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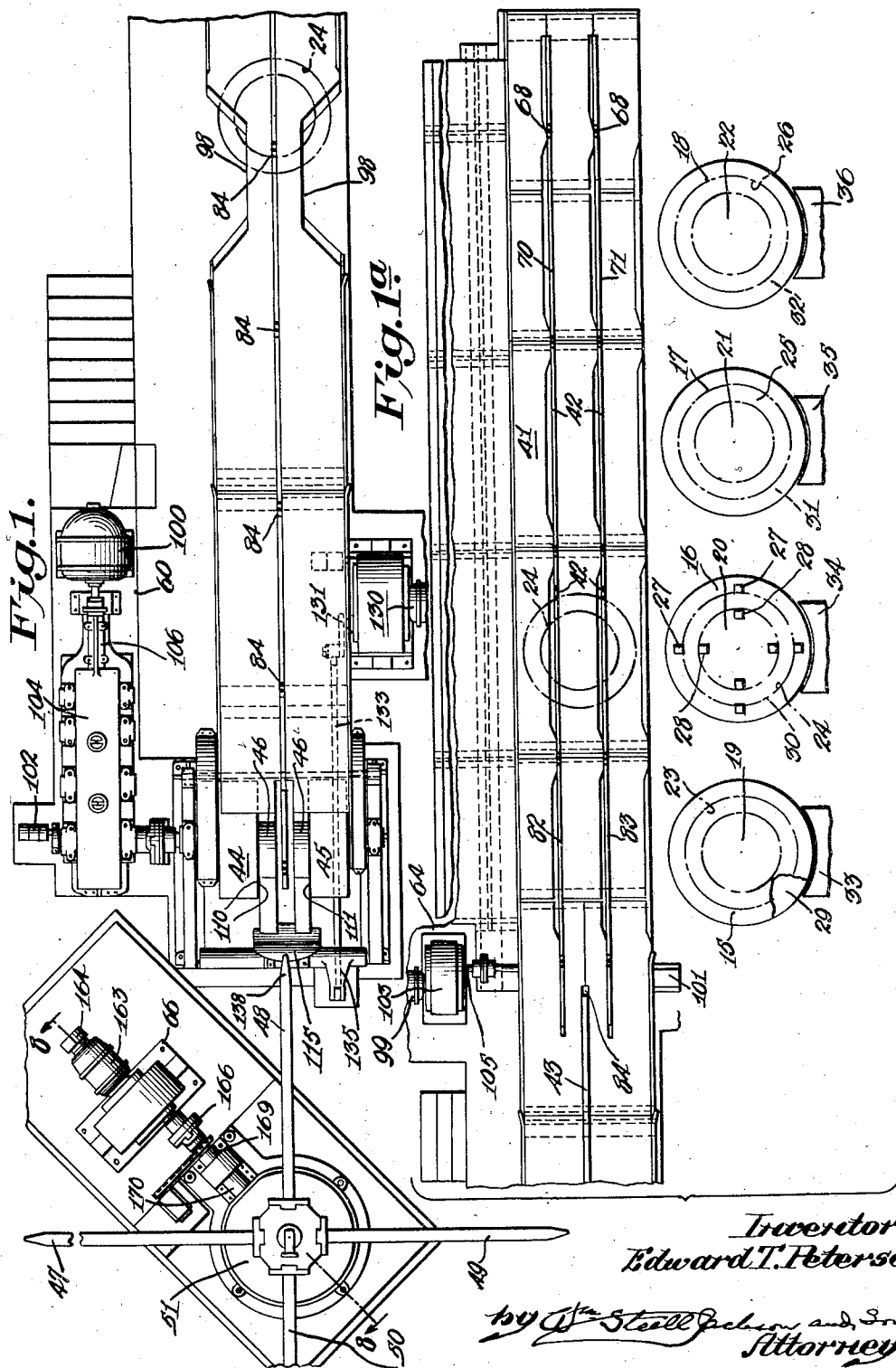
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2,301,747

CONVEYER SYSTEM

Filed April 12, 1939

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Fig. 2.

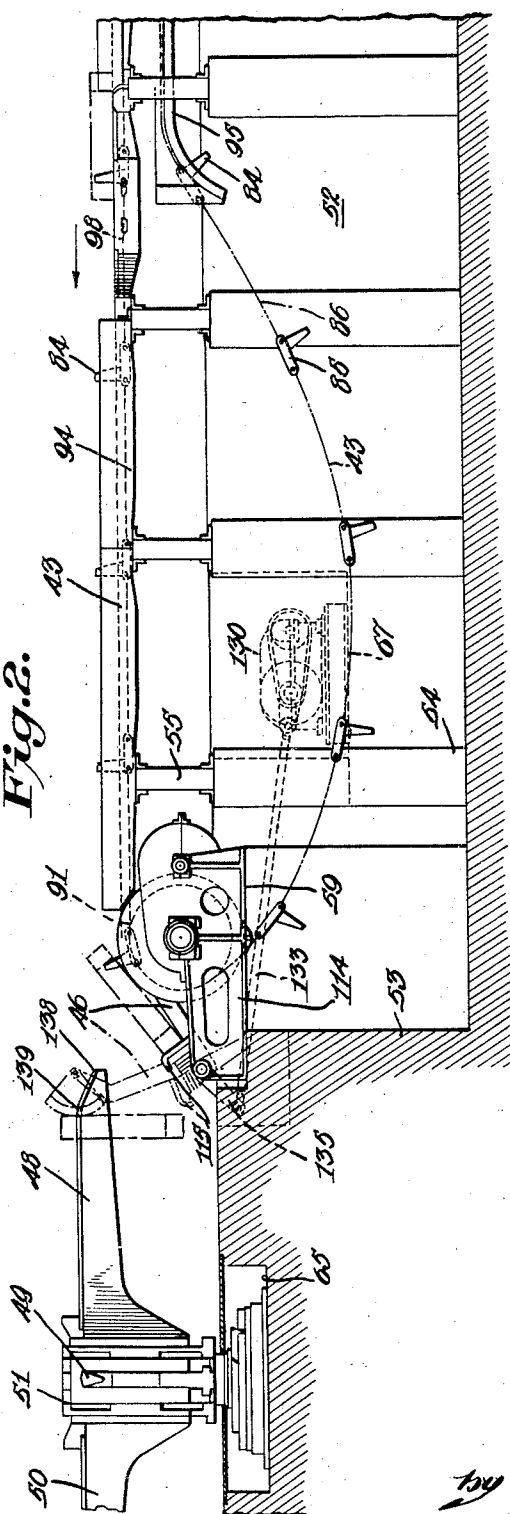
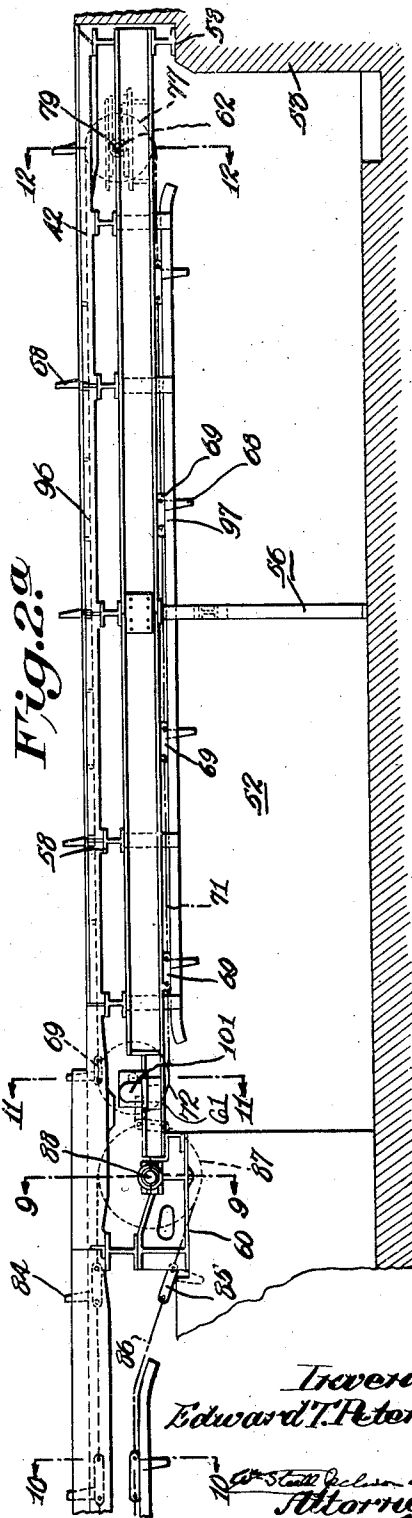


