Dec. 16, 1941. S. NYBERG 2,266,067

COIL FEEDING APPARATUS

Filed April 29, 1939 4 Sheets-Sheet 1

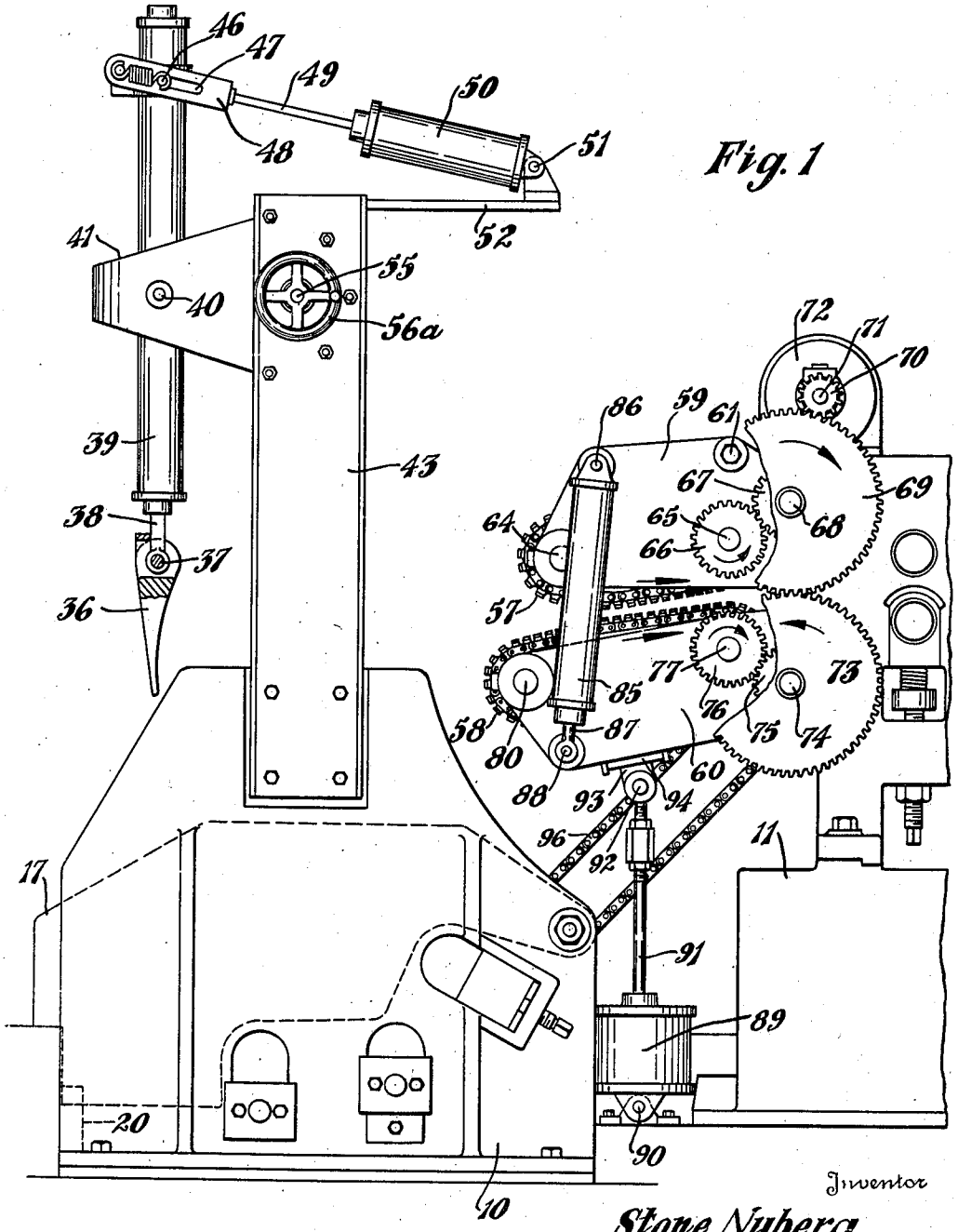


Fig. 1

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Dec. 16, 1941. S. NYBERG 2,266,067

