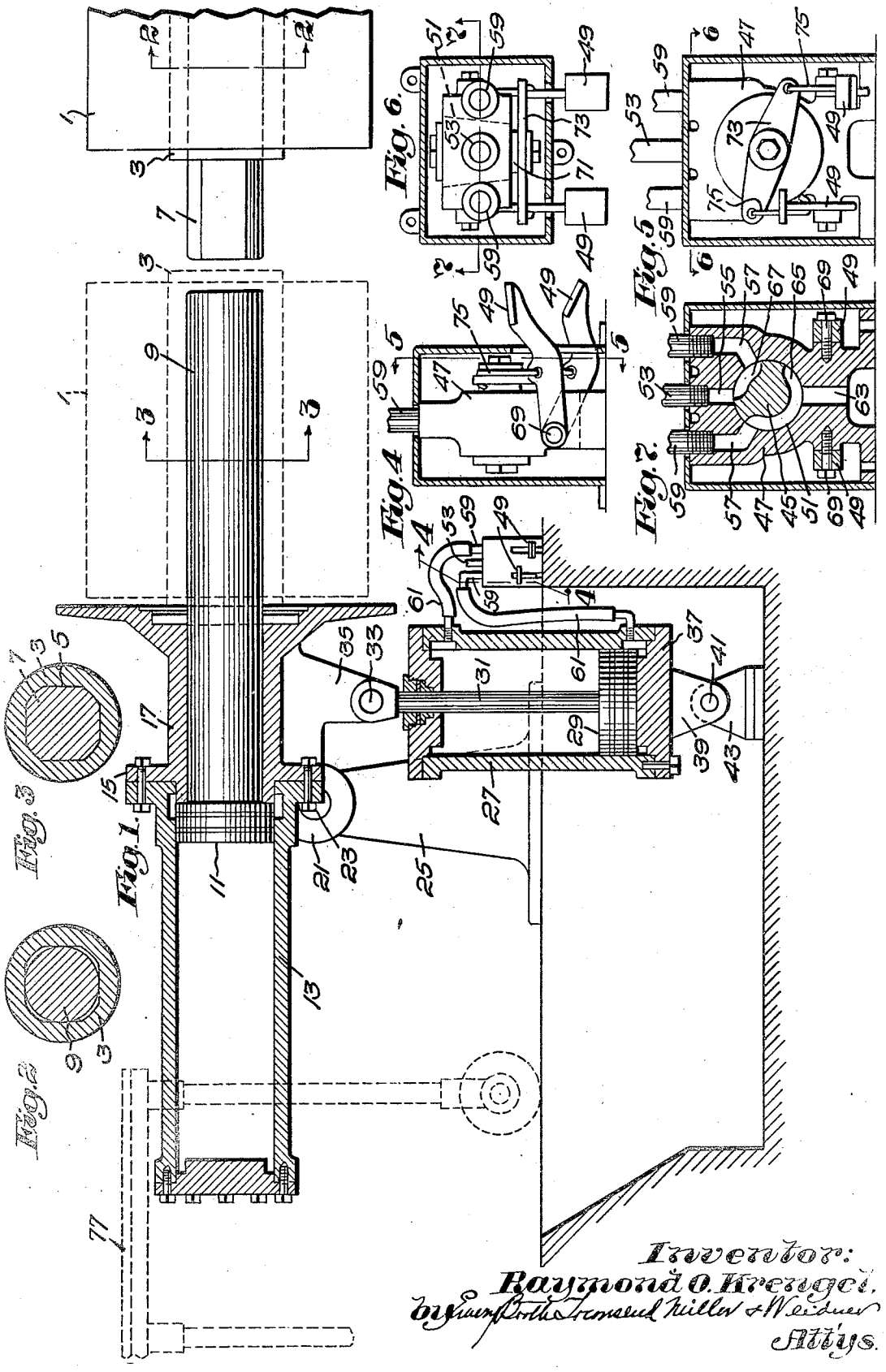
March 12, 1940. R. O. KRENGEL 2,193,765

COIL HANDLING APPARATUS

Filed June 29, 1938 2 Sheets-Sheet 1



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Fig. 12.