Fig. 2.a



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Fig. 3.

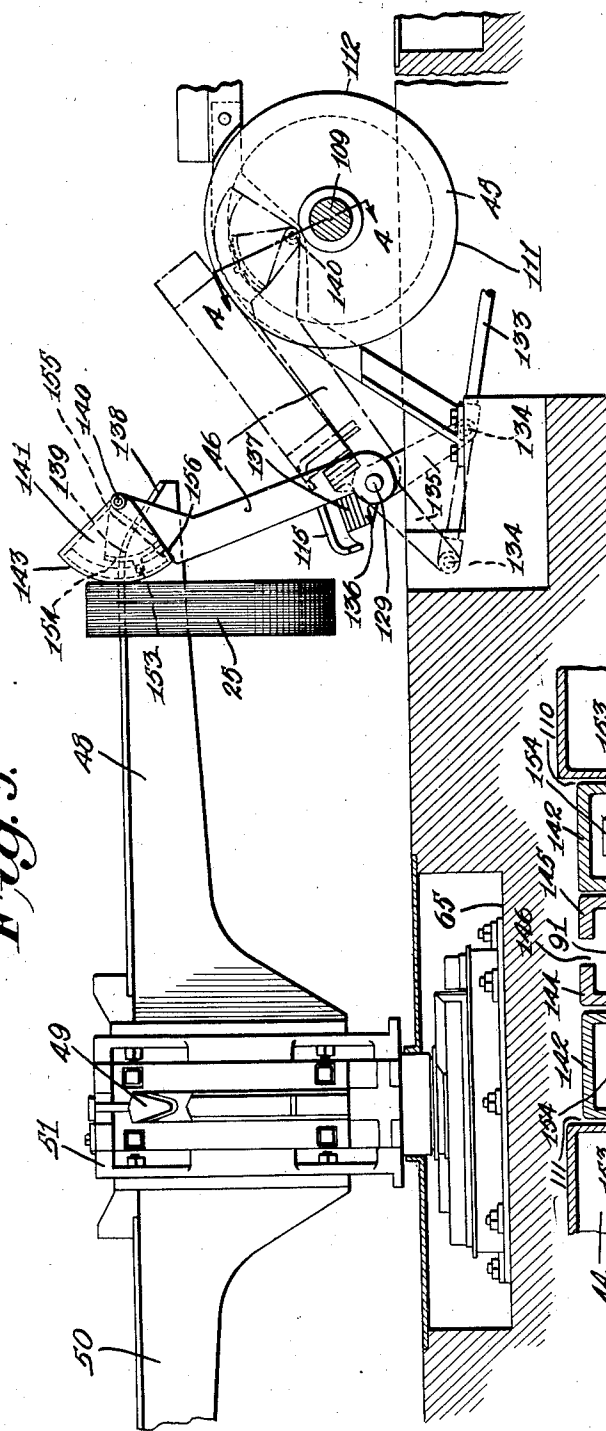
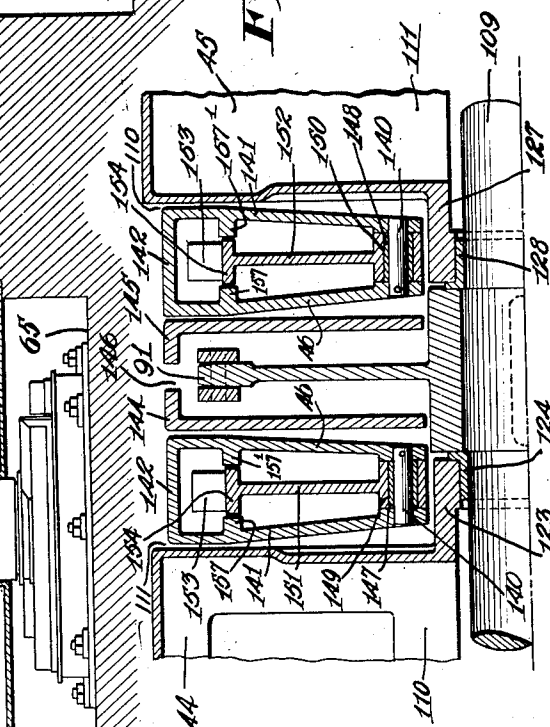


Fig. 4.