COIL FEEDING APPARATUS

Filed April 29, 1939 4 Sheets-Sheet 2

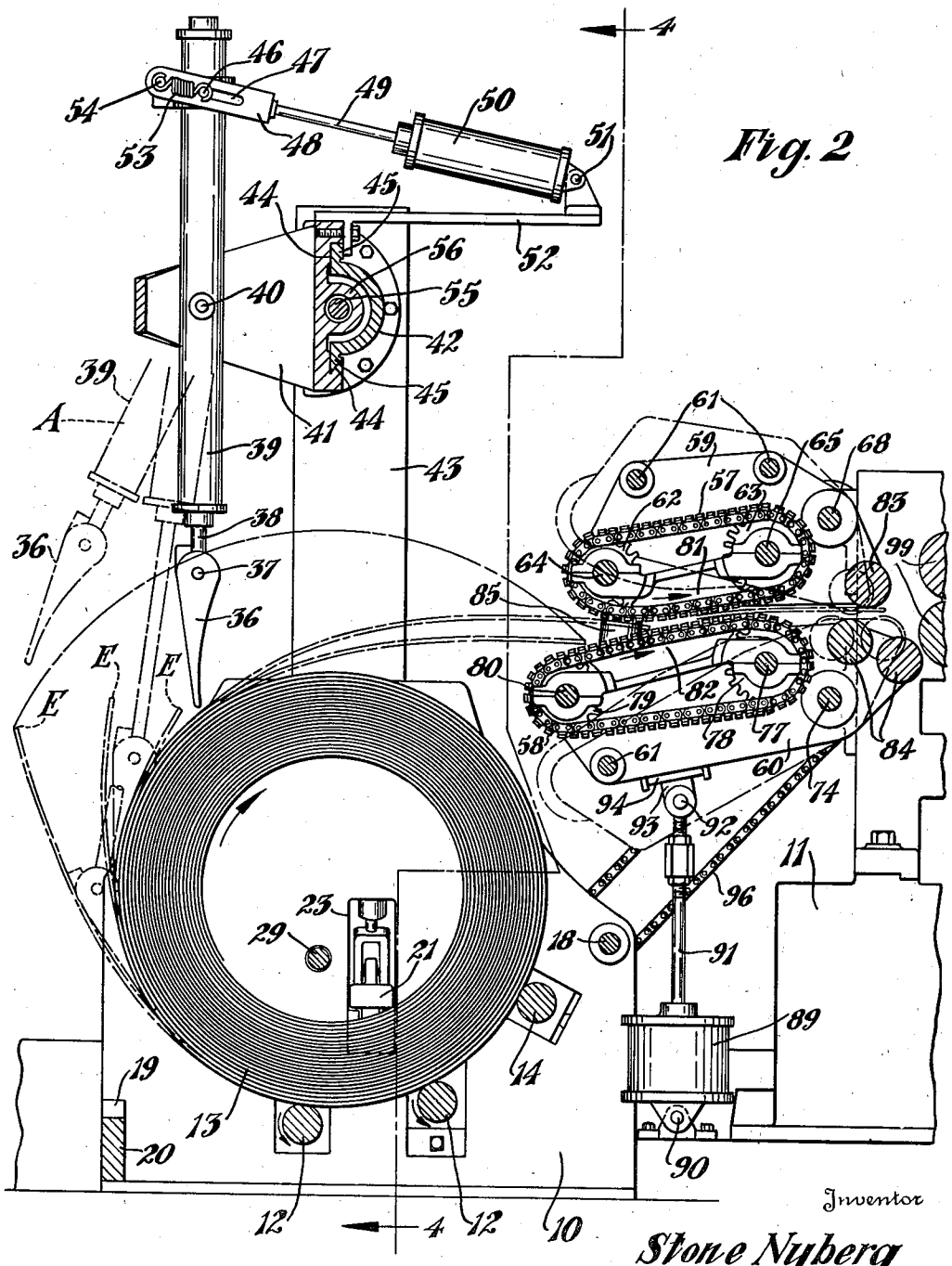


Fig. 2

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