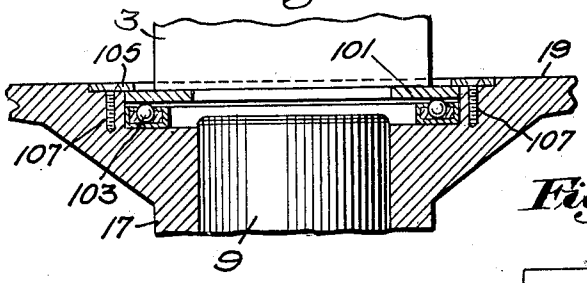


Fig. 8.

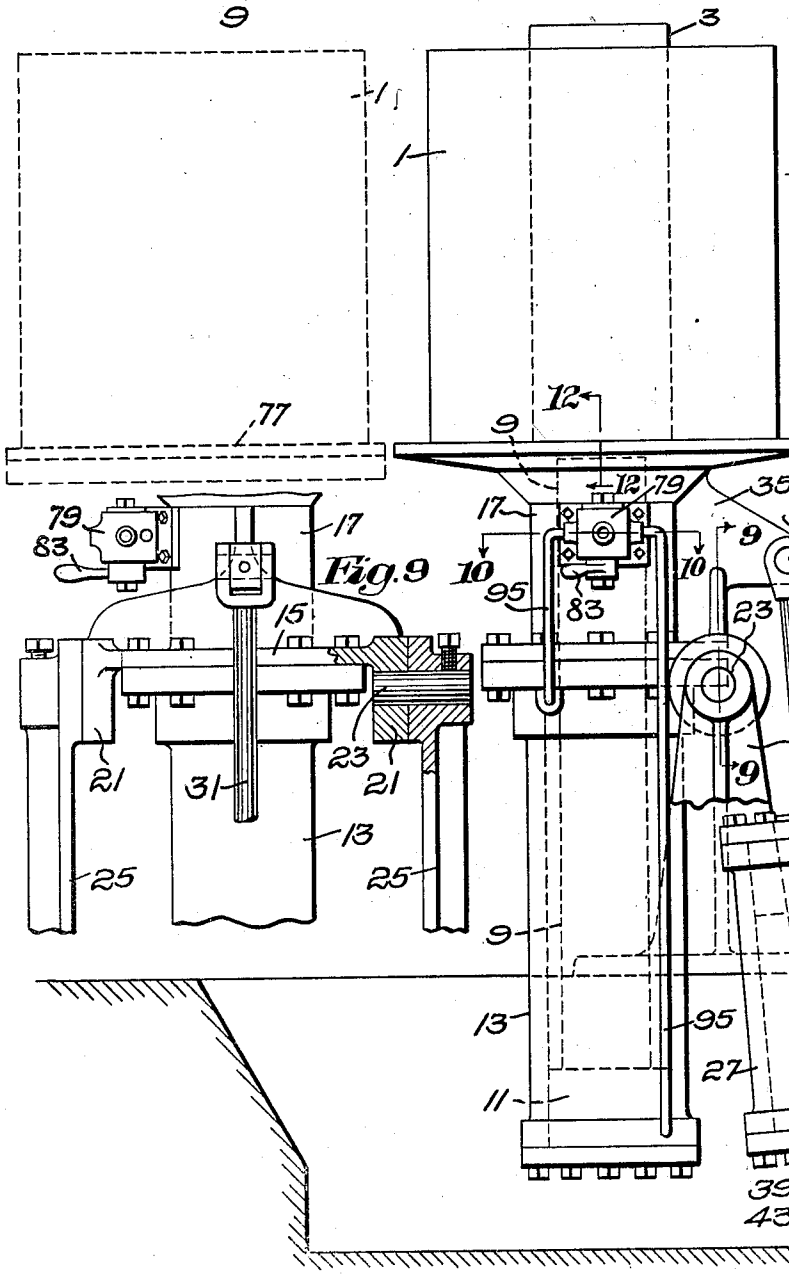


Fig. 10.

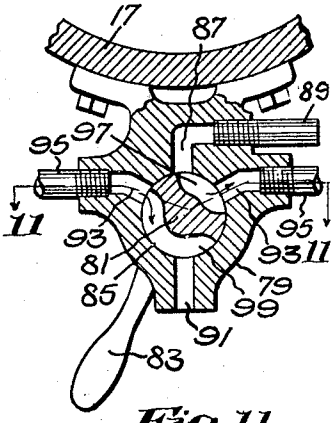


Fig. 11.