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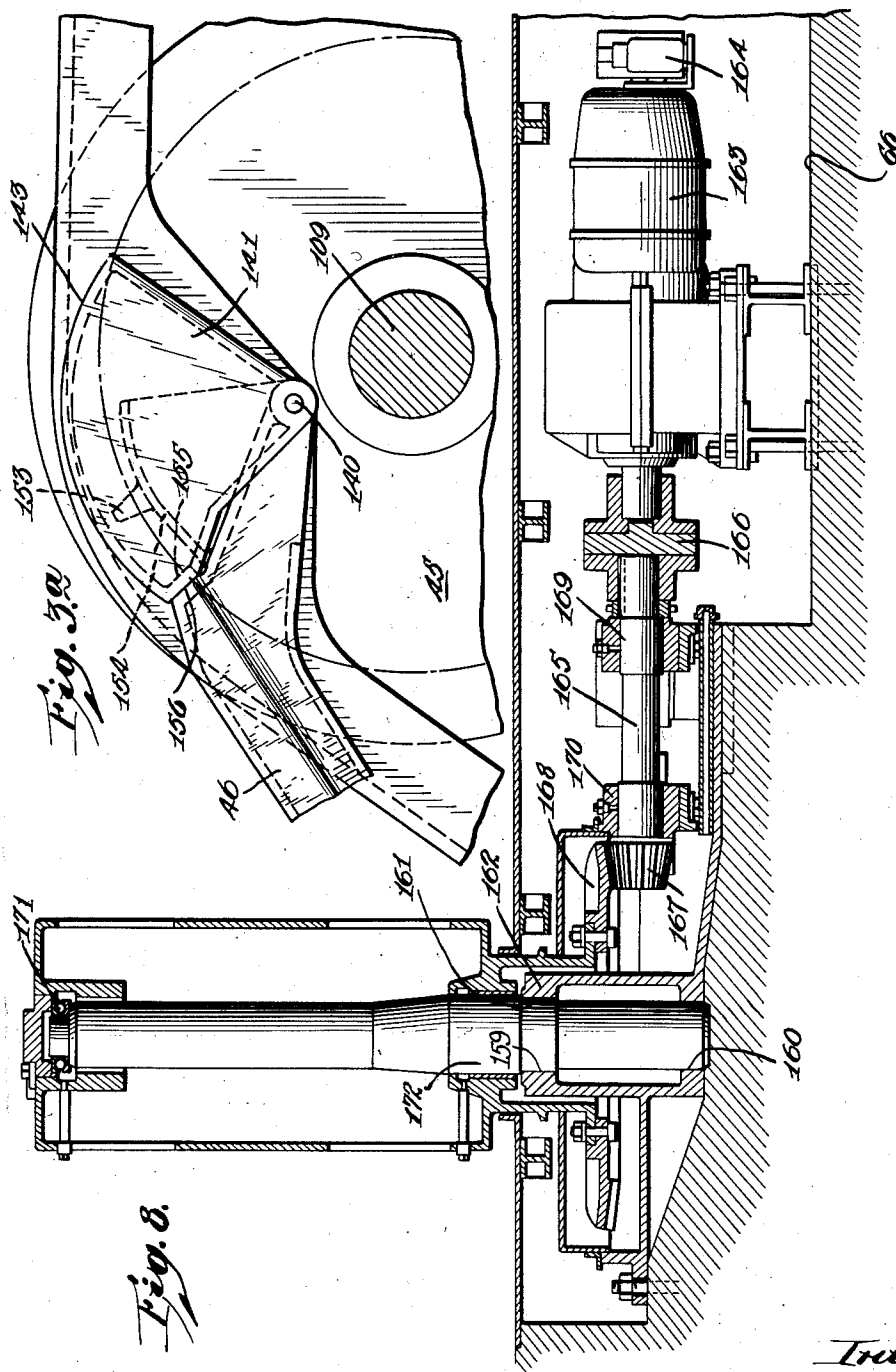
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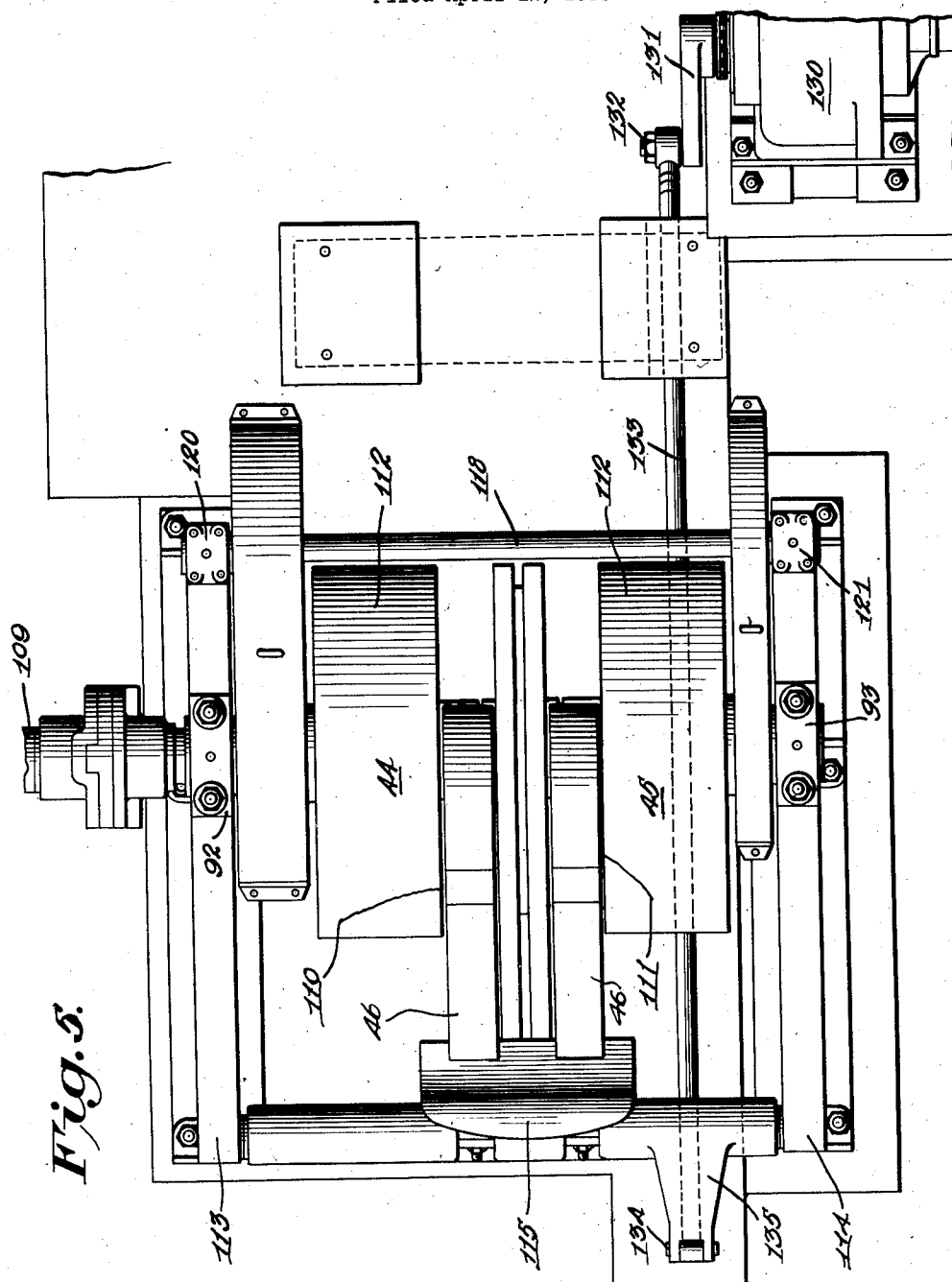


Fig. 5.