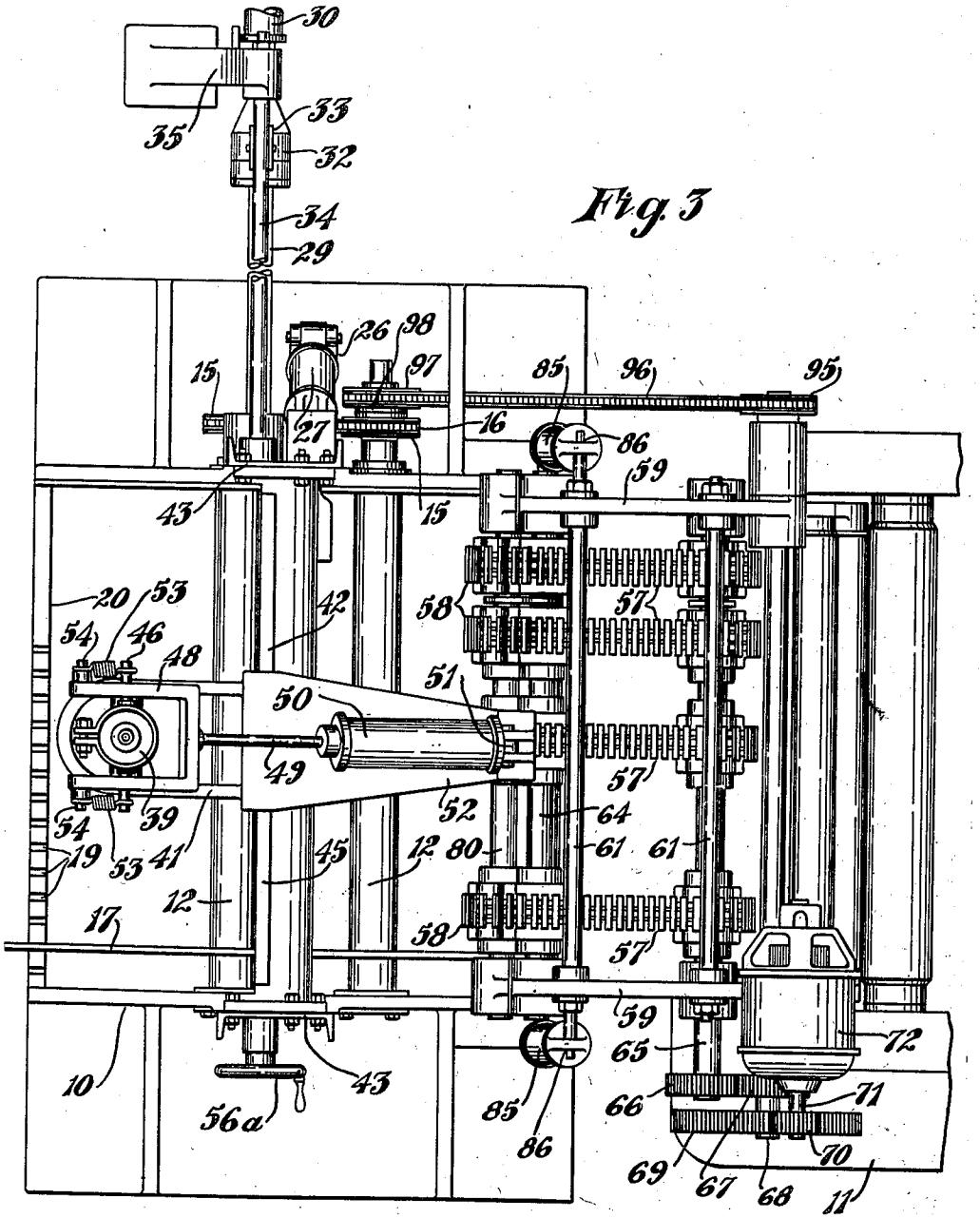
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Dec. 16, 1941. S. NYBERG 2,266,067