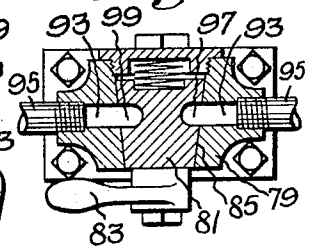


Fig. 9

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UNITED STATES PATENT OFFICE

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COIL HANDLING APPARATUS

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Application June 29, 1938, Serial No. 216,515

18 Claims. (Cl. 214—130)

My invention relates to coil handling apparatus, particularly but not exclusively to a device for receiving and upending coils of strip metal.

The invention will be best understood from the following description when read in the light of the accompanying drawings of an embodiment of the invention selected for illustrative purposes, while the scope of the invention will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is an elevation, with parts in section, of a device for receiving a coil of strip metal from an arbor or so-called blocker shaft on which the coil is wound;

Figs. 2 and 3 are, respectively, sections on the lines 2—2 and 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1, on an enlarged scale, with parts in elevation;

Fig. 5 is a section on the line 5—5 of Fig. 4, with parts in elevation;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is an elevation of the device according to Fig. 1 with the parts in a different position;

Figs. 9 and 10 are, respectively, sections on the lines 9—9 and 10—10 of Fig. 8;

Fig. 11 is a section on the line 11—11 of Fig. 10; and

Fig. 12 is a section on the line 12—12 of Fig. 8 on an enlarged scale.

Referring to the drawings, which show a preferred form of the invention, the coil 1 of thin sheet metal, for example brass, is wound on the drum or so-called "blocker" 3 as the coil leaves the rolling mill or other apparatus which forms or treats it. The blocker 3, as indicated in Figs. 1, 2 and 3, is a sleeve of cylindrical exterior having a polygonal bore 5 which permits it to be slipped over the rotating blocker shaft 7, having the same cross-section as that bore, and removed therefrom.

As is indicated by Fig. 1, the blocker 3 with the coil 1 thereon may be slipped from the blocker shaft 7 to place it on a cylindrical arbor 9 which rotatably receives it. As illustrated, this arbor is a prolongation of a piston rod for the piston 11, which latter is reciprocally received within a cylinder 13. As shown, the front head 15 of the cylinder is formed with an elongated sleeve-like projection 17 the outer end of which is flanged to form a table 19 upon which the coil rests when the parts are in the position shown by Fig. 8.

As shown, the front head 15 of the cylinder 13 is formed with perforated ears 21 (see Fig. 9) receiving the projecting ends of trunnions 23 fixedly carried by standards 25 at the outer sides of the ears. By this construction the part comprising the cylinder 13 and table 19 is mounted for swinging movement so that that part has a position illustrated by Fig. 1 in which it receives the coil and blocker 3 and a position illustrated by Fig. 8 in which the coil and blocker are turned on end.

In the present embodiment of the invention, for swinging the cylinder 13 and associated parts a cylinder 27 is provided in which is reciprocally mounted a piston 29. The piston rod 31 rigidly attached to the piston 29 is pivotally connected at 33 to an arm 35 formed integrally with the sleeve 17. As shown, the lower head 37 of the cylinder 27 is formed with a perforated ear 39 which is pivoted at 41 to a fixed bracket 43 so that the cylinder 27 may swing about the axis of the pivot 41 when the piston 29 is reciprocated for swinging the cylinder 13 and associated parts on the trunnions 23.

