No. 798,918. PATENTED SEPT. 5, 1905.

E. J. McILVRIED.

MACHINE FOR MANIPULATING COILS.

APPLICATION FILED FEB. 9, 1904.

3 SHEETS—SHEET 1.

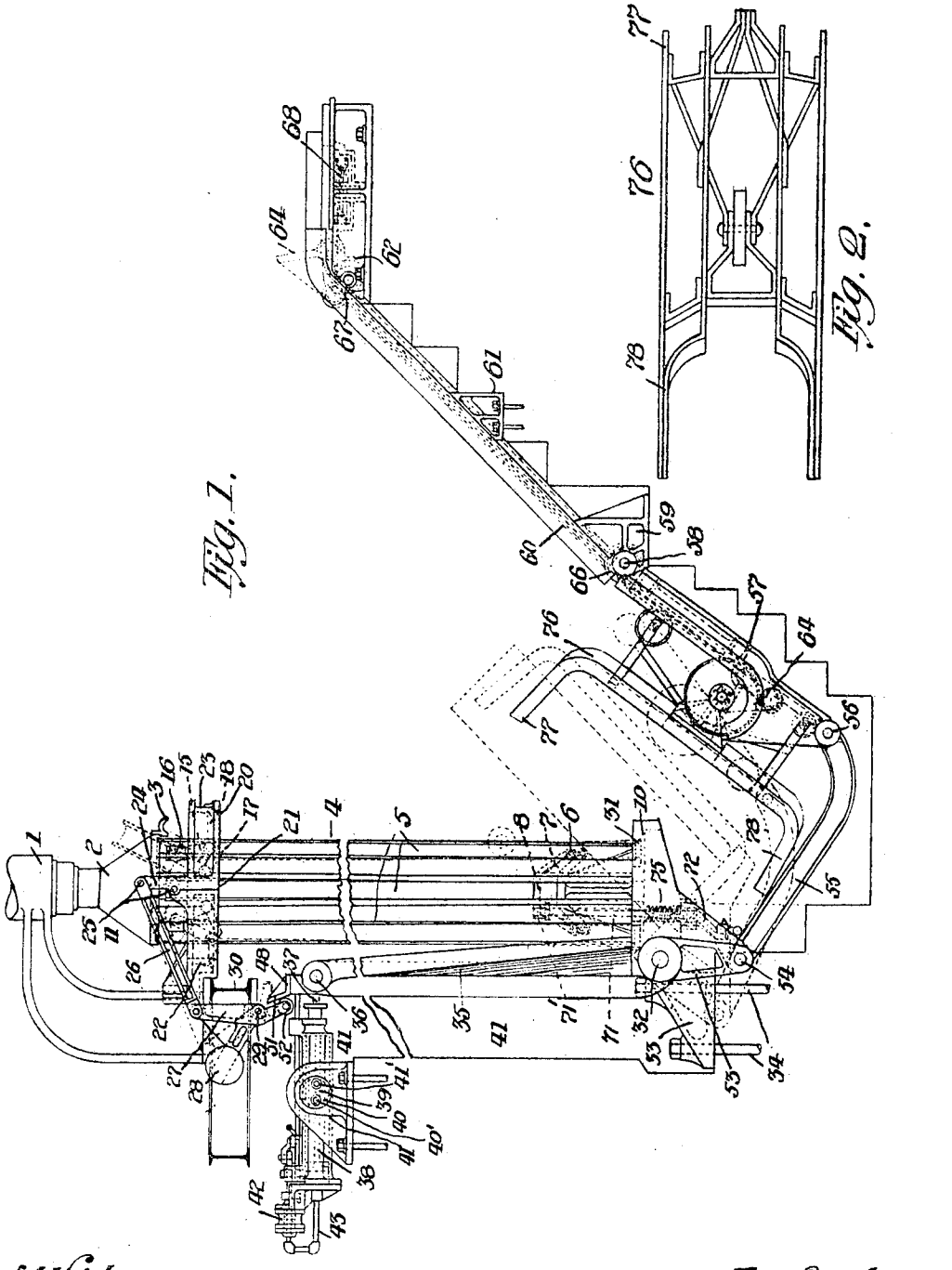


Fig. 1.

Fig. 2.

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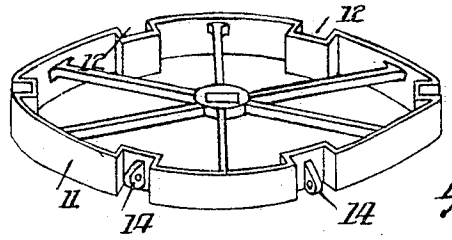


Fig. 4.

