Jan. 2, 1940. H. H. TALBOT 2,185,360

COIL STRIPPER

Filed April 29, 1936 5 Sheets-Sheet 1

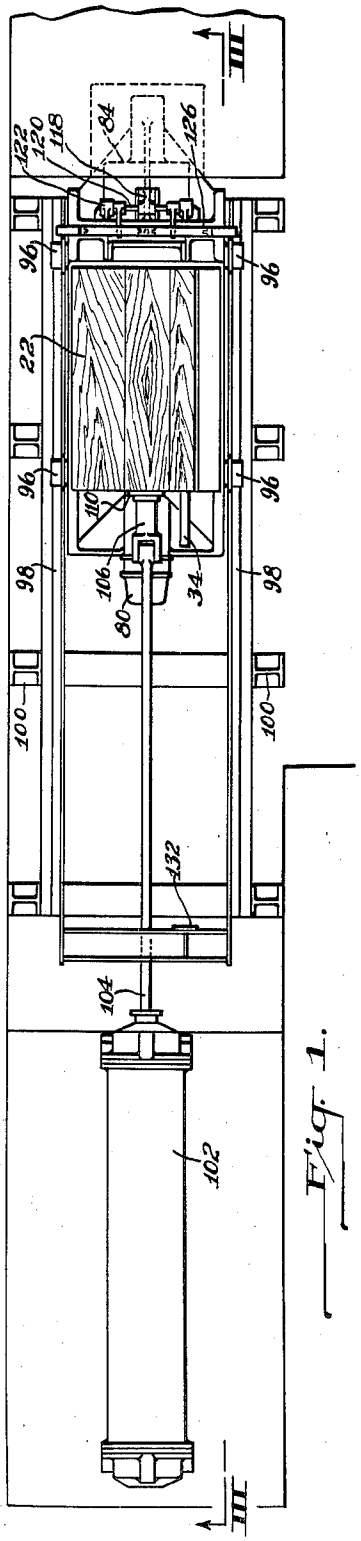


Fig. 1.

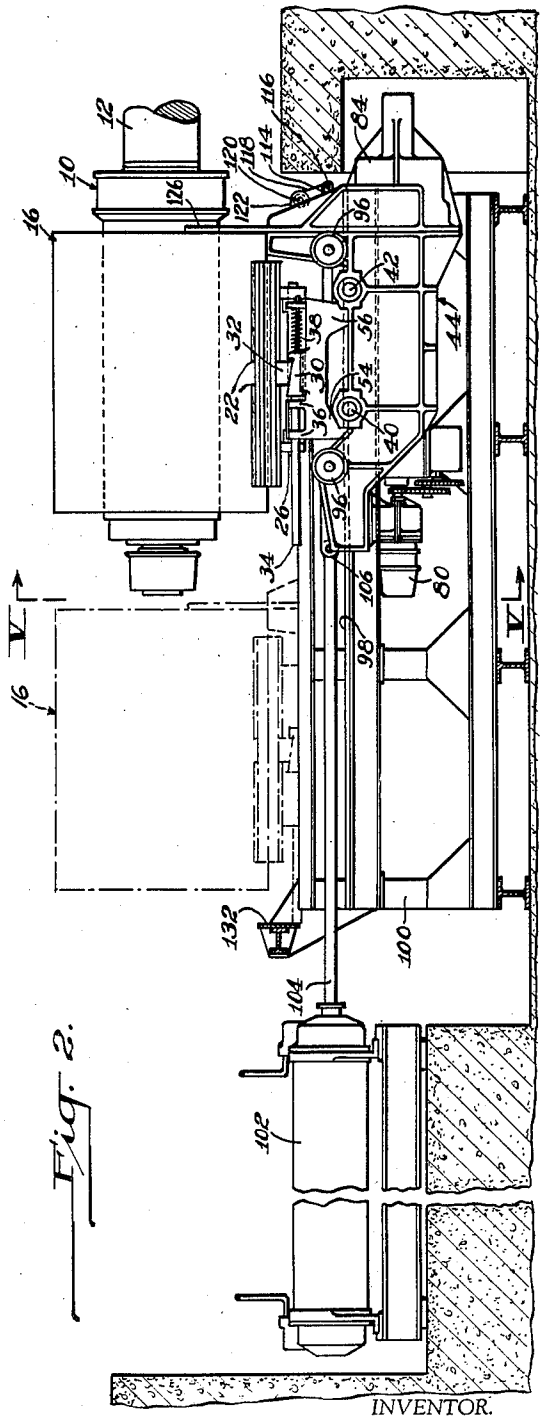


Fig. 2.

INVENTOR.
Howard H. Talbot

BY
Brown, Critchlow & Flick
his ATTORNEYS.

