Oct. 10, 1939. E. A. MATTESON 2,175,755

COIL FEEDING APPARATUS

Filed Sept. 1, 1936 2 Sheets-Sheet 1

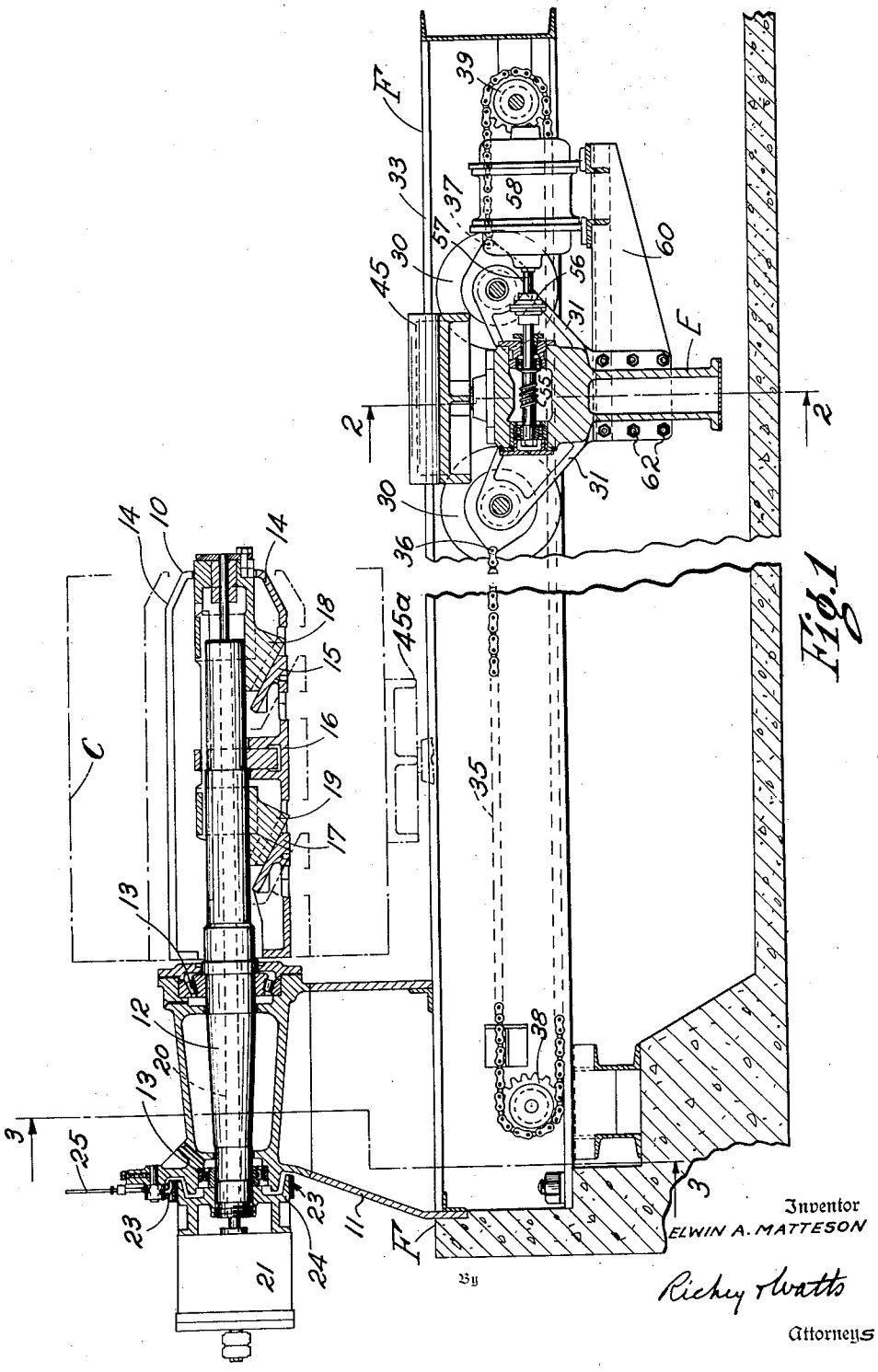


Fig. 1

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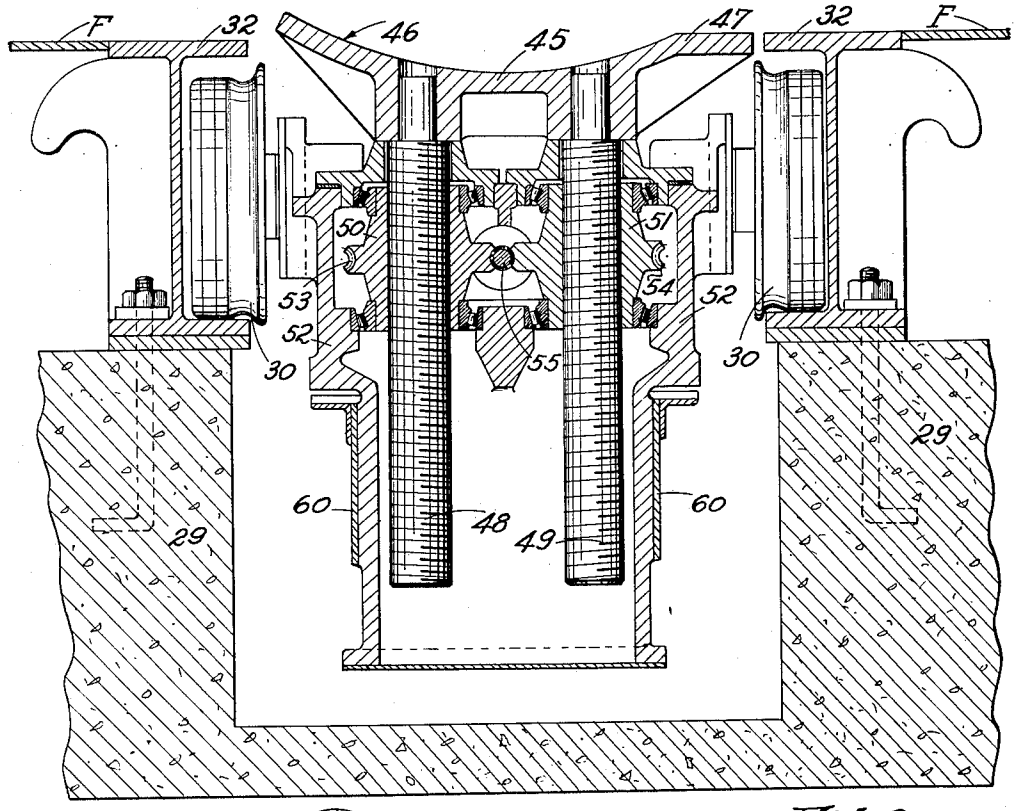


Fig. 2

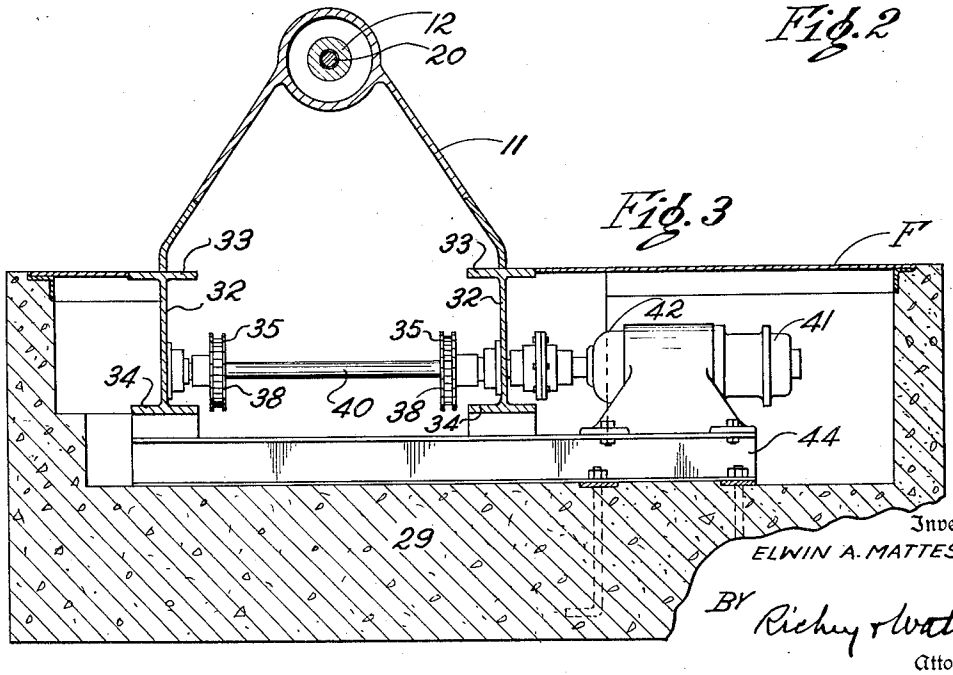


Fig. 3

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Patented Oct. 10, 1939

2,175,755

UNITED STATES PATENT OFFICE

2,175,755

COIL FEEDING APPARATUS

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Application September 1, 1936, Serial No. 98,999