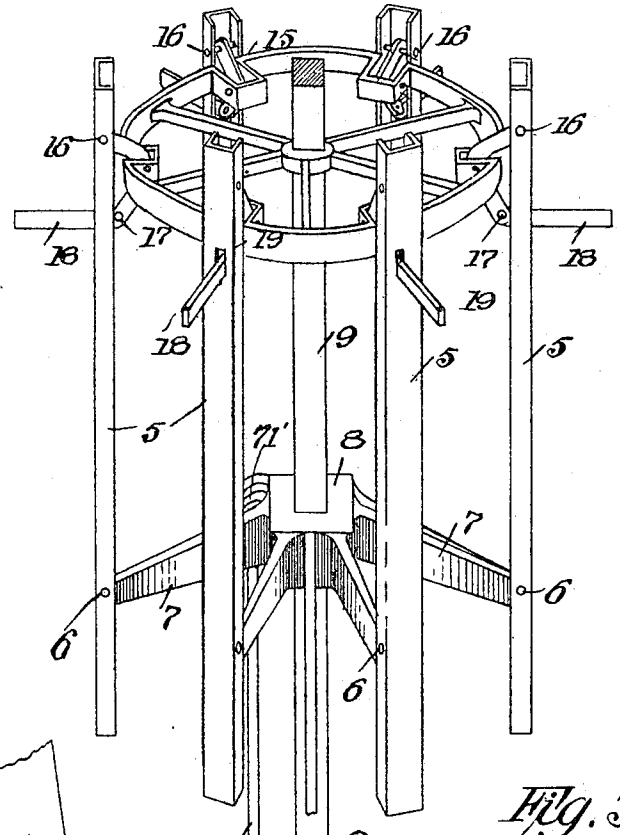
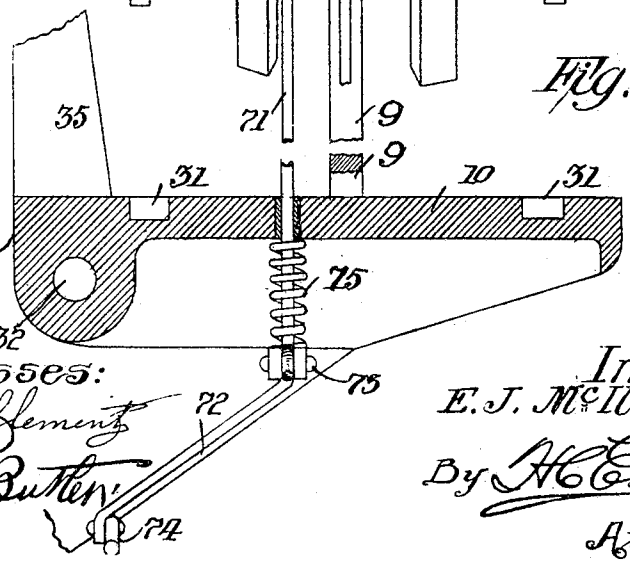


Fig. 3.



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3 SHEETS—SHEET 3.