Jan. 2, 1940. H. H. TALBOT 2,185,360

COIL STRIPPER

Filed April 29, 1936 5 Sheets-Sheet 2

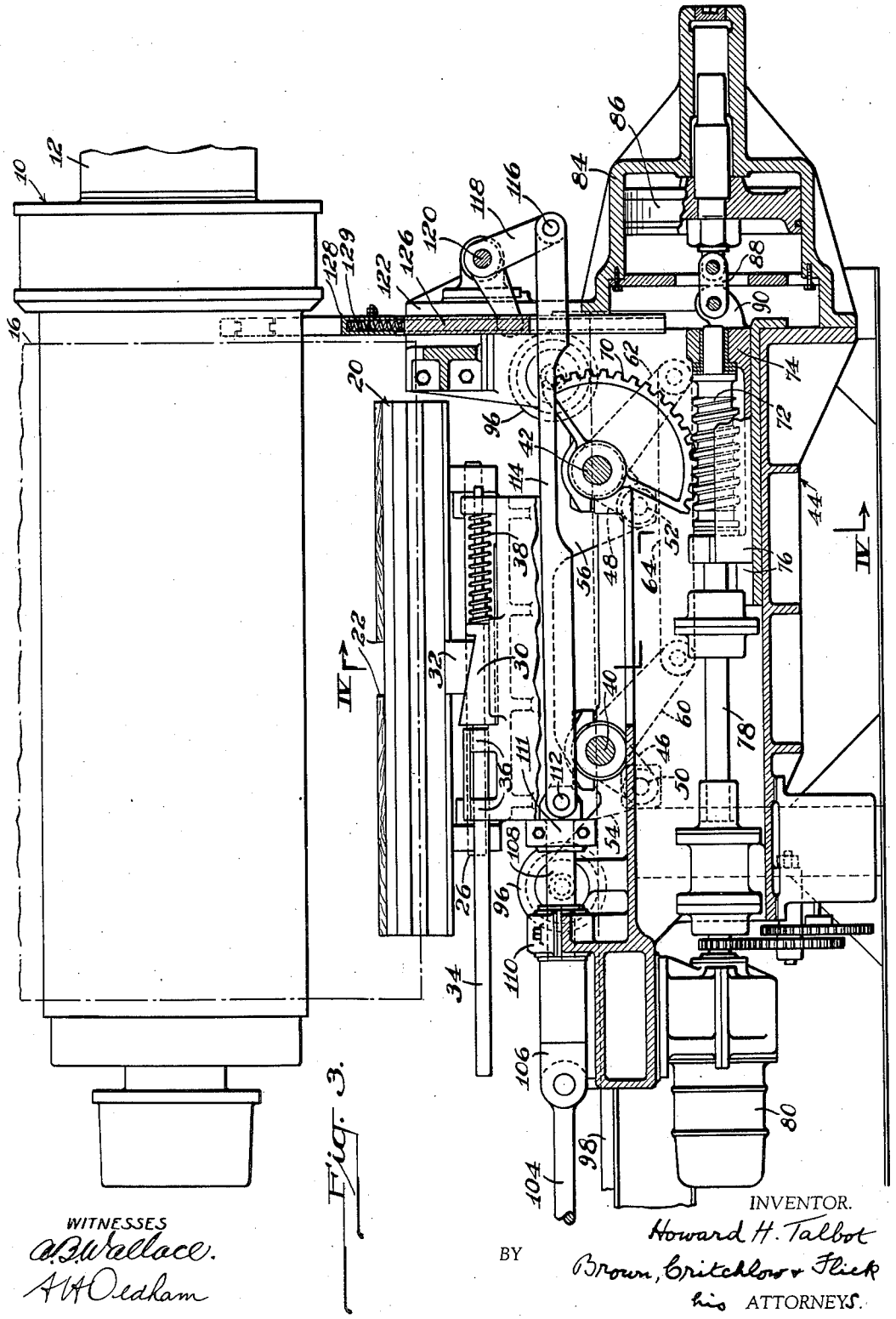


Fig. 3.

WITNESSES
A. B. Wallace.
A. H. Oldham

INVENTOR.
Howard H. Talbot
BY
Brown, Critchlow & Flick
his ATTORNEYS.

Jan. 2, 1940. H. H. TALBOT 2,185,360

COIL STRIPPER

Filed April 29, 1936 5 Sheets-Sheet 3

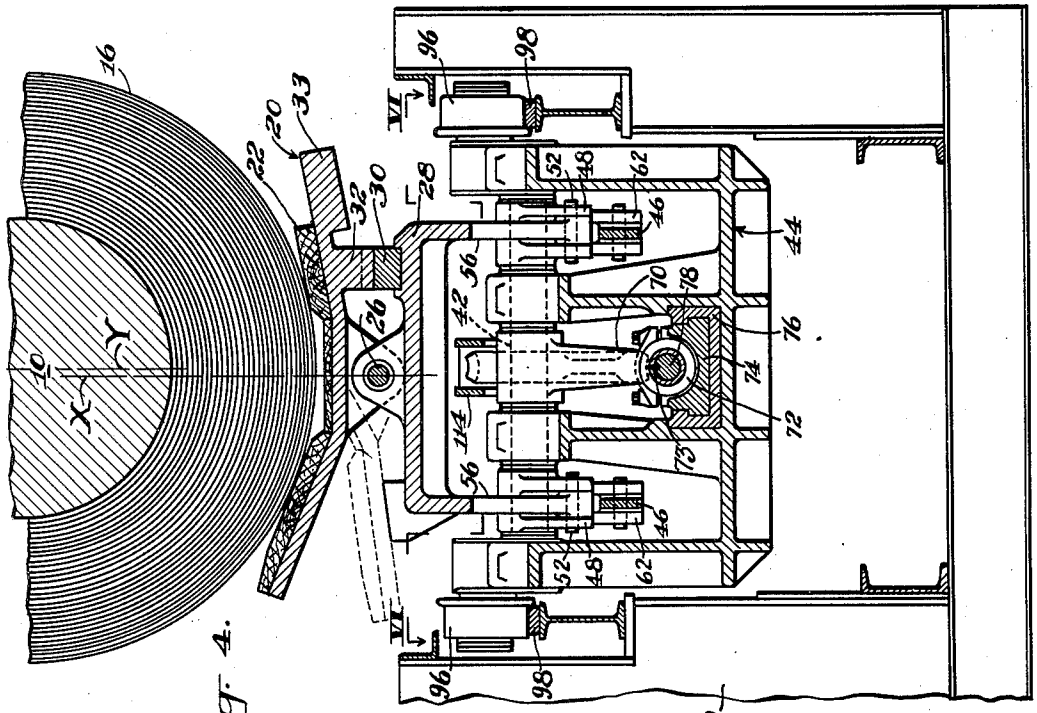


Fig. 4.