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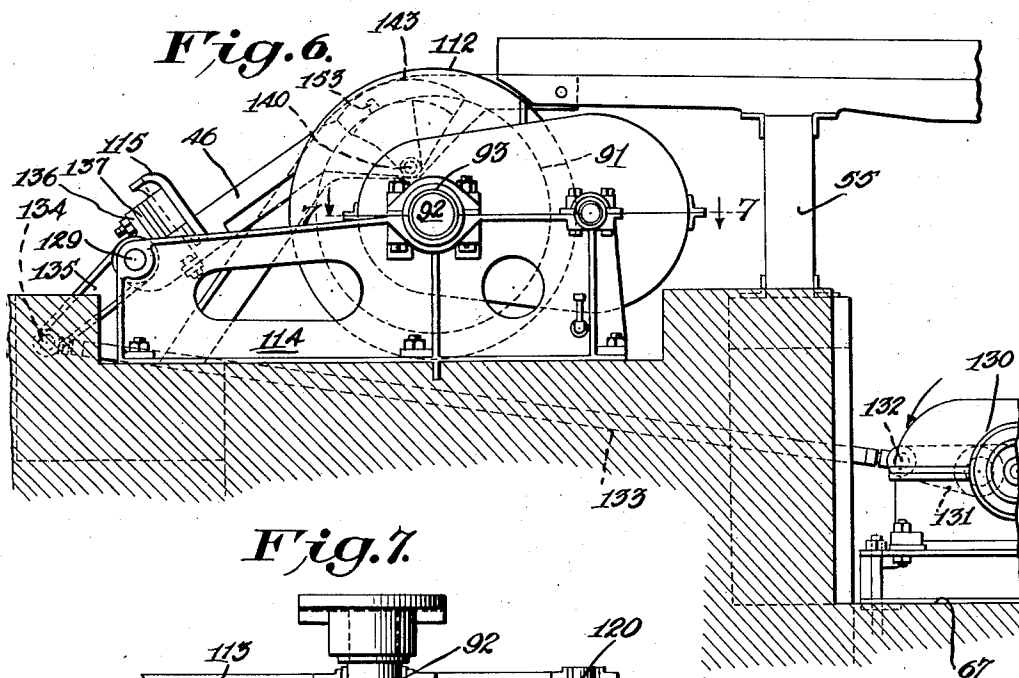
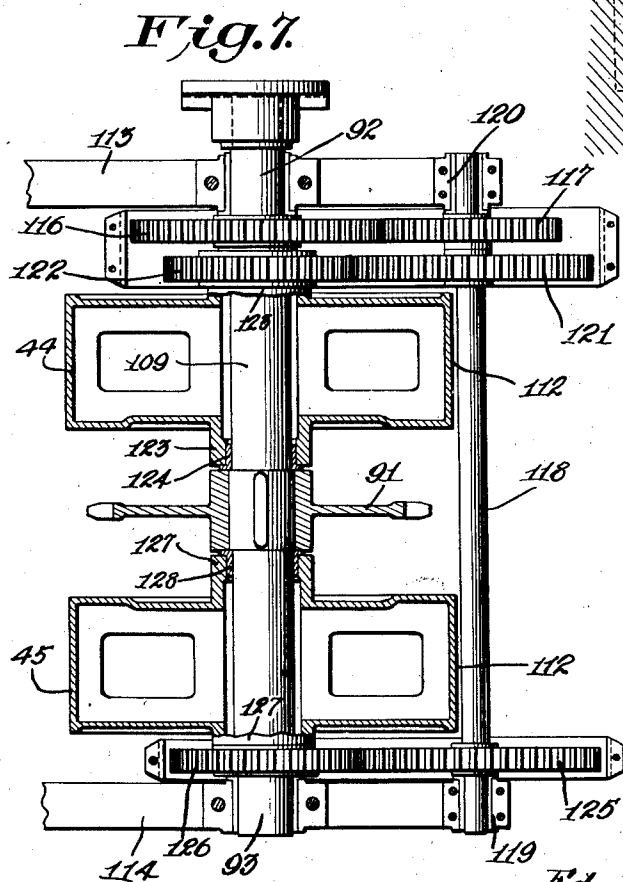
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Fig. 9.

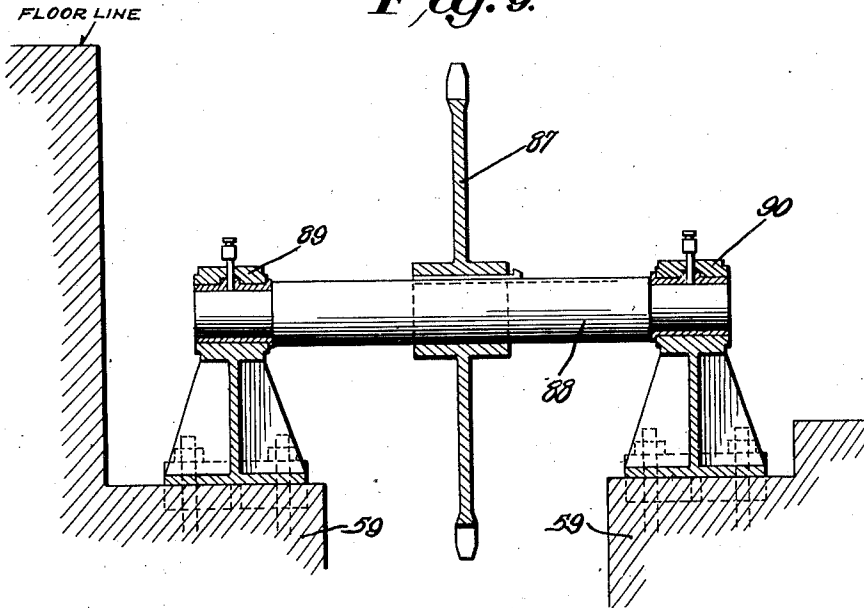
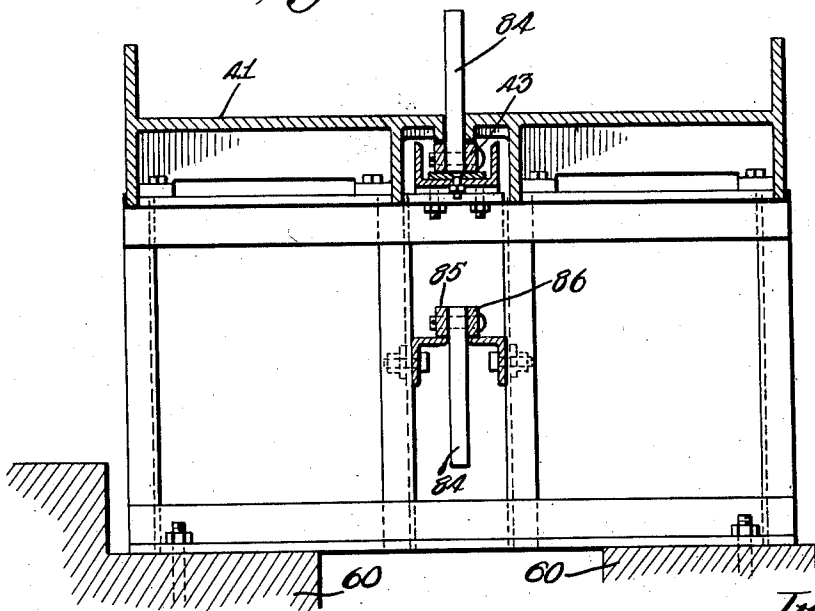


Fig. 10.



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Fig. 11.