COIL FEEDING APPARATUS

Filed April 29, 1939 4 Sheets-Sheet 3

Fig. 3



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COIL FEEDING APPARATUS

Filed April 29, 1939 4 Sheets-Sheet 4

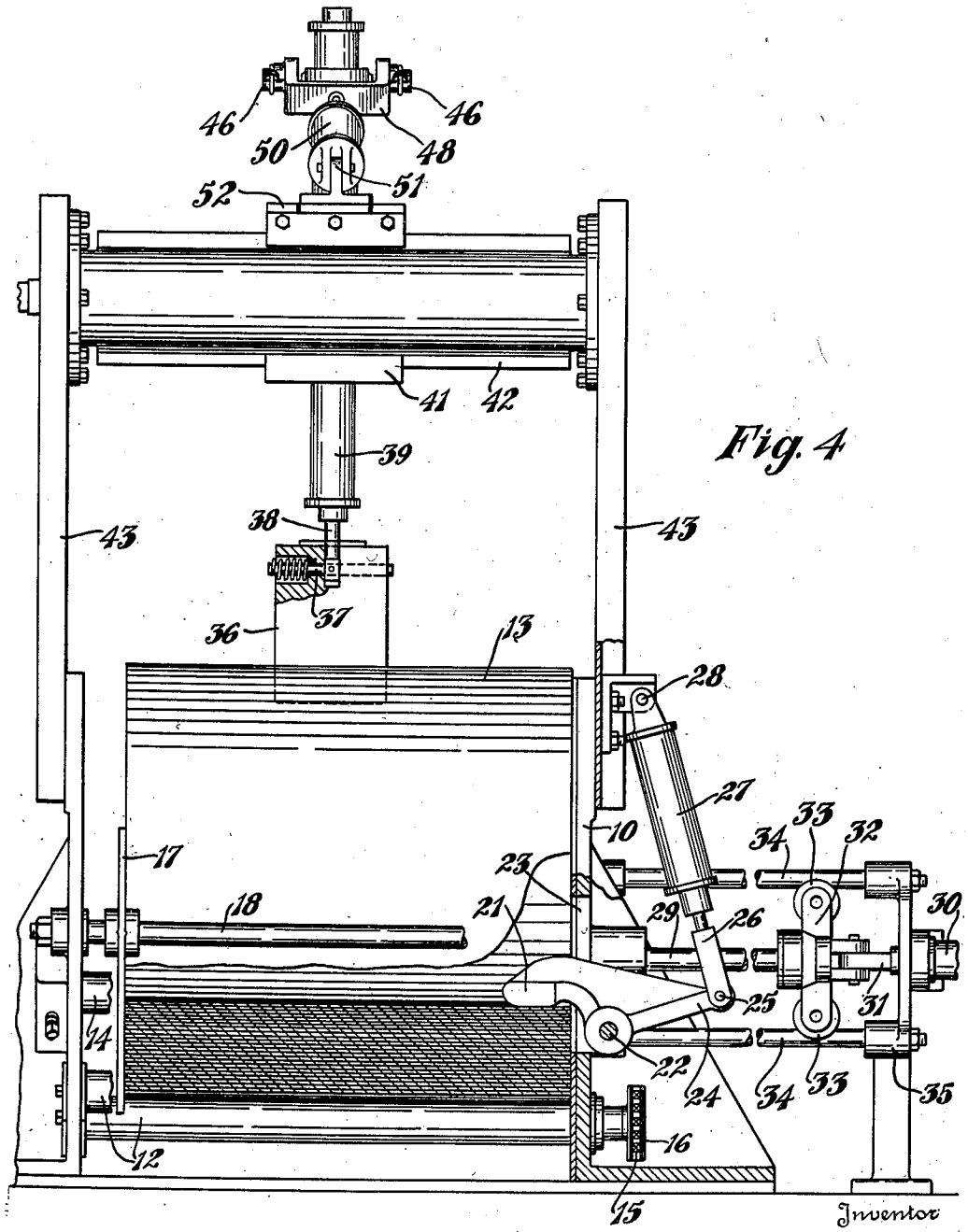


Fig. 4

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UNITED STATES PATENT OFFICE

2,266,067

COIL FEEDING APPARATUS

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Application April 29, 1939, Serial No. 270,732

3 Claims. (Cl. 242—78)

The invention relates to mechanism for opening the outer end of a coil of metal and feeding the same to a recoiler, and is more specifically concerned with mechanism for feeding a coil of hot rolled strip steel to a recoiler such as disclosed in Greer application Serial No. 230,304 filed September 16, 1938 and Greer Patent No. 2,191,463, dated February 27, 1940, for loosely recoiling the coil so that it may be passed through a pickling machine of the general type disclosed in Greer Patent No. 2,091,921 dated August 31, 1931 and Greer Patent No. 2,196,210, dated April 9, 1940.

Difficulty has been experienced in starting the outer end of a hot rolled coil into recoilers of the general character above referred to, the outer end of the hot rolled coil being loosened or opened up and fed to the recoiler by hand.