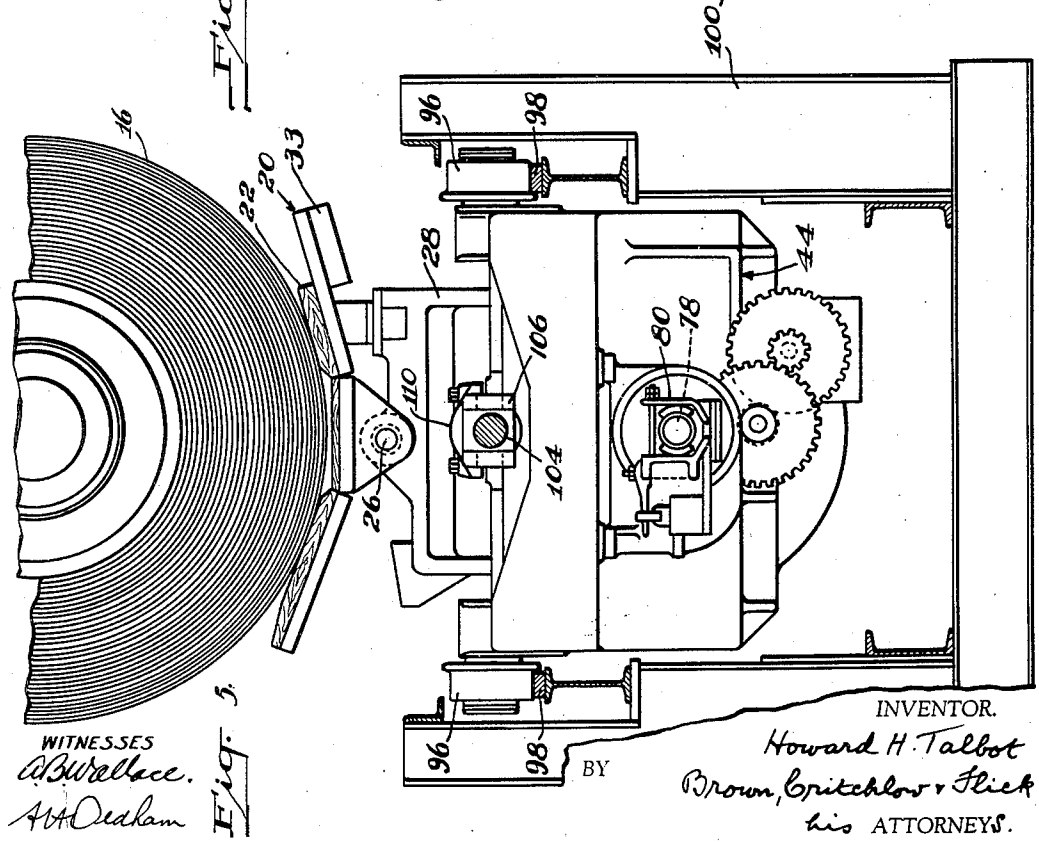


Fig. 5.

WITNESSES
A. B. Wallace.
H. A. Dealam

INVENTOR.
Howard H. Talbot
BY
Brown, Critchlow & Flick
his ATTORNEYS.