For reciprocating the piston 29, in the present embodiment of the invention pressure fluid, preferably compressed air, is admitted to and exhausted from opposite ends of the cylinder 27 by operator controlled means. This means in the present embodiment of the invention comprises an oscillatory plug valve 45 (Fig. 7), the casing 47 of which is mounted on the floor in any convenient position so that it may be operated by foot treadles 49. As shown, compressed air is admitted to the bore 51 of the valve casing from a suitable connection 53 leading from a source of compressed air supply and communicating with a port 55 opening into the bore 51. In the valve casing at opposite sides of the port 55 are ports 57 in communication with short lengths of pipe 59. To these pipes are attached flexible hoses 61 (Fig. 1) in communication with opposite ends, respectively, of the cylinder 27. A port 63 places the bore of the valve casing in communication with the atmosphere, the valve 45 being provided with an exterior arcuate groove 65 adapted to place this port in communication with either port 57 so that opposite ends of the cylinder 27 may be alternately exhausted to the atmosphere. Similarly the valve is provided with an exterior arcuate groove 67 adapted to place either of the ports 57 in communication with the compressed air supply port 55 so that either end of the cylinder 27 may be supplied with pressure fluid while the opposite end thereof is connected to the atmosphere.

As shown, the foot treadles 49 are pivoted at 69 to opposite sides, respectively, of the valve casing 47. The stem 71 of the valve fixedly carries an arm 73 (Fig. 5), each end of which is connected by a bent up wire link 75 to the adjacent foot treadle. In the position of parts illustrated by Figs. 1, 4, 6 and 7 the lower end of the cylinder 27 is connected to the atmosphere and compressed air is admitted to the upper end of the cylinder 27 to hold the piston 29 in its lowermost position. By pressing the uppermost foot treadle 49 of Figs. 1 and 4 down the valve 45 will be turned counter-clockwise to admit pressure fluid to the lower end of the cylinder and exhaust its upper end, which will move the piston 29 to the upper end of its stroke and tilt the cylinder 13 and associated parts into the position illustrated by Fig. 8.

When the parts have been moved into the position shown by Fig. 8 the piston 11 is moved by operator controlled means, to the end of its stroke opposite that shown in Fig. 1, to withdraw the arbor 9 from the blocker 3, whereupon the operator by rotating the blocker back and forth may loosen it from the coil and remove it therefrom for replacement on the blocker shaft 7, and after removal of the blocker may push the coil sideways from the table 19 to place it on a truck, conveyer, or other suitable support 77.

For controlling the reciprocation of the piston 11, in the present embodiment of the invention there is secured to the sleeve 17 the casing 79 (Fig. 8) of a plug valve 81 (Figs. 9 and 10), which valve may be oscillated by a handle 83. As illustrated, communicating with the bore 85 for the valve 81 is a port 87 which may be supplied with motive fluid, preferably compressed air, by means of a flexible hose (not shown) connected to a short length of pipe 89. A further port 91 in communication with this bore connects it to the atmosphere, while one port of a pair of ports 93 in communication with the bore is connected by a pipe 95 to one end of the cylinder 13 and the other by a similar pipe 95 to its opposite end. By means of the arcuate grooves 97 and 99 formed on the exterior surface of the valve the two pipes 95 may be alternately placed in communication with the ports 87 and 91 so as to admit motive fluid to and exhaust it from the opposite ends of the cylinder 13 for reciprocating the piston 11.

As illustrated, the table 19 is conveniently formed with a ring-shaped support 101 (see Fig. 12) for the end of the blocker 3 when the coil rests upon the table 19, this ring-shaped support being mounted on a ball thrust bearing 103 and being retained on the table 19 in any convenient way as, for example, by a ring 105 secured by screws 107 to the table.

It will be understood that within the scope of the appended claims wide deviations may be made from the forms of the invention described without departing from the spirit of the invention.

I claim:

1. A device for receiving and upending coils having, in combination, a part comprising a support upon which the end of a coil is adapted to rest, a reciprocatory arbor operatively carried by said part having a position relative to said support in which it projects from the plane thereof for receiving a coil and another position in which it is withdrawn from the coil, said part being tiltable for moving said arbor and support from a position in which the arbor receives a coil and a position in which the arbor upends the coil and stands it upon said support, and means operatively carried by said tilting part for reciprocating said arbor.

2. A device for receiving and upending coils having, in combination, a tilting part comprising a support upon which the end of a coil is adapted to rest, an arbor reciprocally carried by said part having a position in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, and motor means operatively carried by said part for reciprocating said arbor.

3. A device for receiving and upending coils having, in combination, a tilting part comprising a support upon which the end of a coil is adapted to rest, an arbor reciprocally carried by said part having a position in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, and fluid pressure means carried by said part for reciprocating said arbor.