1 Claim. (Cl. 242—78)

This invention relates to feeding or pay off devices and more particularly to apparatus for paying off coiled strip material, such as coiled strip steel, to a succeeding machine or apparatus.

With the increasing use of continuous strip mills in the steel industry, an increasing portion of strip or sheet material is prepared in coil form. These coils may be of considerable size and weight and present a difficult problem insofar as handling is concerned. It has been the practice to feed material from coils to succeeding operations by means of manually loaded pay off devices such as the ordinary coil box. Devices of this character are slow in operation, require considerable time for loading, and in addition the edges of the material may be damaged while the material is being fed from the coil box. Because of the friction in pay off devices of this type, it is difficult to feed the leading end of the strip into the succeeding machine.

According to my invention, I eliminate the difficulties noted above by providing an apparatus which preferably includes an expanding mandrel suitably mounted above the floor level and adapted to engage the central opening of the coiled strip material, in combination with a loading mechanism which preferably comprises a power driven traveling elevator mounted on tracks aligned with the axis of the mandrel. The coil receiving platform of the elevator may be lowered to the level of the floor, loaded with a coil, and then raised to bring the central opening of the coil into alignment with the mandrel. The coil may be slipped over the mandrel by the elevator, the mandrel is then expanded to engage the coil, and the material of the coil is ready to be delivered to a succeeding machine or operation.

Referring to the drawings, Figure 1 is an elevation of a preferred form of my pay off device, various parts being shown in section; Figure 2 is a section on an enlarged scale through the traveling elevator as indicated by the line 2—2 of Figure 1; and Figure 3 is a vertical section as indicated by the line 3—3 of Figure 1.

As illustrated in the drawings, the expanding mandrel indicated generally at 10 may be mounted at a desired distance above the floor level by means of a pedestal or base member 11. The mandrel is mounted on an axially extending shaft 12 which in turn is mounted in the base or pedestal member 11 by a roller or other anti-friction bearings 13. The expanding mandrel itself may be of any well known construction. As the details of the mandrel per se form no part of the present invention, it will suffice for the purposes of this application to state that the mandrel may preferably consist of a plurality of radially extending segments 14, 15, 16 and 17, which are expanded outwardly into the dotted line position shown in Figure 1, to engage the internal surface of a coil of strip material C by means of cam members 18 and 19. The cam members 18 and 19 may be actuated to move axially of the mandrel (to the left as shown in Figure 1) by means of the rod 20 which extends through a central bore in the shaft 12 and which may preferably be actuated by means of an air cylinder 21.

It will be evident that the bearings 13 are entirely independent of the expanding mechanism of the mandrel so that the free rotation of the mandrel will not be affected by the expansion or contraction thereof. The rotation of the mandrel may be retarded by means of a brake band 23 engaging the braking surface 24 on the exterior of the air cylinder 21, the brake band being contracted by a hand lever 25. Of course, other braking means may be provided and if desired driving mechanism may be incorporated in the mandrel assembly in order to make it easier to pay off heavy strip material from the mandrel.

In order to provide a mechanism for conveniently loading the mandrel with coiled strip material, I preferably employ a traveling elevator indicated generally at E and mounted in a pit below the level of the floor F. The elevator may comprise a car or truck having wheels 30 carried by suitable axles and bearings mounted on frame members 31, the wheels running on tracks comprising I-beams 32 which are preferably aligned with the axis of the expanding mandrel 10, and which may be supported in any convenient manner on a suitable foundation 29. As illustrated in the drawings, the upper flanges 33 of the I-beams 32 are preferably disposed at or near the floor level while the lower flanges 34 of the I-beams form the surfaces on which the wheels 30 run. The track formed by the I-beams 32 may be of any convenient length, it only being necessary to have the track of sufficient length so that a coil of material can be loaded onto the elevator without interfering with the operation of the expanding mandrel or the discharge of a coil of material mounted thereon.