Jan. 2, 1940. H. H. TALBOT 2,185,360

COIL STRIPPER

Filed April 29, 1936 5 Sheets-Sheet 4

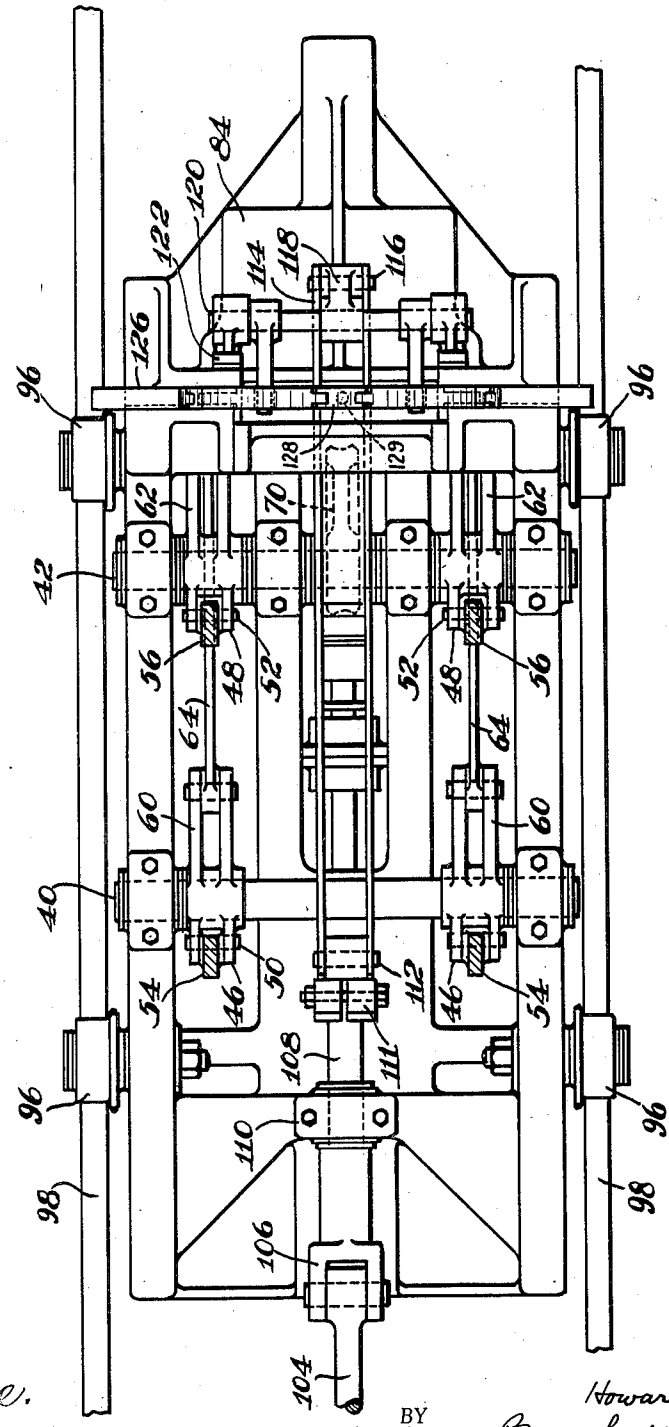


Fig. 6.

WITNESSES
A. B. Wallace.
A. A. Oldham

BY

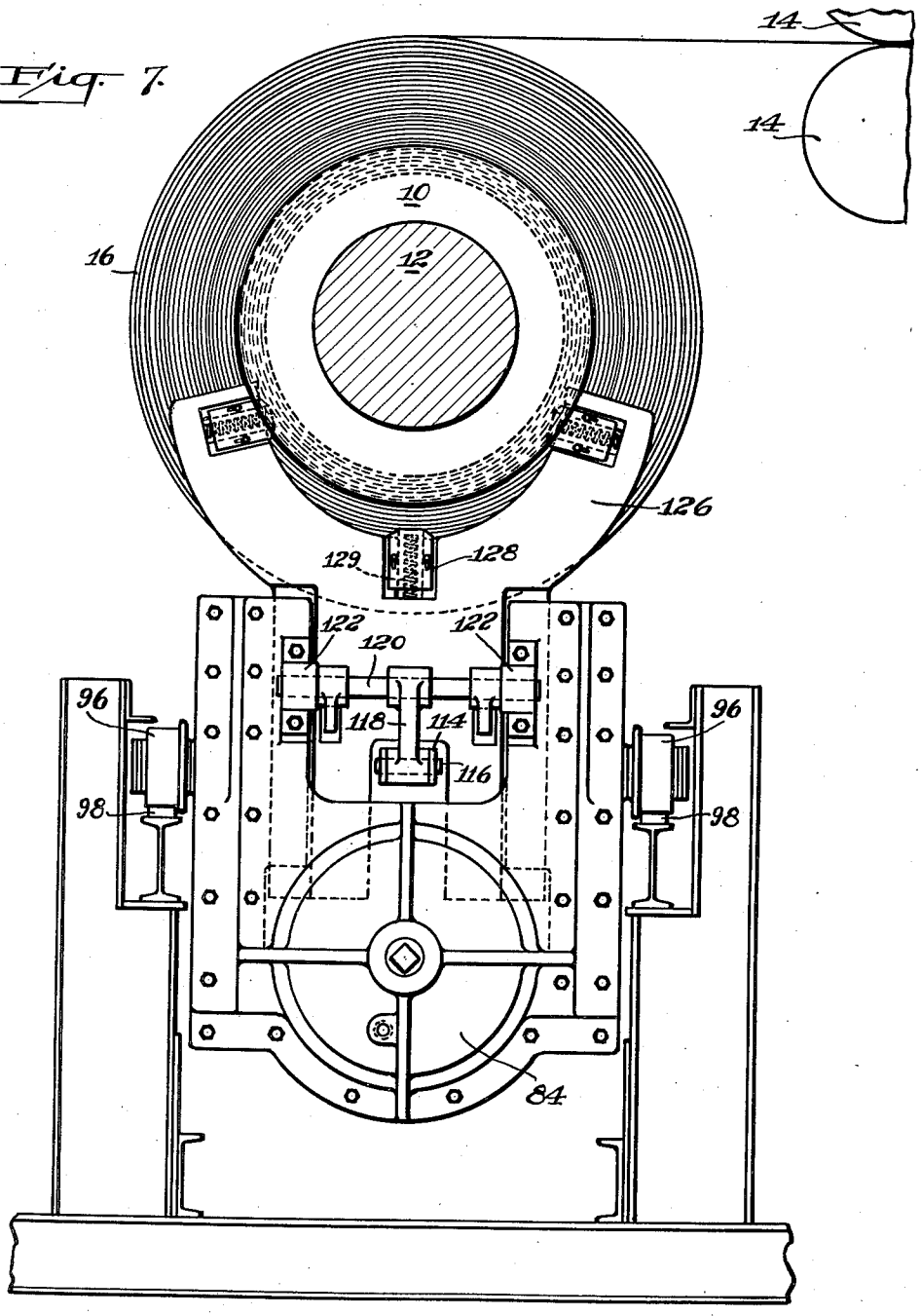
INVENTOR.
Howard H. Talbot
Brown, Critchlow & Flick
his ATTORNEYS.