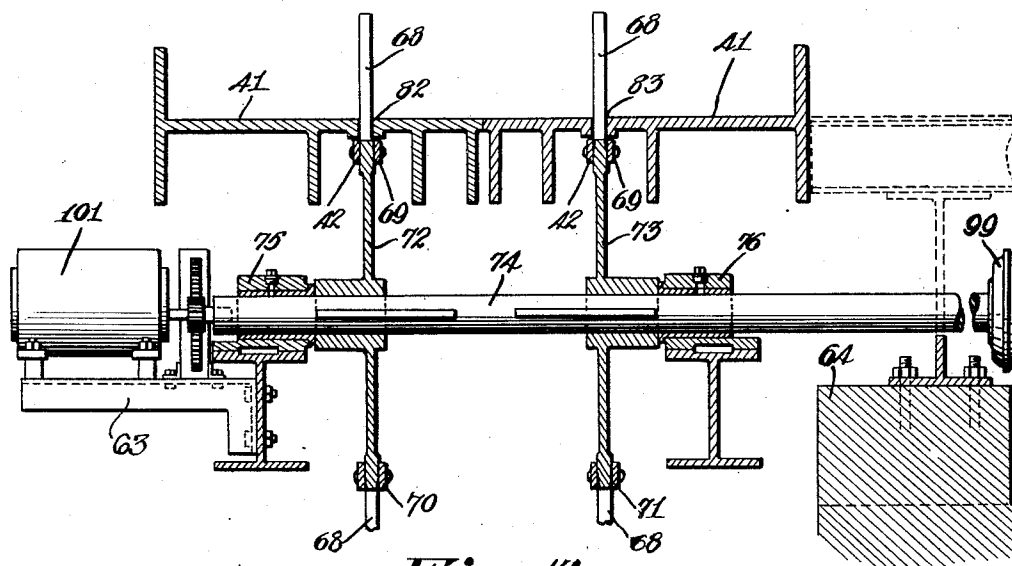
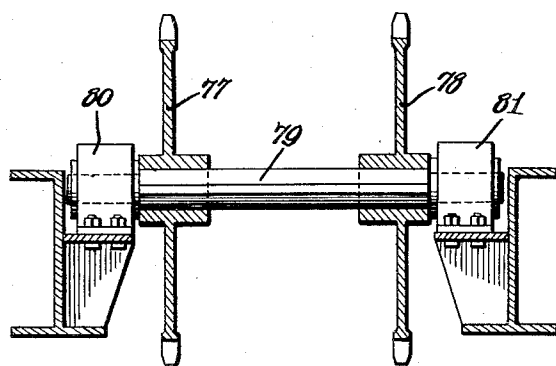


Fig. 12.



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UNITED STATES PATENT OFFICE

2,301,747

CONVEYER SYSTEM

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Application April 12, 1939, Serial No. 267,439

10 Claims. (Cl. 198—27)

The present invention relates to rolling mills and particularly to a system thereof for handling made-up coils or bundles as they are being delivered at short intervals from a group of bundle coilers that receive, coil-bundle and deliver the hot rolled output from the rolls.

A further purpose is to pull the bundles along a slideway by the successive dogs of a conveyer and to speed up each bundle to unloading arms having an angularly movable bed, the bed in its bundle receiving position sloping downwardly from the discharge drums, and to angularly reciprocate the bed upending and retracting it, during periods intermediate its receipt of successive bundles from the drums—for charging the successive bundles upon the preferably horizontal receiving arms of a carrier.

A further purpose is to use each dog of a conveyer first to pull a bundle along the slideway to a discharge drum and then to limit the forward movement of the bundle as it slides forward to the inclined receiving bed of an unloading device.

A further purpose is to locate the axis of a four-armed bundle carrier and the line of travel of bundles to the carrier in a common vertical plane.

A further purpose is to use a common drive for a conveyer and for unloading drums receiving and unloading bundles from said conveyer.

A further purpose is to provide a swinging frame which receives bundles, one at a time and to unload them upon a transfer mechanism through an intervening pusher pivoted to the arm.

A further purpose is to coordinate the operations of the second conveyer, of a bundle unloader and of a bundle carrier, using the conveyer to deliver the bundles one at a time to the unloader for one-at-a-time delivery to the carrier. Preferably the conveyer, unloader, and carrier are operated by means of individual limit switch motors, associating the starting switches of the unloader and carrier motors respectively with the stop switches of the conveyer and unloader motors.

A further purpose is to provide novel and efficient mechanism for transferring a succession of bundles from a rolling mill conveyer to an arm of bundle carrier—for subsequent presentation to bundle transfer mechanism.

Further purposes will appear in the specification and in the claims.

My invention relates not only to the mechanism involved but to methods by which this and

other mechanism may be operated to carry out the invention.

I have preferred to illustrate my invention by one form only selecting a form which is practical, effective, and highly desirable but which has been chosen because of its excellence in illustrating the invention.

Figures 1 and 1a are top plan views, respectively, toward opposite ends of mechanism embodying the present invention for handling and delivering the bundle output from a group of bundle coilers.

Figure 1a is partially diagrammatic of mechanism for discharging the bundles from the coilers.

Figure 1b is a diagrammatic reduced scale view intended for a conventional illustration of structure shown more specifically in Figures 1 and 1a.

Figures 2 and 2a are sectional elevations of 1 and 1a respectively.

Figure 3 corresponds generally to an enlarged fragment of Figure 2, but parts are in delivery position. For clearness it omits some of the structure of Figure 2 and discloses other structure not seen in Figure 2.

Figure 3a is an enlarged cross section, largely side elevation, of structure seen in Figure 3 but with parts in different positions.

Figure 4 is a section of structure of the unloader of Figure 3 to enlarged scale, the view corresponding to one taken upon the line 4—4 of Figure 3 looking in the direction of the arrows and with the unloader in dotted position.

Figure 5 is a fragmentary top plan of the structure of Figure 3 to enlarged scale.

Figure 6 is a vertical sectional view corresponding nearly to an enlarged fragment of Figure 2, omitting, however, in Figure 6 some of the structure shown in Figure 2.

Figure 7 is a horizontal section of Figure 6 upon line 7—7 thereof in the direction of the arrows, the view illustrating the drive of the delivery drums.

Figure 8 is an enlarged section of Figure 1 taken upon the line 3—8 thereof in the direction of the arrows, omitting some parts seen in Figure 1.

Figures 9, 10, 11 and 12 are sections of Figure 2a to enlarged scale and respectively upon the lines 9—9, 10—10, 11—11 and 12—12 thereof, looking in the direction of the arrows.

Like numerals refer to like parts in all figures. Describing in illustration and not in limitation and referring to the drawings:

It will be understood that the hot rolled products from a plurality of rolls, not shown, deliver to any of a number of bundle-coilers in positions 15, 16, 17 and 18, Figure 1a and that neither the rolls nor the bundle-coilers are themselves the object of the present invention.

The bundle-coilers may be of any suitable number and be located side by side. They are intended to be shown here conventionally only, and as four in number.

Each bundle-coiler includes a vertically movable stripper spider 19, 20, 21, 22 above which each bundle or coil 23, 24, 25, 26 is wound between inside and outside fingers 27 and 28. The fingers 27 and 28 of each coiler extend upwardly from and form a portion of an intermittently movable rotor 29, 30, 31, 32 individual to that coiler. In each position the corresponding rotor is stopped after winding a coil and the stripper spider 19, 20, 21 or 22 is then moved vertically upwardly to present the freshly wound coil high enough to clear the fingers and in front of one of a group of discharge plungers 33, 34, 35 and 36.

The invention does not reside in the coilers nor in the mechanism by which the coils are discharged. The discharge plungers are operated in any suitable way by a motor not shown. The coils are hollow and are discharged as in the prior art, being deposited upon the receiving or input end of a slideway 41, extending longitudinally in the direction of feed. They are progressed on the slideway by a first conveyer 42, which carries them into position where their forward interior surfaces are engaged by the dogs of a second conveyer.

The bundles of the various groups upon the slideway are carried meantime by a second conveyer 43, preferably an intermittently continuous conveyer, through successive intermediate positions to the output unloading (discharge) end of the slideway. Here they are fed, one at a time to speed pick-up slideway unloader drums 44, 45, which act effectively as a unit.