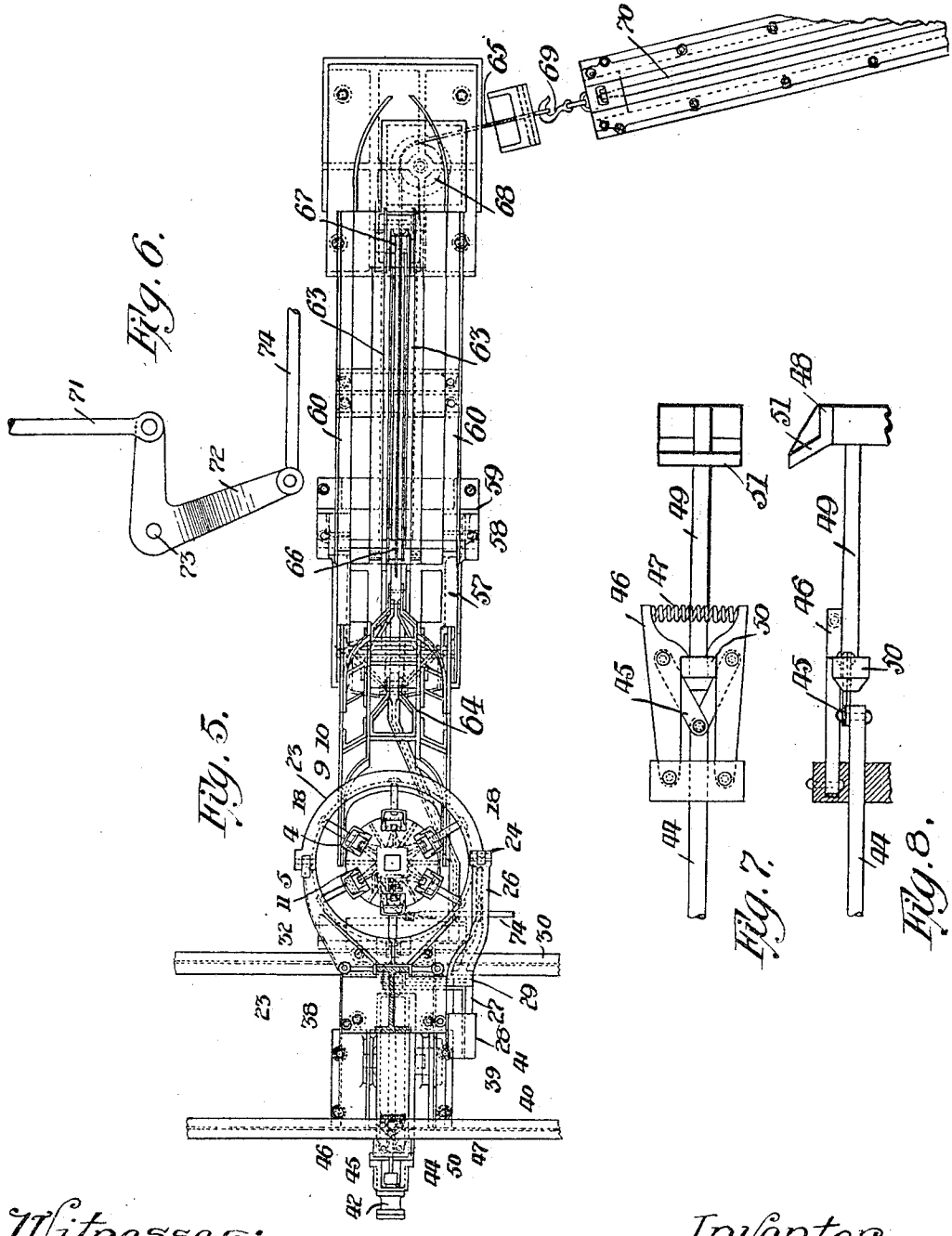


Fig. 6.

Fig. 5.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWIN J. McILVRIED, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR MANIPULATING COILS.

No. 793,918. Specification of Letters Patent. Patented Sept. 5, 1905.

Application filed February 9, 1904. Serial No. 192,829.

To all whom it may concern:

Be it known that I, EDWIN J. McILVRIED, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Manipulating Coils, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in machines for manipulating coils, and has for its object the provision of novel means whereby rods are fed to an apparatus and formed into coils, the coils suspended as they are formed, then released and permitted to drop by gravity to the lower portion of the reel, and this operation repeated until a sufficient number of coils have been placed on the reel.

My invention further aims to provide a novel form of mechanism whereby the reel, together with the coils, may be tilted into a car or conveyer, the latter being also of a peculiar and novel construction for the purpose of coöperating with the reel when in the tilted position for the purpose of stripping the coils from the reel, which will be set automatically in the proper manner, permitting the car or conveyer to strip a large number of coils from the reel and convey the same to a convenient place for handling the coils.

I propose to mount and operate the mechanism in such a manner that all parts may be easily returned to their normal position and to provide such safeguards as will reduce the chances of accident to a minimum; furthermore, to provide a machine that will not only greatly facilitate the manipulation of wire coils and the like, but will also greatly reduce the cost of manufacture in a rod-mill.

With the above and other objects in view the invention consists in the novel construction, combination, and arrangement of parts hereinafter fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the complete apparatus constituting my improvement. Fig. 2 is a detail plan view of a truck that receives the coils of wire discharged from the reel. Fig. 3 is a detail view of the reel, partly in perspective and partly in sectional elevation. Fig. 4 is a perspective view of a portion of the reel-operating mechanism. Fig. 5 is a top plan view of the apparatus shown in Fig. 1. Figs. 6 and 7 are detailed views in elevation of parts of the reel-operating mechanism, and Fig. 8 is a sectional view of the parts of the mechanism shown in Fig. 7.