Jan. 2, 1940. H. H. TALBOT 2,185,360

COIL STRIPPER

Filed April 29, 1936 5 Sheets-Sheet 5

Fig. 7.



WITNESSES
A. B. Wallace
A. H. Oldham

BY

INVENTOR.
Howard H. Talbot
Brown, Critchlow & Flick
his ATTORNEYS.

Patented Jan. 2, 1940

2,185,360

UNITED STATES PATENT OFFICE

2,185,360

COIL STRIPPER

Howard H. Talbot, Pittsburgh, Pa., assignor to United Engineering & Foundry Company, Pittsburgh, Pa., a corporation of Pennsylvania

Application April 29, 1936, Serial No. 76,963

17 Claims. (Cl. 242—81)

This invention relates to apparatus for handling metal and the like and more particularly is concerned with mechanism for removing or stripping a coil of metal from a winding reel.

In the manufacture of metal strip it is the usual practice to coil the strip on a reel or drum as it comes from the mill. The reel may be driven to provide some tension on the strip and is made collapsible so that the coiled strip metal may be removed from the reel after a coil of desired size has been wound thereon. Heretofore apparatus for removing or stripping the coiled metal from the reel has been provided, but its construction, maintenance and operation has been open to certain difficulties and objections. Among others, known apparatus is not readily adapted to handle coils of varying widths, weights and diameters in a commercially satisfactory manner. Again, the considerable weight of most of the coils handled has necessitated relatively heavy apparatus which in many instances is cumbersome to operate and expensive to build and keep operating.

Certain mechanisms formerly provided for stripping coils of metal from collapsible reels have not been capable of removing the coils and depositing them upon a run-out conveyor or transporting truck. In others the operation of the apparatus has not been sufficiently automatic to adapt it to commercial production requirements.

It is the general object of the invention to avoid and overcome the foregoing and other difficulties of and objections to known coil-handling apparatus by the provision of improved mechanism of this character which is of relatively simple, rugged construction adapted to handle coils of metal and the like of widely varying weights and sizes in a substantial automatic manner from the time the mechanism strips the coil from its support to when the coil is deposited on conveyor or other means as desired.

The foregoing and other objects of the invention are achieved by the provision of apparatus including a coil-receiving saddle, and mechanism mounting the saddle for movement to a position away from or below a reel. Means are incorporated in the apparatus for adjusting the initial position of the saddle vertically with associated means for raising the saddle vertically to pick up a coil from the reel. The relative position of the saddle-mounting mechanism and the reel is controlled by suitable means which actuate a yoke or fingers adapted to engage behind the coil during the removing operation. Generally incorporated in the apparatus are means for tilting the saddle to discharge the coil once it has been removed from the reel and carried to the desired position.

In the drawings, Fig. 1 is a plan view of one embodiment of coil-handling apparatus embodying the principles of the invention; Fig. 2 is a side elevation of the apparatus illustrated in Fig. 1; Fig. 3 is a vertical cross-sectional view taken on line III—III of Fig. 1 but on a larger scale and illustrates details of the saddle-mounting mechanism; Fig. 4 is a vertical transverse cross-sectional view taken on line IV—IV of Fig. 3; Fig. 5 is an end view of the apparatus of Figs. 1 and 2 and for the purpose of clarifying the direction of the view Fig. 2 has been marked with the section line V—V which indicates the end of the apparatus illustrated; Fig. 6 is a plan view of the saddle-mounting mechanism with the saddle and its supporting table removed, this view being taken substantially on line VI—VI of Fig. 4; and Fig. 7 is a view of the other end of the apparatus than that illustrated in Fig. 5 and shows the construction and mode of operation of the coil-contacting yoke or fingers.

While the principles of the invention are broadly applicable to the handling of various kinds, weights and sizes of material, they are particularly beneficial when applied to apparatus for stripping and handling relatively heavy coils of strip metal. Accordingly the invention has been illustrated and will be described with respect to apparatus of the specified character.

Referring to Figs. 1, 2 and 7 of the drawings, the numeral 10 indicates generally a collapsible winding reel of any known type driven by a shaft 12 and positioned in alignment with guiding or mill rolls shown generally at 14. The handling apparatus of the present invention is positioned below the reel 10 and is adapted to move a coil 16 of strip metal from the full-line position shown in Fig. 2 to the dotted-line position of the same figure to thereby strip the coil from the reel and to discharge coil from the handling apparatus as hereafter more fully described.

Considering specifically the construction of the handling apparatus, reference should be had to Figs. 3, 4 and 5 wherein the numeral 20 indicates a saddle adapted to receive the coil 16. The upper surface of the saddle 20 is curved to fit the coil and suitable cushioning blocks 22 of wood or like material are generally secured to the saddle. The saddle 20 is pivotally secured by a pin 26 to the top of a table 28 to thereby provide a substantially balanced support for the saddle. However, as best seen in Fig. 4, a vertical plane x passing through the pivot pin 26 lies a short distance to one side of a vertical plane y passing through the axis of the reel 10.

In order to prevent the saddle 20 from tilting about the pivot pin 26 a wedge block 30 slidably carried upon the table 28 is positioned between the table and saddle with a complementary wedge element 32 secured to the saddle. A weight 33 on the saddle holds the wedge element and block

in engagement. Fastened to the wedge block 30 is a trip rod 34 slidably carried in bearings 36 so that relative movement of the blocks 30 and element 32 causes a tilting or rocking movement of the saddle 20. The trip rod 34 and the wedge block 30 are normally held by a spring 38 in a retarded position so that the saddle 20 is very firmly supported on the table 28 against rocking movement.