At the slideway discharge point an unloader 46 pushes the bundles one at a time upon one of the arms 47, 48, 49, 50 of a bundle holder or carrier 51. It is shown as of four-arm turnstile type. The bundle holder or carrier 51 moves intermittently to present its receiving arms 47, 48, 49 and 50 successively to the bundle receiving position. As soon as one arm is filled another is presented to receive bundles. In receiving position these arms lie in the vertical plane of the second conveyer.

The slideway for convenience is located over a pit 52 within the foundation walls 53. These walls, along with piers 54, posts 55 and beams 56, 57 provide supports 58, for the two conveyers 42, 43; and foundations 59, 60, 61 and 62, for conveyer sprocket support; 63 and 64 for conveyer driving and timing mechanisms; 65 for the bundle holder 51; 66 for the driving and timing devices for the bundle holder; and 67 for the means for tilting unloader 46.

The bundles are advanced by the first conveyer by pushing for a reason which will later appear. This pushing is accomplished by dogs 68, upon links 69 of the first conveyer 42 comprising a pair of chains 70, 71 which operate about sprocket wheels 72, 73 upon a shaft 74 in bearings 75, 76, and about sprocket wheels 77, 78 mounted upon a shaft 79 in bearings 80, 81. Either pair of sprocket wheels may be drivers and the other pair driven or idlers. As illustrated 72 and 73

are the drivers. The dogs operate in parallel slots 82, 83 oppositely offset in the slideway.

Because the first conveyer 42 shoves or pushes the bundles from the rear of each bundle, it advances the bundles beyond the forward end of this conveyer. This gives each bundle enough of a lead at this point so that it can be engaged conveniently by one of the prongs 84 of the second conveyer 43 which enters within the interior space of the bundle. This takes place as a link 85 carrying the prong is carried by its chain 86 about one of its sprocket wheels 87 upon shaft 88 in bearings 89, 90.

The chain of this second (in this case preferably the "puller" type of chain conveyer 43 passes about a second sprocket wheel 91 rigidly mounted on a shaft 100 in bearings 92, 93. As in the case of the first conveyer, either sprocket wheel may be the driver.

The top and bottom stretches of the two conveyers are supported appropriately at 94, 95 and 96, 97. At an intermediate point 98 in the travel of the second conveyer the slideway is narrowed, giving access to the bundles for inspection and facilitating here the removal of bundles where this is desired.

The operations of each of the different motors may be controlled by hand switches so as to be operatively separate with or without the use of limit switches or the controls which they exert over the operation of other parts of the system. This applies not only to both conveyers but also to the unloading arms and to rotation of the carrier or holder shown of turnstile type. The bundles are delivered upon the slideway in front of a dog 68.

The first conveyer is relatively short and progresses the bundles to a position where each in turn will be picked up by one of the dogs of the second conveyer.

The speed of the entire system will normally be dictated by the speed of supply from the mill and, intermediately, by the speed of the coiling (bundling) mechanisms and their number.

The first conveyer is operated at a speed which will deliver each bundle in time to be picked up by the second conveyer.

The second conveyer may preferably operate intermittently because it is dependent upon the supply of bundles from the coiling mechanisms.

As a preferred means of operating I run the first and second conveyers by separate motors 99, 100, of limit switch type having suitable limit switches 101, 102, connecting gearing 103, 104 and bearings 105, 106. In order to emphasize the fact that the individual conveyers—as well as the other mechanism described—can be actuated independently I show hand operated starting switches 107, 108 in the circuits of these two motors.

It is desirable to interlink the various mechanisms so as to continue the operation successively after it shall have been started.

One suggested way for operating, applied to operation of the second conveyer, is to have final operation of the bundle lift at coiler position close the circuit of the motor operating the lateral loading mechanism to transfer a bundle to the first conveyer. This at the start opens the circuits of the motors of both conveyers. Retraction of the plunger for the lateral loading closes the circuits of both conveyers. If the second conveyer controls the first, it would not be necessary for this plunger movement to open—nor then to close—the circuit of the first conveyer.

The limit switch 102 of the second conveyer may not only control the second conveyer as above so as to cause it to stop after bundle has been advanced into position for engagement by the second conveyer, but may also regulate the operations of the first conveyer and of the unloading arms.

In proper sequence for discharge of bundles from the second conveyer, the second conveyer will stop after feeding a bundle and it will remain stopped and the first conveyer will consequently remain stopped until the bundle loading mechanism shall have reciprocated, loading another bundle.

Turning of the bundle carrying arms upon which the bundles are placed by the unloader may also be controlled by a limit switch 102 but preferably is controlled through the limit switch of the mechanism which throws the unloader arms. In either event the intention is after one arm shall have been filled to have the receiving arms revolve a quarter turn prior to the placing of a succeeding bundle upon a newly presented holder arm.

Shaft 109 carrying sprocket 91 carries also pick up drums 44 and 45 which serve several purposes. They are spaced at 110 and 111 from adjacent parts and are larger in diameter than the body of the sprocket wheel. The bundles are carried up upon their surfaces 112 by the second conveyer, relieving the bundles of a part at first and then of all of the friction against the slideway.

Through back gearing hereinafter described the pick up drums are given a peripheral speed considerably greater than the lineal speed of the second conveyer, with the result that as soon as the bundles have been pushed up upon the pick up drums far enough for the pick up drums to take over the progression of the individual bundles, each bundle in turn is drawn ahead more rapidly than moves the particular dog of the second conveyer which previously has been dragging the bundle. This relieves the bundles from engagement with the dog and permits the dog to be carried by its link about the adjacent circumference by the sprocket wheel 91 without rubbing the dog against the interior surface of the bundle.

The structure is stiffened by braces 113, 114 between the end of the slideway and the support.

In the meantime the bundle is carried by the surfaces of the drums and is thus tilted and discharged so that its forward end slides down against a bumper 115 at the lower end of unloading arms 46. As illustrated the upper part of the bundle rests upon the surfaces of the pick up drums until—which should be immediately after—the unloading arms 46 start their swing toward one of the turnstile arms.

As the pick up rolls tilt the bundle down against the bumper 115 there need be—and in the illustration is—no engagement between the bundle and the upper ends of the unloader arms nor with the segmental faces of the pushers. Friction of pick-up rolls with the bundle is then avoided by timing which immediately swings the unloading arms 46 upward and to the left so as to first engage the bundle from the right and beneath and to lift the bundle away from the pick-up rolls. The weight of the bundle is taken at the start by the swinging, unloading arms 46 and partly by the bumper. As the bundle reaches approximately vertical position the weight is almost all transferred to the bumper and with subsequent movement of the arms 46 and the push-

ers, the bundle is transferred to one of the arms 47—50. A succeeding bundle when placed upon the same arm must push the next and any additional bundles already on the arm to the left before the bundle which is being mounted can be transferred. The unloading arms 46 then return to the position shown in dotted lines in Figure 3 to receive the next bundle.

Mechanism by which the peripheral speed of the pick-up drums may be stepped up above that of the chain advance is seen in Figure 7, in which at the upper end of the figure back gearing is provided suitable for effecting the stepping up of the speed.