In the several figures of the drawings like reference-numerals designate corresponding parts, and 1 designates the reel-housing; 2, a revolving cone which is mounted above the reel. Said reel 2 is supported on the end of a vertical shaft, which is journaled in the housing 1, and motion is communicated to said vertical shaft by any suitable means.

4 designates the reel, which is composed of vertical channel-irons 5, suitably mounted below the cone 2, said reel being adapted to receive the coils of wire as they are formed and the said channel-irons being pivotally secured at 6 to the arms 7 of a spider 8, through which extends the center post 9, upon which the spider is slidingly secured, said post being rigidly secured at the bottom upon a tilting platform 10. The top of the center post carries a band 11, rigidly secured upon it by means of a spider 11′, said band having formed therein seats 12 for the reception of the upper ends of the channel-irons 5 when the reel assumes a collapsed position.

The reference-numerals 14 designate apertured lugs which are formed in the seats 12, to which are pivotally secured the bell-cranks 15, these bell-cranks corresponding in number to the channels 5, the upper ends of the bell-cranks being pivotally attached at 16 to the channels 5, and the lower ends of the bell-cranks are pivotally connected at 17 to fingers 18, the latter extending through openings 19, formed in the channels 5. The ends of the fingers 18 are slightly beveled and when in their extended position are lodged in pockets 20, formed in the annular guard 21, which is composed of two sections 22 and 23, hinged together, the forward section 23 being movable and the rearward section 22 being rigidly attached to the reel-housing 1. The said forward section 23 carries an arm 24, which is formed integral with the section 23 and is pivotally secured at 25 to the section 22 of the guard. At the upper extremity of the arm 24 is pivotally attached a connecting-rod 26, the other end of said rod being pivotally attached to a crank-lever 27, which carries a weight 28. Said lever is pivotally attached at 29 to the floor-beams 30, supporting the reel-housing 1. The function of the guard 21 is to maintain the coil of wire in proper position upon the fingers 18 and prevent it from falling off the same and also to serve as a sup-

port for the outer ends of the fingers during the time the wire is resting upon the fingers, and the purpose of forming the guard in hinged sections is to permit of its being opened so as to allow the reel to be tilted when the accumulated coils are to be discharged therefrom, as will be hereinafter described. The lever 27 is operated by the reel-tilting mechanism to swing the forward section 23 of the guard upwardly on its pivot 25 and permit the reel to move outwardly from between the two sections of the guard.

The platform 10 has formed in its upper face seats 31 for the reception of the lower ends of the channel-irons 5, which rest in the seats when the spider 8 is lowered and the upper end of the reel is collapsed and while the reel is being tilted and restored to its vertical position. This platform 10 is pivoted at 32 to a standard 33, which is secured by bolts 34 or other suitable fastening means to the foundation. Formed integral with the platform 10 is a back plate 35, which extends upwardly and is pivotally attached at 36 to the plunger 37 of the hydraulic cylinder 38, which cylinder is trunnioned at 39 in bearings 40, secured upon a standard 41, anchored to the foundation. Through the bearing 40 and trunnion 39 are openings 40′ and 41′, the opening 40′ communicating with the rear end of the hydraulic cylinder 38 and the opening 41′ being in direct communication with the forward end of the cylinder 38. The said hydraulic cylinder 38 is provided at its rear with a supplemental cylinder 42, which is in direct communication with the rear end of the cylinder 38 by means of a pipe 43. The plunger 44 of the supplemental cylinder 42 is connected by toggle-levers 45 to jaws 46, the forward ends of said jaws being connected by a spring 47. A cross-head 48 mounted on the upper end of the back plate 35 carries a guide-rod 49, having formed at its end a head 50, which is locked between the jaws 46. Upon the top of the cross-head 48 is mounted an incline guideway 51, which engages an antifriction-roller 52, carried by the lever 27. The inclined guideway 51 contacts with roller 52 and moves the lever 27 when the lever 48′ is drawn toward the supplemental cylinder 42 by the forward movement of the plunger thereof, the jaws 46 then engaging with the head 50 on guide-rod 49. This movement of lever 27 effects the closing of the guard 21 around the upper end of the reel. The purpose of the hydraulic cylinder and its attached parts is twofold—first, to raise and lower the reel on its pivotal point 32, and, secondly, to effect the opening and closing of the guard 21 around the upper end of the reel, and the operation of these parts will be hereinafter more fully explained.