The table 28 is adjustable to an initial vertical position and likewise is adapted to be moved vertically so as to move the saddle 20 up against the coil 16 to pick up and support the weight thereof during the stripping operation. Means to achieve the desired end preferably include a pair of shafts 40 and 42 journaled in a carriage indicated generally by the numeral 44. Secured to the shafts 40 and 42 at axially spaced positions thereon are respectively a pair of arms 46 and a pair of arms 48 which are pivotally secured by pins 50 and 52 to downwardly extending lugs 54 and 56 formed integrally with the table 28. The rotation of the shafts 40 and 42 is linked together so that they move in unison for purposes that will become evident as the description proceeds. Means for achieving the coordination of the shafts 40 and 42 may comprise levers 60 and 62 pivotally connected at their ends by links 64.

Rotation of the shafts 40 and 42 to control the vertical position of the saddle 20 is provided for by securing a worm-gear 70 to the shaft 42, and in the preferred practice of the invention the gear 70 is made segmental in form. Cooperating with the worm-gear 70 is a worm 72 which is journaled in a block 74 slidably mounted in guideways 76 mounted in the carriage 44. A shaft 78 connects a motor 80 with the worm 72 so that operation of the motor revolves the worm 72 and thereby turns worm-gear 70 to turn shafts 40 and 42 and thus initially adjust the vertical position of saddle 20.

Incorporated or associated with the means for initially adjusting the vertical height of the saddle 20 are means for positively moving the saddle vertically to pick up the coil 16 from the collapsible reel 10. As best shown in Fig. 3 of the drawings, these means include a housing 84 secured to the carriage 44 and carrying a fluid-pressure motor 86 connected by linkage 88 to a lug 90 integral with or secured to the block 74. Thus operation of the fluid-pressure motor 86 operates the worm 72 as a rack to move the saddle 20 vertically through the connecting linkage heretofore described. The reciprocating movement of the block 74 and the worm 70 is permissible since the shaft 78 leading to the worm is suitably splined therewith, as by a spline 73, to provide for the said movement. It will accordingly be recognized that the means for vertically moving the saddle 20 to pick up the coil 16 is correlated with the means for adjusting the initial vertical position of the saddle 20.

The carriage 44 is adapted to have movement from a position immediately below the reel 10 to a position remote therefrom in order to transfer the coil 16 from the reel to the point desired. The carriage is mounted for such movement through the provision of wheels 96 which are received on rails 98 fixed to a suitable foundation 100. As best shown in Figs. 1 and 2, the position of the carriage 44 in the foundation 100 and relative to the reel 10 is controlled by a fluid-pressure motor 102 connected by a piston rod 104 to an eye 106 mounted on the carriage. The eye 106 is fastened on the end of a shaft 108 slidably received in a bearing 110 in the carriage 44 and the extent of sliding movement of the shaft 108 in the bearing is determined by an adjustable collar 111. The end of the shaft 108 remote from the eye 106 is pivotally connected as at 112 with a link 114 connected pivotally at 116 to a bell-crank 118 rotatably carried on a pin 120 supported by a bracket 122 secured to the carriage 44. The arm of the bell-crank 118 remote from the link 114 is received in an aperture formed in a vertically movable yoke finger 126. As shown in Fig. 7, the yoke 126 carries a plurality of spaced contact shoes 128 which are adjustably mounted in the opening of the yoke so that the limit of the upward vertical movement of the yoke may, if desired, be determined by the shoes 128 engaging with the surface of the reel 10. In the usual practice of the invention the shoes 128 are carried for radial movement in slideways and are held at the outer limit thereof by resilient means, such as springs 129.

The movement of the carriage 44 and its associated saddle 20 away from beneath the reel 10 accordingly occurs when the fluid-pressure motor 102 is energized to pull in the piston rod 104 which through eye 106, shaft 108, and linkage 114 and bell crank 118 initially acts to move the yoke 126 vertically so that it is positioned behind the coil 16 and engages with the end of the coil to assist the saddle 20 in stripping coil from the reel. Continued movement of the piston rod 104 inwardly of the fluid-pressure motor 102 causes the collar 111 to engage with the bearing 110 so that the entire carriage 44 and saddle 20 are moved from the full-line to the dotted-line position shown in Fig. 2. As the base and saddle reach the dotted-line position the trip rod 34 positioning the wedge block 30 engages a stop 132 carried by the foundation 100. Continued movement of the base causes the wedge block 30 to be forced below the wedge element 32 carried by the saddle 20 and against the action of spring 38 to thereby tilt the saddle 20 from the full to the dotted line position of Fig. 4 whereby the coil is discharged from the saddle 20 onto a conveyor, a table, a truck, or other desired means.

It is believed that the operation of the apparatus will be understood from the foregoing description of the arrangement of parts. Suffice it to say that in the operation of the coil-handling apparatus herein described and illustrated when a coil 16 has been wound on reel 10 the handling apparatus is moved to a position beneath the reel and the reel is collapsed. The exact height of the coil-carrying saddle 20 is initially controlled by motor 80 operating through shaft 78 to turn worm 72, worm-gear segment 70, shafts 40 and 42, and linkage 46 and 48. If a certain size of coils is being continuously handled the initial adjustment when once set need not be altered. In all events, with the mechanism in a position so that the saddle 20 just clears the bottom of the coil 16, the fluid-pressure motor 86 is operated to move block 74 in base 44 to thereby carry worm 72 as a rack beneath the worm-gear segment 70 to raise the saddle 20 against the bottom of the coil through the linkage just described.