The object of the present improvement is to provide a mechanism which will automatically feed the outer end of the coil through a set of leveling or breaker rolls to the recoiler.

Another object is to provide two sets of cooperating guide chains for guiding the outer end of the coil to the recoiler mechanism.

A further object is to provide means for adjusting the position of said guide chains to accommodate coils of different diameters.

A still further object is to provide means for moving the guide chains to open or inoperative position and simultaneously moving the leveling or breaker rolls to operative position when the outer end of the coil has been received in the pinch of the feed rolls of the recoiler mechanism.

Another object of the invention is to provide means for rotating the coil after the outer end has been loosened or opened up so as to feed said outer end of the coil into the guide chains.

The above objects together with others which will be apparent from the drawings and following description or which may be later referred to may be attained by constructing the improved coil opener and feeder in the manner illustrated in the accompanying drawings in which

Figure 1 is a side elevation of the coil opener and feeder to which the invention pertains;

Fig. 2, a vertical longitudinal section through the same;

Fig. 3, a top view of the machine; and

Fig. 4, a transverse sectional view taken as on the line 4—4, Fig. 2.

Similar numerals refer to similar parts throughout the several views.

The coil opening apparatus is mounted in a housing indicated generally at 10 and the feeding or guiding mechanism may be carried upon a housing 11 located adjacent thereto.

The present application is directed to the coil feeding apparatus, and while no claim is made herein to the coil opening apparatus which forms the subject matter of a divisional application, Serial No. 371,876, filed December 27, 1940, this coil opening mechanism is illustrated in the accompanying drawings and hereinafter described for the purpose of showing the relation of the two devices as in actual use.

A spaced pair of rolls 12 located in the lower portion of the housing 10 supports the coil 13 to be opened and means is provided as will be later described for rotating these rolls so as to project the opened outer end of the coil into the feeding and guiding mechanism.

A roll 14 is preferably provided in the housing 10 at a point spaced above the rolls 12 and adapted to engage the forward side of the coil 13 so as to hold the coil positioned upon the rolls 12 while the coil is being unwound.

A sprocket wheel 15 is fixed upon one end of each roll 12 and sprocket chain 16 is located around said sprocket wheels to drive both rolls 12 in the same direction and at the same speed. As will be later described means is provided for driving one of the rolls 12 in the desired direction so that the rotation is transmitted to the other roll by the sprocket gearing 15—16.

For the purpose of accommodating coils of various widths, an adjustable plate 17 may be slidably mounted at one end upon the tie rod 18 which is located transversely through the forward side of the housing 10.

The opposite end portion of the plate 17 is adapted to selectively engage any desired notch 19 in the plate 20 located transversely across the rear side of the housing.

In order to hold the coil rigidly against movement during the opening operation, a clamp is provided comprising the clamping jaw 21 fulcrumed as at 22 at one side of the housing 10 and extending through a slot 23 in the adjacent side of the housing, a lever arm 24 extending outwardly from the fulcrum and being pivotally connected as at 25 to the piston rod 26 of a fluid operated cylinder 27 which is hingedly mounted as at 28 upon the adjacent side of the housing 10.

The cylinder 27 may be operated to withdraw the clamping jaw 21 outwardly through the opening 23 in order to place a new coil within the housing 10 after which the cylinder is operated to the position shown in Fig. 4 pressing the clamp-

ing jaw 21 tightly upon the lower portion of the coil to hold the same against movement on the rolls 12.

A rod 29 is slidable transversely through the housing 10 for the purpose of preventing the coil from lifting out of the housing during the feeding operation when the coil has been unwound to such a point that the weight of the coil will not hold it upon the rolls 12.

This rod may be operated by a fluid cylinder 30 to the piston rod 31 of which is connected the carriage 32 fixed to the outer end of the rod 29, said carriage being provided with rollers 33 rolling upon the guide rods 34 which extend outwardly from the adjacent side of the housing 10 and may be supported at their outer ends as by the bracket 35.

The spud 36 for opening the outer end of the coil may be pivotally mounted as at 37 upon the lower end of the piston rod 38 of an upright fluid cylinder 39 which may be pivotally mounted intermediate its ends as indicated at 40, within a bifurcated bracket 41 slidably mounted upon the guide plate 42 which is transversely located relative to the housing 10 and connected to the upper ends of the uprights 43 of said housing.