The shaft 109 carries a gear 116 which meshes with the gear 117 upon a back gearing shaft 118 turning in bearings 119 and 120. Rigid with shaft 118 is gear 121 which meshes with a gear 122 rigidly connected to the drum 44 and with the drum 44 freely turning on the shaft 109 coaxial with gear 116. Gear 122 is keyed to a hub extension from the drum 44, opposite hub extensions of the drum turning freely on the shaft 109. Intermediate bearing metal is shown in ring 124.

Because the gear 116 is much larger than the gear 122 and the gear 117 is much smaller than the gear 121, there is considerable increase of speed by the back gearing shown, the increase of speed being proportionate to the differences in the diameters in these respective pairs of gears.

The back gearing shaft 118, at the opposite end from that which carries gears 117 and 121, carries gear 125 of the same size as gear 121 and it drives gear 126 mounted rigidly upon one of the hub extensions 127 of the pick-up drum 45 which turns freely on the shaft 109. It will be seen that the pick-up drums, on opposite sides of the sprocket 91, operate effectively as a unit. Bearing metal 128 may be used if desired between the hubs 127 and the shaft 109.

The unloading mechanism appears in Figures 1, 2, 3, 4, 5 and 6.

The arms 46 are duplicates. They are rigidly mounted on a shaft 129 and with the shaft tilt between some such positions as are shown in Figure 3 in solid and dotted lines respectively. They are tilted by a motor 130 angularly reciprocating the shaft, operating through crank arm 131, pin 132, connecting rod 133, pin 134, and rocker arm 135 rigidly mounted on the shaft 129. Any suitable mechanism connects the rocker arm and unloading arms 46. As shown, both are intended to be rigidly attached to the shaft 129.

The bumper 115 is adjustable along the length of the unloading arm by the interposition between it and the bracket 136 of a variant quantity of lagging 137 according to the diameter of the bundle, so that when the bundle unloading arms have been thrown from dotted position to full line position in Figure 3, the interior of the bundle will fit over the nose 138 of that turnstile arm 47—50 upon which the bundles are being placed, without undue friction in placing the bundle.

With the front faces of the unloading arms approximately vertical and the bundle to the left of the front faces in the figure, the thickness of the bundle will bring the inner upper edge of the bundle nearly to the top of the slope 139 upon the appropriate arm so that further swinging movement of the unloading arms to the left will push the bundle up upon the carrier arm. The exact point to which the bundle will come and the question of whether the inside of the

bundle shall be level with the top of the carrier arm when the engagement with this arm takes place will be subject to variation according to the wishes and policy of the user and obviously can be varied for the same size of the bundle by altering the lagging and can be made to suit different sizes of bundles by the same means, lifting the interior of the bundle to any predetermined height along the length of the unloading arms.

The unloading arms are shown in top plan view in Figures 1 and 5 and in side elevation in Figures 2, 3, and 6.

Each unloading arm not only itself swings but carries at its outer end a pivoted pusher shoe, the two pusher shoes being alike. The unloading arms 46 at the upper ends are extended diagonally upward and rearward to give position for shafts 140 upon which the pusher shoes are pivoted. Each pusher comprises, as illustrated, side frame members 141 joined across the end by a cylindrical pusher wall 142, forming a sector which presents an arc shaped pusher face at 143. The center of the arc is the axis of the pivot shaft 140.

Each pusher face is adapted to engage with the rear face of a bundle which is being handled and to push the bundle to the left and upwardly as the arm 46 swings. The pivotal engagement of the pusher permits the sector to swing so that there is rolling engagement only between the pusher face and the rear of the bundle.

The sectorial pushers are shown in cross-section in Figure 4 and in side elevation in Figures 3 and 3a. In Figure 4 fragmentary portions of the pick-up drums appear to the right and left and the sprocket wheel with its chain is located in the center within protecting walls 144, 145, spaced at 146. The sectorial pushers lie between these walls and the pick-up drums. Their pivot shafts or pins turn within bushings 147, 148 supported by the walls of bores 149, 150 in the hubs of the respective arms 46. Continuations 151, 152 of the arms carry stops 153 reinforced by rims 154. The stops limit the outward swing of the pushers by end walls 155. Inward swing is restricted by shoulders 156, one upon each arm. Laterally adjacent stops 153 are facing ribs 157, 157' which normally perform no function but which afford support against excessive lateral thrust upon the pushers.

The "turnstile" carrier or holder for the bundles as shown, Figures 1, 2, 3 and 8, is mounted about a vertical post 158. The post 158 is rigidly mounted in bores 159 and 160 of a metal stationary base 162. This post forms a fixed axle or bearing member about which the carrier or holder 51 is turned by motor 163 controlled by limit switch 164. The motor drives shaft 165 through coupling 166. The shaft is connected to the turnstile or holder 51 through gears 167 and 168. Shaft bearings are shown at 169, 170.

The rotary carrier or holder 51 is supported by bearings 171 and is held against tilting movement by lateral bearing 172.

The switch interlinkage between the second conveyer and the unloading arms must be such that the arms lie back in receiving position at the time the second conveyer delivers its foremost bundle upon the pick-up drums 44 and 45 that in turn tilt the bundle to and deliver it upon the unloading arms 46.

If the unloading arms be not immediately engaged by the bundle except at the lower end of the bundle adjacent the bumper, it is quite de-

sirable that the unloading arms be tilted as soon after the bundle has been placed upon them as possible in order to avoid rubbing friction between the pick-up drums and the bundle.

One of the carrier or holder arms must be opposite the bundle at the time the unloading arms act. They place each bundle in turn upon the end of a carrier arm and each as placed is effective to shove any bundles already on the carrier arm further back upon the arm, up to the time when this carrier arm holds its intended full load.

The timing and switch connection are such that when the last unloading arm movement takes place, and after the unloader arms have retracted, the carrier or holder is rotated by rotation of gear 168 to a distance sufficient to bring an empty arm in position to receive the succeeding bundles; and one carrier or holder arm at a time is filled or partially filled with bundles and turned to position for discharge of these bundles as another empty carrier or holder arm is brought to position.

The linkage may be direct or not. For example, the successive operations of the unloader arms and carrier or holder arms need not be linked up with the closest moving parts but in some cases can be operated by some other member within the train of operation.

It will be evident that the use of pushing prongs on the first conveyer permits the bundles to be shoved far enough ahead of the first conveyer so that the second conveyer may have room to turn and to raise its prongs into the spaces within the bundles.

It will further be evident that stoppage of the first conveyer with its forward prongs near or at the end of its pushing stroke but before their chains have begun to turn about their sprocket wheels, with subsequent removal of the bundle by the second conveyer from contact by the first, avoids scraping of the first conveyer prongs against the rear faces of the bundles when these prongs do turn with their chains about their sprocket wheels. The use of the pick-up rolls at the unloading position performs a corresponding function for the second conveyer, carrying the bundles out of contact with the second conveyer prongs before these second conveyer prongs have begun to turn about their sprocket wheels adjacent the pick-up rolls.

It will be evident that the turning of the carrier arms can take place while the unloader arms 44 and 45 are retracted or partly retracted but that if the number of bundles to a carrier arm corresponds with the number of bundles loaded at a time and the second conveyer be stopped for loading, plenty of time can be provided for this carrier arm movement during the stoppage of the second conveyer.