The metal-handling reel 10 in accordance with the customary construction is generally not adapted to collapse any appreciable extent so that a relatively short vertical movement of the saddle from its initial position is required to effect the proper lifting of the coil so that the collapsed reel

is substantially centered in the coil opening. Too small a vertical movement of the saddle makes stripping difficult or impossible since the greater weight of the coil will be carried by the top of the reel. Likewise too great a vertical movement of the coil-receiving saddle causes the bottom of the coil to engage with the reel and thereby prevents or hinders the proper stripping or removal of the coil from the reel. The saddle-moving and adjusting mechanism of the present invention is, however, particularly adapted to quick adjustment of the saddle height so that proper support during the coil-stripping operation is readily obtained.

Moreover, it is to be noted that the upward movement of the saddle 20 as effected by the rack-worm 72 and worm-gear segment 70 and the associated linkage is relatively powerful and adapted to handle great weights with ease. This is due not only to the mechanical linkage advantages but also to the fact that the levers 46 and 48 secured to the shafts 40 and 42 and pivotally connected to the lugs 54 and 56 extending downwardly from the table 28 move in an arcuate direction from substantially the lowest point of rotary movement so that movement of the levers through a relatively large angle effects little vertical movement of the table and saddle.

Once the coil 16 has been picked up by the saddle 20 in the proper fashion the fluid pressure motor 102 is energized to move the carriage 44 and its associated parts away from below the reel. The initial movement of the piston rod 104 operates through shaft 108, linkage 114 and bell-crank 118 to vertically move yoke 126 up behind the end of the coil 16 so that the resilient shoes 128 positively engage with the surface of the reel and during the stripping action prevent any telescoping of the coil as might be occasioned by the innermost convolution thereof sticking to the reel, for example in the strip-clamping jaws. Thus the proper stripping of the coil from the reel is assured. The limit of vertical movement of the yoke and the contact shoes is controlled by the collar 111 engaging with bearing 110. Further inward movement of the piston rod 104 pulls the carriage 44 and coil 16 completely from the reel into the dotted position seen in Fig. 2 at which time strip rod 34 moves wedge block 30 to tilt saddle 20 and discharge the coil 16 therefrom. Fluid motor 86 is then operated in the other direction to lower the saddle 20 and the carriage 44 is returned to its position beneath the reel 10. The apparatus is accordingly ready to handle the stripping of another coil.

From the foregoing it will be recognized that the object of the invention has been achieved by the provision of relatively simple but rugged apparatus for commercially handling and stripping metal coils and the like from reels with the apparatus being capable of handling coils of various weights and sizes. The operation of the apparatus is substantially automatic and can readily be controlled as desired by a workman with little training.

While in accordance with the patent statutes one embodiment of the invention has been illustrated and described in detail, it should be appreciated that the invention is not limited thereto or thereby, but is defined in the appended claims.

I claim:

1. Mechanism for stripping a coil of metal from a collapsible reel comprising a saddle for receiving the coil, a table pivotally supporting the saddle, a wedge positioned between the table and the saddle and normally holding the saddle level on the table, a carriage, a pair of shafts journaled in the carriage transversely of the table, depending lugs on the table, levers secured to the shafts and pivotally connected to the lugs, linkage connecting the shafts for simultaneous arcuate movement, a worm-gear secured to at least one shaft, a block slidably mounted in the carriage, a worm journaled in the block and engaging with the worm-gear, means for rotating the worm in the block to adjust the initial level of the saddle, means for moving the block relative to the carriage to raise the saddle into engagement with and to pick up the coil from the reel, means mounting the carriage for movement in a direction substantially parallel to the axis of the reel, means for moving the carriage to and from the reel, means energized by the carriage moving means and movable into engagement with the end of the coil to assist the saddle in stripping the coil from the reel, and a stop adjacent the end of travel of the base away from the reel for engagement with the wedge to thereby tilt the saddle and discharge the coil.

2. Mechanism for stripping a coil of metal from a collapsible reel comprising a saddle for receiving the coil, a table supporting the saddle, a base, a pair of shafts journaled in the base transversely of the table, depending lugs on the table, levers secured to the shafts and pivotally connected to the lugs, a worm-gear secured to at least one shaft, a block slidably carried in the base, a worm journaled in the block and engaging with the worm-gear, means for rotating the worm in the block to adjust the initial level of the saddle, means for moving the block relative to the base to raise the saddle into engagement with and to pick up the coil from the reel, means mounting the base for movement in a direction substantially parallel to the axis of the reel, means for moving the base relative to the reel, and means energized by the base-moving means and movable into engagement with the end of the coil to assist the saddle in stripping the coil from the reel.

3. Mechanism for stripping a coil of metal from a collapsible reel comprising a saddle for receiving the coil, a carriage, a pair of shafts journaled in the carriage transversely of the saddle, levers secured to the shafts and pivotally connected to the saddle, a gear secured to at least one shaft, a block slidably carried in the carriage, a rack journaled in the block and engaging with the gear, means for shifting the rack in the block to adjust the initial level of the saddle, means for moving the block relative to the carriage to raise the saddle into engagement with and to pick up the coil from the reel, means mounting the carriage for movement in a direction substantially parallel to the axis of the reel, means for moving the carriage to and from a position vertically below the reel, and means movable into engagement with the end of the coil to assist the saddle in stripping the coil from the reel.