The platform 10 carries a downward-extending arm 53, which has pivoted at 54 a connecting-rod 55, which in turn is pivotally connected at 56 to a rocking table 57, the latter being connected pivotally at 58 to a standard 59, which also forms a support for the angle-irons 60, which constitute the rails for the truck. These angle-irons or rails 60 are further supported by standards 61 and 62 and form an incline plane. Between these rails 60 are positioned a second set of rails 63 for a dummy carriage 64, which is connected to a cable 65, passing over sheaves 66, 67, and 68. The end of the cable is attached to a hook 69 of a plunger 70 or any other suitable hoisting means. The dummy carriage travels up and down the rails 63, and it engages with an axle of a truck 76, which travels on the rails 60 and serves as a means whereby the truck may be drawn upwardly on said rails 60.

The spider 8 has pivotally connected thereto at 71′ a connecting-rod 71, which is pivotally secured to a bell-crank 72, which is pivoted at 73 to the platform 10, and the lower end of the bell-crank 72 is pivoted to the operating-lever 74, which extends out from the side of the machine, as shown in Fig. 5, so as to be within reach of the workmen. A spiral spring 75 encircles the connecting-rod 71 and is arranged between the bottom of the platform 10 and the connection of the bell-crank 72. This spring serves to assist in the rapid movement of the fingers 18, the spring being normally compressed.

The truck which runs upon the angle-irons 60 and which is provided for the purpose of receiving the coils of wire from the reel and conveying them to any required point is shown in side elevation in Fig. 1 and in plan view in Fig. 2 and is composed of suitably braced and connected parallel plates, the plates at the outer edges of the truck at the forward end extending outwardly beyond the body of the truck and upwardly, so as to form arms 78, which when the reel is tilted will embrace the sides of the reel and serve when the truck is drawn up the inclined tracks by the dummy carriage to strip the coils of wire from the reel.

The operation of my improved coil-manipulating machine is as follows: The wire rods are fed by rolls in the rod-mill (not shown in the drawings) through the center of the reel-housing, downwardly along the outer face of the cone 2, and under the shoe 3, which revolves and forms the rod into a coil. The above is one of the well-known methods of forming coils, and it is from this point that my improved mechanism comes into use. As the rods are formed into coils the latter will rest during their formation upon the fingers 18, and when the entire rod has been formed into a coil the mechanism is operated which will withdraw the fingers 18, partly collapse the reel 4, and allow the coil to drop upon the platform 10. The manner of permitting the coils to drop upon the platform is as follows: The lever 74 is manually operated by thrusting the same forward, thereby operating the

bell-crank 72 and exerting a pull upon the rod 71, which is assisted by the expansion of the spring 75 imparting a downward movement to the spider 8, which carries downwardly with it the channels 5. The upper portions of the channels are by reason of their connection to the band 11 by the bell-cranks 15 drawn inwardly toward the center of the reel, thereby partly collapsing the same. The fingers 18, attached to the bell-cranks 15, will be drawn inwardly, moving through the openings 19 of the channels, which will withdraw the support of the suspended coil, allowing the latter to drop by gravity upon the platform 10. When the coil has been dropped upon the platform, the lever 74 is pulled by the operator, which will reverse the heretofore-described mechanism and return the parts to their normal position. At the completion of every coil the above operation is repeated, each successive coil resting upon the other until the reel has received a number of separate coils to within a short distance from the fingers.

The manner of lowering the reel for the purpose of stripping the same is as follows: The water under pressure enters through the opening 40′ in the end of the hydraulic cylinder, the flow of water through opening 40′ and opening 41′ being controlled by suitable valves (not shown) exerting pressure against the piston on plunger 37, which cannot move until the hydrostatic pressure has continued through pipe 43 into the supplemental cylinder 42, the space in the cylinder 38 in the rear of its plunger, the space in the cylinder 42, and the intervening pipe 43 being kept full of water, the pressure transmitted thereby forcing the plunger 44 forward, operating the toggle-levers 45, and opening the jaws 46, releasing the head 50 carried by rod 49, and allowing plunger 37 to move forward, tilting the reel 4, the plunger being, as before said, connected to the back plate 35, extending upwardly from platform 10, carrying the coils into the truck, the latter being raised simultaneously to meet the same by the movement of levers 53 and 55 and the rocking table and assuming a position as shown in dotted lines in Fig. 1 of the drawings. Simultaneously with the beginning of this operation the inclined guideway 51 being moved forward by the movement communicated to back plate 35 by plunger 37 will permit the antifriction-roller 52 to ride thereupon and permitting the lever 27 to be rocked on its pivot by means of the counterbalance-weight 28, communicating movement to the connecting-rod 26, operating the arm 24, which in turn raises the forward section 23 of the annular guard, permitting a free movement of the reel 4 to its tilted position. As the reel is tilted the downward-extending arm 53 is operated, which serves to raise the table 57, the latter carrying the truck 76 and placing the same in proper position for stripping the reel 4.

