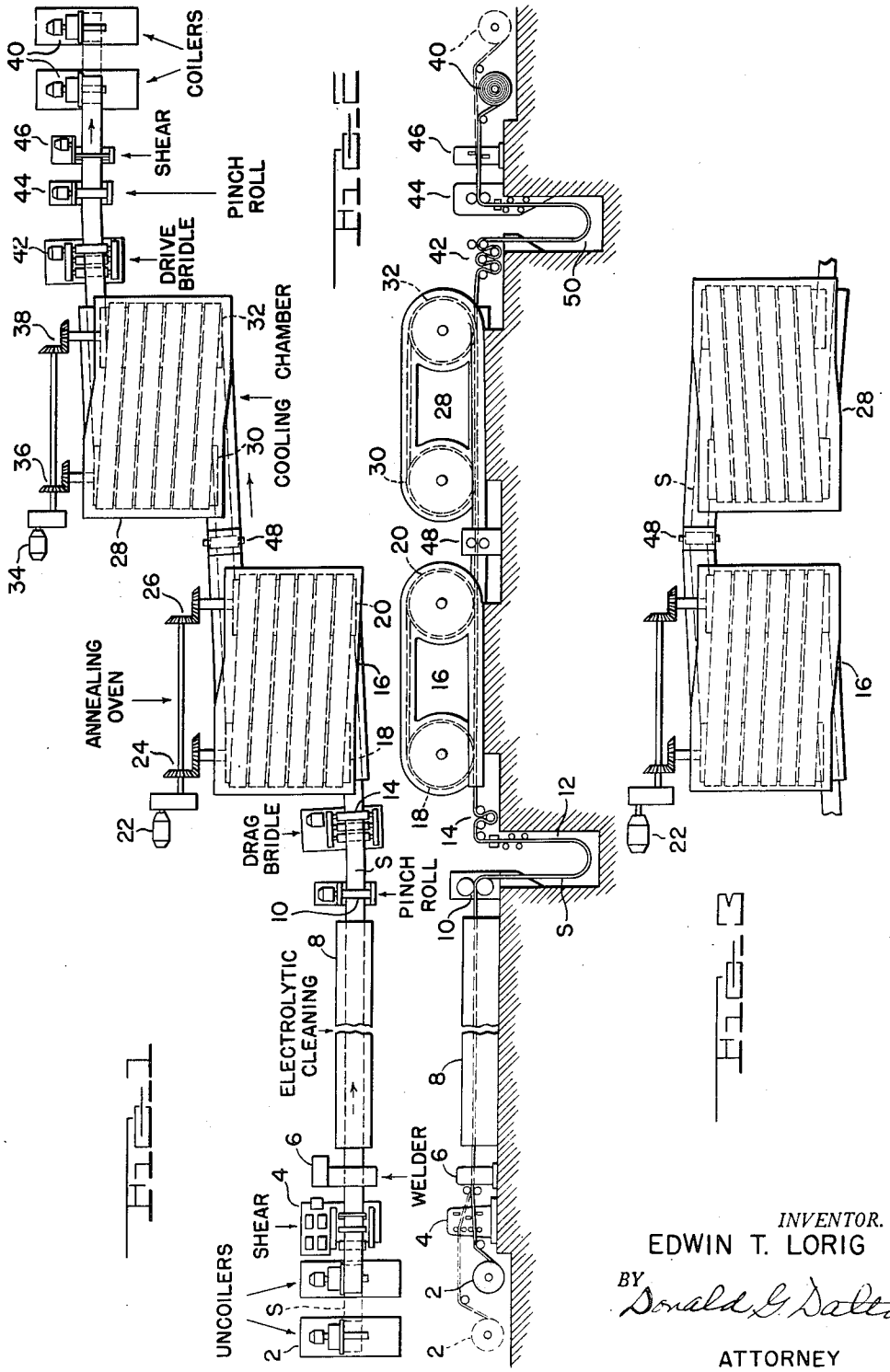
March 4, 1952 E. T. LORIG 2,587,742

APPARATUS FOR CONTINUOUSLY PROCESSING STRANDS

Filed May 10, 1949



INVENTOR.
EDWIN T. LORIG
BY Donald G. Dalton
ATTORNEY

Patented Mar. 4, 1952

2,587,742

UNITED STATES PATENT OFFICE

2,587,742

APPARATUS FOR CONTINUOUSLY PROCESSING STRANDS

Edwin T. Lorig, Ross Township, Allegheny County, Pa., assignor to United States Steel Company, a corporation of New Jersey

Application May 10, 1949, Serial No. 92,346

2 Claims. (Cl. 266—3)

1

This invention relates to apparatus for continuously processing strands, especially metal wire and hot or cold rolled strip. Continuous annealing and removal of work strain from metallic strands, such as cold reduced wire, strip, tin plate and sheet products, is now done at high cost and relatively slow speed is catenary, roller bottom type, and vertical multiple pass tower type furnaces.