4. Mechanism for stripping a coil of metal from a collapsible reel comprising a saddle for receiving the coil, a table pivotally supporting the saddle, a carriage, a pair of shafts journaled in the carriage transversely of the table, depending lugs on the table, levers secured to the shafts and pivotally connected to the lugs, means connecting the shafts for simultaneous rotary movement, a worm-gear secured to at least one shaft, a block slidably mounted in the carriage, a worm journaled in the block and engaging with the

worm-gear, means for rotating the worm in the block to adjust the initial level of the saddle, means for moving the block relative to the carriage to raise the saddle into engagement with and to pick up the coil from the reel, and means for effecting relative movement between the carriage and the reel axially of the reel.

5. Mechanism for stripping a coil of metal from a collapsible reel comprising a saddle for receiving the coil, a table pivotally supporting the saddle, a wedge positioned between the table and the saddle and normally holding the saddle level on the table, means to adjust the initial level of the saddle, means to raise the saddle into engagement with and to pick up the coil from the reel, means mounting the table for movement in a direction substantially parallel to the axis of the reel, means for moving the table away from the reel, and a stop adjacent the end of travel of the table away from the reel for engagement with the wedge to thereby tilt the saddle and discharge the coil.

6. Apparatus for removing a metal coil from a collapsible reel comprising a saddle, mechanism mounting the saddle for movement to a position away from or below a reel, means for adjusting the initial position of the saddle vertically, means associated with the adjusting means for raising the saddle vertically to pick up a coil, means for controlling the relative position of the saddle-mounting mechanism and the reel, means actuated by the mechanism controlling means and adapted to engage behind the coil during the removing operation, and means for tilting the saddle to discharge the coil after it has been removed from the reel.

7. Apparatus for removing a metal coil from a collapsible reel comprising a saddle, means for adjusting the initial position of the saddle vertically, means for raising the saddle vertically to pick up a coil, means for effecting relative movement between the saddle and the reel in a direction axially of the reel, means actuated by the last-named means and adapted to engage behind the coil during the removing operation, and means for tilting the saddle to discharge the coil after it has been removed from the reel.

8. Apparatus for removing a metal coil from a collapsible reel comprising a saddle, means for raising the saddle vertically to pick up a coil, means for effecting relative movement between the saddle and the reel in a direction axially of the reel, and means actuated by the last-named means and adapted to engage the reel resiliently behind the coil during the removing operation.

9. In combination with a reel for coiling strip material or the like, coil stripping apparatus comprising a yoke adapted for vertical and horizontal movement toward and away from said reel, a coil carriage adapted for horizontal movement toward and away from said reel, and a common drive for operating said yoke and said carriage.

10. In combination with a reel for coiling strip material or the like, coil stripping apparatus comprising a yoke adapted for vertical and horizontal movement toward and away from said reel, said yoke being adapted to resiliently engage said reel during its horizontal movement away from said reel, a coil carriage adapted for horizontal movement toward and away from said reel, and a common drive for operating said yoke and said carriage.

11. Apparatus for handling coils of metal strip and the like comprising a base, a pair of shafts journaled in the base, a saddle table, levers secured to the shafts and pivotally connected to the saddle table, means for effecting rocking movement of the shafts to raise the saddle table, means for angularly adjusting the shafts to provide for the desired extent of movement of the saddle table, a yoke mounted for vertically reciprocable movement in the base at one end of the saddle table, means for moving the base in a substantially horizontal plane, and means actuated by the base-moving means for raising the yoke vertically of the base.

12. Apparatus for handling coils of metal strip and the like comprising a carriage, a pair of shafts journaled in the carriage, a saddle table, levers secured to the shafts and pivotally connected to the saddle table, means for effecting rocking movement of tse shafts to raise the saddle table vertically, means for angularly adjusting the shafts to provide the desired limit of upward movement of the saddle table, a yoke mounted for vertically reciprocable movement in the carriage at one end of the saddle table, means for moving the carriage in a substantially horizontal plane, and means associated with the carriage-moving means for raising the yoke vertically of the carriage.

13. Apparatus for handling coils of metal strip and the like comprising a carriage, a pair of shafts journaled in the carriage, a saddle table, levers secured to the shafts and pivotally connected to the saddle table, means for effecting rocking movement of the shafts to raise the saddle table, a yoke mounted for vertically reciprocable movement in the carriage at one end of the saddle table, and means for moving the carriage in a substantially horizontal plane.

14. Apparatus for handling coils of metal strip and the like comprising a carriage, a pair of shafts journaled in the carriage, a coil-receiving table, levers secured to the shafts and pivotally connected to the table, means for effecting rocking movement of the shafts to raise the table, means for angularly adjusting the shafts to adjustably limit the extent of upward movement of the table, and means for moving the carriage in a substantially horizontal plane.

15. Apparatus for handling coils of metal strip and the like comprising a carriage, a pair of shafts journaled in the carriage, a coil-receiving table, levers secured to the shafts and pivotally connected to the table, means for effecting rocking movement of the shafts to raise the table, and means for moving the carriage in a substantially horizontal plane.

16. In combination, a coil-receiving member, means for moving the member a substantially constant distance vertically, means operable through the last-named member moving means for adjusting the height of the member before movement caused by said first means, and means for moving the member horizontally.

17. In combination, a coil-receiving member, power driven means for adjusting the initial vertical height of the member, power means for moving the member through a vertical distance in addition to the initial adjustment which distance is substantially the same and regardless of the initial adjustment, and means for moving the member horizontally.

HOWARD H. TALBOT.