It will be evident that the turnstile type of carrier construction is quite convenient and effective but that other types of carrier construction could be used with part of the advantage of my construction.

It will be evident that friction against the bundle can be reduced greatly by exact timing of the delivery from the pick-up rolls and the operation of the unloading arms. This is accomplished by having the pick-up rolls tilt the bundles free from initial contact with the upper parts of the unloading arms but into contact with the bumper on the unloader and just as these unloader arms tilt to lift the bundle away from the pick-up rolls. By this timing sliding of the bun-

die along the length of the unloader arms is avoided and at the same time the bundle is lifted from the pick-up rolls in time to relieve from rubbing of the under surface of the bundle by these rolls.

As seen in Figure 2, the foremost prong upon the second conveyer may be used to prevent the bundle from moving unduly in a lateral direction as it tilts on the pick-up rolls. It may also act as a catch, engaging the inner rear bundle surface to take part of the jar which would otherwise be taken upon the bumper or all of the jar of the tilted bundle (Figure 2).

The pivotal connection of the pushers upon the unloader arms prevents sliding friction of the pushers against the faces of the bundles as the bundles are transferred to the carrier arms and at the same time are lifted by the wedge action of the sloping ends of the carrier arms as the bundles are forced upon these arms.

It will be evident that hand switches in all of these motor circuits permit individual operation of these circuits either using the hand switches alone for control of the circuits or providing the hand switches as ultimate control, to prevent operation when the individual hand switches are open. Where the hand switches are used for the entire control of the circuits they not only permit alteration of the sequence of the operation, to use one of the motors out of turn but permit use for a longer time than would be the case with the automatic control described.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such in so far as they fall within the reasonable spirit and scope of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the character stated, a bundle conveyer having dogs, means for operating it, pick-up drums for the bundles adapted to receive the bundles, lift them free from the conveyer and tilt them while the dogs of the conveyer free themselves from engagement with the successive bundles, pivoted unloading arms to which the bundles are delivered by the pick-up drums, timed in operation to conveyer movement corresponding to the spacing between bundle positions and means including a carrier arm for receiving the bundles one at a time from the unloading arms.

2. In a conveyer system an unloading arm, a pivot carried by the arm, a pusher supported by the pivot and adapted to swing about it, a shoulder on the pusher adapted in normal inactive position to rest against the arm and flanges upon the arm and inside the pusher adapted to engage each other with swinging movement of the pusher away from the body of the arm.

3. In an unloading system, a rocker arm, a conveyer for the bundles in flat position, pick-up rolls by which the bundles are tilted upon the rocker arm, a pivoted pusher upon the rocker arm, a carrier arm upon which the bundles are to be deposited and means for rocking the arm to bring the pivoted pusher into engagement with individual bundles, to carry the bundles into position adjacent the arm and to push them upon the arm.

4. A rocker frame for successive delivery of

coiled bundles from a bundle conveyer, a pivoted shoe carried by the frame toward the outer end thereof and adapted to engage the bundles, a bundle-receiving arm upon which the bundles are delivered successively by the frame, and means for rocking the frame whereby the shoe in pushing the delivering bundle upon the arm moves pivotally upon the rocker frame so as to maintain roller engagement of the shoe with the bundle during the shoving operation.

5. A conveyer for bundles, a rocker frame in its receiving position sloping downward and forward from the delivery end of the conveyer toward the rocker pivot, upon which frame the conveyer delivers the bundles successively for delivery by rocking the frame, a shoe pivoted to the end of the frame and engaging the upper end of the bundles, a bundle-receiving arm upon which the bundles are to be loaded, said arm having a sloping arm end, and means for rocking the frame, whereby the frame deposits each bundle in turn upon the end of the arm whence they are pushed back on the arm by the shoe, the shoe maintaining rolling as distinguished from sliding contact with the bundles in pushing the bundles up the slope of the arm.

6. A rocker frame for transferring coiled bundles one at a time from a bundle conveyer to a bundle carrier arm and adapted to lie in empty position on one side of the perpendicular and in that position to receive a bundle from the conveyer, a bundle-carrier arm upon which the frame is adapted to deliver the bundles, one at a time, the arm having a downwardly sloping receiving end, a shoe pivoted to the frame and engaging the rear of the upper side of each of the bundles in turn upon the frame, and means for angularly swinging the frame to deposit the bundles upon the end of the arm and to shove the bundles inwardly along the arm by the shoe, with the shoe in rolling engagement with the bundles.

7. In a system for handling coiled bundles, a delivery conveyer adapted to carry bundles one after another to the end of the conveyer, a rocking frame upon which the bundles are delivered one at a time from the conveyer, and a bundle carrier adapted to receive bundles one at a time from the rocking frame, the bundle-carrier comprising an intermittently advancing turn structure having a vertical pivot located in front of the delivery end of the conveyer and substantially in the vertical center plane of the conveyer, radial bundle-receiving arms extending from said structure, somewhat higher than the conveyer and adapted to be registered sequentially in position to receive bundles from the rocking frame, individual limit-switch motor mechanisms operatively connected respectively to the conveyer, to the rocking frame and to the bundle carrier and including a starting switch for the rocking frame operatively connected to the conveyer motor mechanism, a starting switch for the bundle-carrier mechanism timed to operate for each predetermined number of bundles handled and stop switches for the rocking frame motor mechanism and the bundle-carrier motor mechanism operatively connected with their respective mechanisms.

8. In a system for handling coiled hollow bundles, an endless delivery conveyer adapted to drag bundles by engaging the interiors of the bundles, one after another, to the end of the conveyer, dogs on the conveyer, unloading drums operatively a unit having peripheral bundle-receiving surfaces sloping upwardly from a straight

delivery path of the conveyer, adapted to engage the bundles, having peripheral speed in excess of the lineal speed of the conveyer, the conveyer turning downwardly within the contours of the drums, the dogs having also a final retarding function as the coils pass over the drums, a rocking frame upon which the bundles are delivered and a movable bundle-receiving arm upon which the rocking frame is adapted to deposit and shove the bundles one at a time.

9. An endless conveyer having dogs engaging the insides of hollow bundles of coiled metal adapted to drag the bundles in horizontal position, pick-up rolls upon which the dogs feed the bundles and having peripheral bundle-receiving surfaces sloping upwardly from a straight delivery path of the conveyer, means for driving the rolls at higher peripheral speed than the conveyer speed, the conveyer turning downwardly within the contours of the rolls, the dogs having thus a retarding function during part of their downward travel, a rocker arm upon the lower part of which the bundles are tilted by the pick-up rolls, a carrier arm upon which the bundles

are to be unloaded and means for swinging the rocker arm into engagement with the upper parts of the bundles and swinging the bundles into position upon the arm.

10. A straight slideway, a continuous conveyer for hollow rod bundles, including a succession of dogs engaging the interiors of the bundles, turning downwardly at the delivery end of their straight travel, for moving the bundles along the slideway, a pick-up drum across the slideway having a peripheral bundle receiving surface sloping upwardly from the plane of the slideway at the delivery end thereof, the conveyer dogs generally following the contour of the drum after they deliver bundles to the drum and projecting outwardly beyond the drum surface, the drum having a peripheral speed greater than the speed of the dogs and the conveyer dogs protecting against excessive sliding of the bundles upon the drum, and pivoted unloading arms upon which the pick-up drums downwardly deliver the bundles.

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