It is therefore an object of my invention to provide apparatus for annealing or otherwise processing strip at much higher speeds than is now commercially possible.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a schematic plan view of the apparatus of my invention;

Figure 2 is a schematic side elevation of Figure 1; and

Figure 3 is a modification of a portion of the apparatus of Figure 1.

Referring more particularly to the drawings, the reference numeral 2 indicates a pair of uncoilers at the entry end of the processing line. A shear 4 and welder 6 are provided between the uncoilers and an electrolytic cleaning tank 8. The strip S to be processed passes from the tank 8 to a pair of pinch rolls 10 which feed the strip into a looper pit 12. From the looper pit 12 the strip passes through a drag bridle 14 to an annealing oven or furnace 16. The annealing furnace has a pair of spaced apart continuous strip helical conveying reels 18 and 20 arranged at opposite ends thereof with their axes arranged transversely to the direction of strip feed. These continuous strip helical conveying reels are preferably of the type disclosed in my copending applications, Serial No. 80,673, filed March 10, 1949, Serial No. 85,699, filed April 5, 1949, and Serial No. 86,375, filed April 8, 1949, now Patent No. 2,576,233, issued November 11, 1951. As disclosed in these applications, each convolution of strip or strand in contact with the reel is conveyed thereover in a true helical path. The reels 18 and 20 are driven from a motor 22 by means of gearing 24 and 26, respectively. Located adjacent the annealing furnace 16 is a cooling chamber 28. Arranged in the cooling chamber 28 are a pair of spaced apart continuous strip helical conveying reels 30 and 32 which are the same type and arranged in the same manner as the reels 18 and 20 in the annealing furnace. Reels 30 and 32 are driven from the motor 34 through gearing 36 and 38, respectively. The

2

strip passes from the cooling chamber 28 to coilers 40. Between the cooling chamber 28 and the coilers 40 are located drive bridle 42, pinch rolls 44 and shear 46. Arranged in the path of strip travel between the annealing furnace 16 and cooling chamber 28 is an adjustable roll 48 which can change the angle of feed of the strip to the cooling chamber.

The operation of the device is as follows:

The strip S to be processed passes through the electrolytic cleaning tank 8 where the oil and grease thereon is removed and then through the looper pit 12 into the annealing furnace 16 where the strip is heated to the desired temperature as it passes therethrough in a true helical path. Because of the great amount of travel provided by the use of the two helical conveying reels, the time required for annealing the strip is greatly reduced. From the annealing furnace 16 the strip S passes to the cooling chamber 28 where the strip is cooled to the desired temperature. Tension is applied to the strip by means of the drag bridle 14 and the drive bridle 42. When one complete coil of strip is uncoiled, a second coil is fastened thereto in the usual manner. That is, the trailing end of the first coil and the leading edge of the second coil are cut square with the shear 4, after which the two strips are welded together by the welder 6. The looper pit 12 provides storage so that the strip can continue moving through the furnace 16 and cooling chamber 28 during the fastening of the coils together. In the same way the looper pit 50 at the exit end of the processing line provides storage when the strip is being cut and a coil removed from the end of the line.

The embodiment in Figure 3 differs from the first embodiment in the arrangement of the annealing furnace 16 and cooling chamber 28. In this embodiment the cooling chamber 28 is arranged directly in line with the annealing furnace 16 and the direction of strip travel is changed by means of the roll 48 so that the helix on the reels 30 and 32 is in the reverse direction.

While two embodiments of my invention have been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for continuously annealing strands comprising an annealing furnace for heating a strand therein, a pair of spaced apart continuous strand helical conveying reels one at each end of said furnace, said reels being ar-

ranged with their axes transverse to the direction of strand feed, means for feeding the strand to one end of one of the reels, means for discharging the strand from the opposite end of the other of said reels, the strand being heated passing around said reels a plurality of times in a true helical path, a cooling chamber, a pair of spaced apart continuous strand helical conveying reels one at each end of said chamber, said last named reels being arranged with their axes transverse to the direction of strand feed, means for feeding the strand discharged from the annealing furnace to one end of one of the reels in the cooling chamber, said strand passing around said last named reels a plurality of times in a true helical path, and means for discharging the strand from the opposite end of the other of said reels in said cooling chamber.

2. Apparatus for continuously annealing strands according to claim 1 in which an adjustable roll is provided between the annealing furnace and cooling furnace for changing the angle of feed of said strand.

EDWIN T. LORIG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,828,036	Fahrenwald	Oct. 20, 1931
2,199,472	Wean	May 7, 1940
2,232,391	Keller	Feb. 18, 1941
2,283,798	Delano	May 19, 1942