The traveling elevator may be moved along the track formed by the I-beams 32 by means of chains 35 which may be fastened to the elevator as at 36 and 37, the chains being supported by driving sprockets 38 and idler sprockets 39 at either end of the track. The sprockets 38 are preferably mounted on a shaft 40 which may be

driven by a reversing motor 41 through suitable reduction gearing 42. The motor may be conveniently mounted on I-beams 44. By this arrangement, the carriage for the traveling elevator may be pulled in either direction by the chains 35 which are driven by the sprockets 38 and which extend around the idler sprockets 39.

The elevator itself may comprise a platform 45 having an arcuate surface 46 adapted to receive a coil of strip material, one edge of the platform being flat as at 47 and disposed normally at the level of the floor F to make it a simple matter to roll a coil of strip material from the floor F onto the recessed arcuate surface 46 of the platform 45.

The platform is elevated by means of a pair of jack screws 48 and 49, which in turn are operated by nuts 50 and 51 mounted in suitable bearings in the frame members 52. The nuts 50 and 51 are provided with integrally formed worm gears 53 and 54 which engage a worm 55, which in turn is connected through a flexible coupling 56 to the shaft 57 of a reversing motor 58. It will be evident that rotation of the motor 58 will drive the worm 55 and through the worm gears 53 and 54 will rotate the nuts 50 and 51, which will cause movement of the jack screws 48 and 49 and corresponding movement of the platform 45. The motor 58 can conveniently be mounted on bracket members 60 bolted to the frame members of the elevator truck or carriage as indicated at 62. Current may be furnished to the motor 58 by means of a flexible cable, and the elevator may include the usual limit switches and other safety devices. The controls for the traversing motor 41 and the elevating motor 58 may be mounted at any convenient point, preferably adjacent the support for the expanding mandrel 10.

In operation a coil of strip material may be loaded by means of a truck or by hand onto the arcuate surface 46 of the platform 45 of the elevator. Thereafter the elevator may be raised by the elevating motor 58 until the central opening of the coil of the material is in alignment with the expanding mandrel 10. The elevator is then moved bodily in a direction to slip the coil over the expanding mandrel, that is, to the left as shown in Figure 1, the platform being moved to the position 45a shown in dot and dash lines in Figure 1. The mandrel is then expanded by means of the air cylinder 21 and the cams 18 and 19 to firmly grip the inner surface of the coil of material. The elevator then may be lowered to permit disengagement from the outer surface of the coil and moved to the right, away from the mandrel, to the loading position. The strip material on the mandrel may then be fed to any succeeding machine or operation. If desired, a power drive may be employed to assist in the feed, or the mandrel may be allowed to run freely or may be braked by means of the band brake illustrated in the drawings or any other convenient type of brake.

While the material is being discharged from the mandrel, the elevator is in its loading position and may be loaded with another coil of strip material and raised to align the central opening of the coil with the axis of the mandrel, so that as soon as the first loaded coil has been discharged from the mandrel a second coil can be loaded thereon without loss of time.

From the foregoing description of a preferred form of my invention, it will be seen that I have provided a simple, sturdy, and efficient pay off device by means of which coils of strip material can be rapidly fed to any desired succeeding machine or operation. My invention increases the speed of feeding operations, and because coils are held by engagement with the internal openings therein there is no damage to the edges of the material while it is being discharged. The loading operation can be carried out rapidly without waste of time, and the paying off of the material can be accurately controlled. By reason of its many operating advantages, my invention effects important economies in plants handling coils of strip material.

Various changes and modifications of my invention all within the scope and spirit thereof will be apparent to those skilled in the art. It is therefore to be understood that my patent is not limited to the preferred form of my invention as described herein or in any manner other than by the scope of the appended claim when given the range of equivalents to which my patent may be entitled.

I claim:

In a strip feeding machine, the combination of a rotatable expanding mandrel disposed above the level of a floor, means operable independently of the rotation of the mandrel for expanding the mandrel into engagement with the inside of a coil of strip material, and means for loading said coil onto said mandrel comprising a car mounted on tracks aligned with said mandrel and disposed below the level of the floor, an elevating platform carried by said car and adapted to support said coil and normally disposed adjacent the plane of the floor, motor driven screw means for elevating said platform above the level of the floor to align the center opening of said coil with said mandrel, and means including a chain disposed beneath the floor level and a motor for driving said chain for moving said car to position said coil on said mandrel.

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