The stripping operation is as follows: When the reel and truck have assumed the position shown in dotted lines in Fig. 1 of the drawings, the hydraulic plunger 70 is operated, drawing the dummy carriage 64 by means of the cable 65, which in turn pulls the truck 76. The latter by means of its forked ends 78 will strip the coils from the reel 4, leaving the coils in an upright position upon the truck, which is ascending the incline, where the truck is received for a further handling of the coils. By reversing the hydraulic power through opening 41 the reel and other mechanism are returned to their normal position.

Having described my invention, I claim—

1. In a machine for manipulating coils, a vertical reel mounted on a horizontal axis, means for tilting the reel on its axis, a movable truck adapted to receive the coils from said reel, means operable by the tilting of the reel for moving the truck toward the reel and means for moving said truck to strip the coils from the reel.

2. In a machine for manipulating coils, a collapsible reel, means for sustaining separate coils upon the upper end of the reel, and means operated by the collapsing of the reel for releasing the coils from the upper end of the reel and allowing them to descend thereupon.

3. In a machine for manipulating coils, a collapsible and tilting reel adapted to receive a plurality of coils, means for temporarily supporting each coil on the upper part of the reel and for releasing it from such temporary support and allowing it to descend upon the reel and means for collapsing the reel and means for tilting the reel.

4. In a machine for manipulating coils, the combination of a vertical support, a collapsible spider slidably mounted on said support, means for moving said spider, vertical bars pivotally secured to the arms of said spider, a support for the upper ends of said bars, bell-crank levers connecting said bars to said support, and fingers attached to said bell-crank levers and projecting through the bars, substantially as described.

5. In a machine for manipulating coils, the combination of a vertical support, a spider slidably mounted on said support, means for moving said spider, vertical bars pivotally secured to the arms of said spider, a support for the upper ends of said bars, a guard encircling the upper ends of said bars, said guard being composed of two half-sections pivotally secured together, and means for moving one of said half-sections to release the reel and permit the same to be tilted.

6. In a machine for manipulating coils, the combination of a vertical tilting reel, a hinged platform on which said reel is supported, means for holding the reel in a vertical position and

releasing the same, with a movable truck having bifurcated ends adapted to receive said reel when tilted, and engage the coils thereon to strip the coils from the reel and means for adjusting the position of the truck relatively to the angle which the reel assumes when in its tilted position, said last-named means being connected to and operated by the said platform.

7. In a machine for manipulating coils, a hinged platform, a vertical reel on said platform, collapsible bars pivotally attached to said vertical reel, a two-part hinged guard embracing the upper ends of said bars, means for coiling wire upon said reel, a hydraulic cylinder, spring-catches attached to the piston of said cylinder, a cross-head, a bar attached to said cross-head, a head carried by said bar and adapted to engage said catches, a pivoted and weighted lever adapted to be engaged by said cross-head, and a link connecting said pivoted lever to the movable portion of said guard.

8. In a machine for manipulating coils, a pivoted platform, a reel supported thereby, means for coiling wire upon said reel, a guard composed of two parts hinged together and embracing the upper end of said reel, a hydraulic cylinder having its piston operatively connected to and adapted to move the hinged section of said guard, a second hydraulic cylinder having its piston connected to said platform, and conduits connecting the two cylinders so arranged that the cylinder which is connected to the platform will receive water under pressure from the cylinder which operates the hinged guard so that its piston will follow the movement of the piston of the latter.

9. In a machine for manipulating coils, the combination of a swinging platform, a reel supported thereby, means for coiling wire on said reel, inclined ways, a truck movable on said ways, means carried by said truck to engage the wire on the reel and strip it therefrom, means for moving the truck upon the ways, a rocking table arranged at the end of said ways, pivoted levers connecting said rocking table with said platform, and means for tilting the platform and simultaneously rocking said table.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWIN J. McILVRIED.

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