The bracket 41 has guide-ways 44 slidably mounted on the guide ribs 45 formed upon the guide plate 42.

The upper end of the fluid cylinder 39 is provided with the diametrically opposed studs 46 slidably mounted in the slots 47 of the bifurcated head 48 carried by the end of the piston 49 of the fluid cylinder 50 which is pivotally connected as at 51 to the arm 52 carried by the bracket 41.

Springs 53 are connected at opposite ends to the studs 46 and to pins 54 at the forward end of the bifurcated head 48 so as to normally urge the fluid cylinder 39 toward the position shown in full lines in Figs. 1 and 2.

A screw shaft 55 is journaled in the uprights 43 adjacent to the guide plate 42 and the internally threaded boss 56 of the bracket 41 is mounted upon said screw shaft, a hand wheel 56a being fixed upon one end of the screw shaft for adjusting the position of the fluid cylinder 39 and spud 36 transversely relative to the housing 10.

The feeding and guiding mechanism includes two cooperating sets of endless chains 57 and 58 carried by the upper and lower spaced pairs of plates 59 and 60, respectively, said plates being tied together as by the tie bars 61.

The upper chains 57 are located around sprockets 62 and 63 mounted upon the spaced shafts 64 and 65, respectively, journaled in the upper plates 59.

A pinion 66 is fixed upon end of the shaft 65 and meshes with a pinion 67 fixed upon the shaft 68 upon which the upper pair of plates 59 are journaled.

A gear wheel 69 is fixed upon the shaft 68 and meshes with a pinion 70 upon the shaft 71 of the motor 72 which is provided for driving the chains 57 and 58 as well as the rolls 12 in a manner to be later described.

A gear 73 of the same size and pitch as the gear 69 is fixed upon the shaft 74, upon which the lower plates 60 are journaled, said gear meshing with the gear 69.

A pinion 75 is fixed upon the shaft 74 and meshes with a pinion 76 fixed upon the shaft 77. The lower chains 58 are located around sprocket wheels 78 and 79 upon the shafts 77 and 80, respectively.

Guides 81 may be supported by the shafts 64 and 65 for guiding the lower strands of the upper chains 57 and similar guides 82 may be supported upon the shafts 77 and 80 for guiding the upper strands of the lower chains 58.

A leveling or breaker roll 83 is journaled in the rear end portions of the upper plates 59 and a pair of similar rolls 84 are journaled in the rear portions of the lower plates 60 and adapted to cooperate with the upper roll 83 in a manner to be later described.

The upper and lower plates 59 and 60 with the chains and rolls carried thereby may be adjusted relative to each other by means of a fluid cylinder 85 which may be pivotally connected to one plate as indicated at 86, the piston rods 87 thereof being pivotally connected to the adjacent plate as at 88.

By operating the fluid cylinders 85 it will thus be seen that the upper and lower units of the feeding and guiding mechanism may be swung from the full line positions of Figs. 1 and 2 to the broken line position of Fig. 2, at which time the upper and lower sets of chains will be moved out of the path of the strip being uncoiled while the leveling rolls 83 and 84 will be moved into operative position relative to each other.

For the purpose of adjusting the entire feeding and guiding mechanism as a unit, in order to raise or lower the intake end thereof to accommodate coils of different diameters, a fluid cylinder 89 is provided. This cylinder may be pivotally mounted as at 90 upon the floor or other stationary support, and the piston rod 91 thereof is pivotally connected as at 92 to a bracket 93 mounted upon a cross bar 94 connected to the lower edges of the lower plates 60.

It will be seen that the upper and lower units of the feeding and guiding mechanism being pivotally mounted upon the shafts 68 and 74, respectively, at their rear ends and being connected together at their forward ends by the fluid cylinder 85 and piston 87, they may be swung upward or downward as a unit by operation of the fluid cylinder 89.

A sprocket wheel 95 is fixed upon the shaft 74 and connected by a sprocket chain 96 with a sprocket wheel 97 fixed upon one of the rolls 12 and a clutch as indicated at 98 may be provided for operatively connecting the sprocket wheel 97 to said roll.

In the operation of the improved machine to open the outer end of a coil and feed the same to the recoiling machine, a hot rolled coil as indicated at 13 is placed upon the rolls 12 and the clutch 98 is thrown in to rotate the rolls until the coil assumes the position shown in Fig. 2 with the outer end E thereof located as shown in said figure directly below the normal or inoperative position of the spud 36.

The clutch is thrown out when the coil reaches this position and the fluid cylinder 27 is operated to move the clamping jaw 21 down into clamping position upon the lower portion of the coil clamping the same against movement on the rolls 12.

It will be understood that the fluid cylinder 50 may be operated to swing the cylinder 39 and spud 36 to the broken line position shown at A in Fig. 2 in order to facilitate the placing of a coil upon the rolls 12.

With the cylinder 39 in the full line position shown in Fig. 2 the same is operated to force the spud 36 downward beneath the outer end E of the coil, loosening said outer end and bending it outward from the coil through the several broken

line positions indicated upon Fig. 2, the spud pivotally moving upon the piston rod 38 to accommodate itself to the outward movement of the end of the coil.

The spud is then withdrawn to the full line position of Fig. 2, the cylinder 27 is operated to release the clamping jaw 21, and the clutch 98 is thrown in so as to rotate the rolls in the direction of the arrows shown in Fig. 2, rotating the coil clockwise as viewed in said figure.

The upper and lower sets of chains 57 and 58, respectively, of the feeding and guiding mechanism will have been previously moved to closed position, as shown in Fig. 2, by operation of the fluid cylinder 85, and will have been adjusted to the proper height to accommodate the size of coil to be worked on, by operation of the fluid cylinder 89.

The cylinder 27 will be operated to withdraw the clamping jaw 21 and the cylinder 30 will be operated to project the rod 29 through the open interior of the coil.

The feeding and guiding chains 57 and 58 will be moved in the direction of the arrows shown in Fig. 2 by operation of the motor and when the clutch 98 is thrown in, the rolls 12 will be rotated in the direction of the arrows shown in said figure, through the chains 96 and 16 rotating the coil clockwise as viewed in said figure and projecting the loosened outer end E thereof onto the lower chains 58 and then between the upper and lower chains flattening down the end of the coil.

The fluid cylinder 85 may then be operated to open the chains 57 and 58, moving them to the broken line positions shown in Fig. 2, at which time the leveling rolls 83 and 84 are brought into operative position to level the strip as it is passed through the same to the feed rolls 99 of the recoiling machine.

As the rolls 12 continue to rotate, the coil will be unwound and fed through the leveling rolls 83 and 84 and into the recoiling machine.

When the coil is nearly unwound and becomes so light in weight that its own weight will not hold it down upon the rolls 12, the rod 29 will prevent the coil from lifting out of the housing 10 as the remainder thereof is fed into the recoiler.

I claim:

1. Coil feeding apparatus including rolls for supporting a coil, upper and lower pivoted plates located adjacent to the coil, cooperating, endless chains carried by said plates at one side of the pivotal points of the plates, cooperating leveling rolls carried by said plates on the other side of said pivotal points, means for swinging said plates in opposite directions upon their pivotal points to move either the chains or leveling rolls into operative position, means for operating said chains and means for rotating said coil supporting rolls to rotate the coil and feed the outer end of the coil between the chains and leveling rolls so as to unwind the coil.

2. Coil feeding apparatus including rolls for supporting a coil, cooperating, endless chains carried by said plates at one side of the pivotal points of the plates, cooperating leveling rolls carried by said plates on the other side of said pivotal points, means for swinging said plates in opposite directions upon their pivotal points to move either the chains or leveling rolls into operative position, means for adjusting the upper and lower plates in unison upon their pivotal points, means for operating said chains and means for rotating said coil supporting rolls to rotate the coil and feed the outer end of the coil between the chains and leveling rolls so as to unwind the coil.

3. Coil feeding apparatus including a housing, rolls mounted in the housing for supporting a coil parallel to the rolls, spaced upper and lower pairs of plates pivotally mounted in the housing adjacent to the coil, a spaced pair of pivots journaled in each pair of plates, at one side of the pivotal points of the plates, a plurality of endless chains carried by each pair of pivots, means for driving said endless chains in unison, cooperating leveling rolls carried by said plates on the other side of said pivotal points, a fluid cylinder pivotally connected to one pair of plates, and a piston in said cylinder pivotally connected to the other pair of plates for swinging said plates in opposite directions upon the pivotal points to move either the endless chains or leveling rolls into operative position.

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