4. A device for receiving and upending coils having, in combination, a tilting part comprising a support upon which the end of a coil is adapted to rest, an arbor reciprocally carried by said part having a position in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, fluid pressure means for tilting said part, and separate fluid pressure means carried by said part for reciprocating said arbor.

5. A device for receiving and upending coils having, in combination, a tilting part comprising a cylinder and means in fixed relation thereto providing a support on which the end of a coil is adapted to rest, a reciprocatory piston in said cylinder having a piston rod, the end portion of which constitutes an arbor for receiving the coil, said piston having a position in which said arbor projects beyond the plane of said support for receiving a coil and a position in which it is withdrawn from said coil.

6. A device for receiving and upending coils having, in combination, a tilting part comprising a cylinder and means in fixed relation thereto providing a support on which the end of a coil is adapted to rest, a reciprocatory piston in said cylinder having a piston rod, the end portion of which constitutes an arbor for receiving the coil, said piston having a position in which said arbor projects beyond the plane of said support for receiving a coil and a position in which it is withdrawn from said coil, and fluid pressure means for tilting said part.

7. A device for receiving and upending coils comprising a cylinder, a table in fixed relation to said cylinder, said table having a coil supporting surface in spaced relation to the end of said cylinder in a plane normal to and intersecting the axial line of said cylinder, a piston in said cylinder reciprocal axially thereof, means providing a coil arbor operatively directly connected to said piston for reciprocation therewith, said piston having a position in which said arbor projects through the plane of said support for receiving a coil and another position in which said arbor is withdrawn from said coil, means mounting said table and cylinder for tilting about an axis transverse to the axial line

of said cylinder, and means for tilting said table and cylinder about said axis.

8. A device for receiving and upending coils having, in combination, a tilting part comprising a cylinder and a support on which support the end of a coil is adapted to rest, a reciprocatory piston in said cylinder having a piston rod, the end portion of which constitutes an arbor for receiving the coil, said piston having a position in which said arbor projects beyond the plane of said support for receiving a coil and a position in which it is withdrawn from said coil, a second cylinder having a reciprocatory piston therein, a piston rod for the last mentioned piston, and a connection between the last mentioned piston rod and said part for tilting the latter.

9. A device for receiving and upending coils having, in combination, a tilting part comprising a cylinder and a support on which support the end of a coil is adapted to rest, a reciprocatory piston in said cylinder having a piston rod, the end portion of which constitutes an arbor for receiving the coil, said piston having a position in which said arbor projects beyond the plane of said support for receiving a coil and a position in which it is withdrawn from said coil, a second cylinder mounted for tilting and having a reciprocatory piston therein, a piston rod for the last mentioned piston, and a connection between the last mentioned piston rod and said part for tilting the latter.

10. A device for receiving and upending coils having, in combination, a tilting support on which the end of a coil is adapted to rest, an arbor reciprocally associated with said support and having a position in which it projects beyond the plane of said support and another position in which it is withdrawn from the coil, an associated cylinder member and piston member tiltable with said support, one of which members is operatively connected to said arbor for so positioning the latter relative to said support, and a second associated cylinder and piston operatively forming an extensible connection between said support and a relatively normally fixed part for tilting said support.

11. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil.

12. The combination with the arbor of a coil winder of a part comprising a support upon which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, and means operatively carried by said part for reciprocating said arbor.

13. The combination with the arbor of a coil winder of a part comprising a support upon which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, and motor means operatively carried by said part for reciprocating said arbor.

14. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, and fluid pressure means operatively carried by said part for reciprocating said reciprocatory arbor.

15. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, fluid pressure means for tilting said part, and separate fluid pressure means operatively carried by said part for reciprocating said reciprocatory arbor.

16. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, fluid pressure means carried by said part for reciprocating said reciprocatory arbor, and means comprising a cylinder and cooperating reciprocatory piston providing an extensible connection between a fixed part and said tiltable part for tilting the latter.

17. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, said part comprising

a cylinder in fixed relation to said support having therein a reciprocatory piston for reciprocating said reciprocatory arbor, a second cylinder having a reciprocatory piston therein, and a connection between the last mentioned piston and said part for tilting the latter.

18. The combination with the arbor of a coil winder of a part comprising a support on which the end of a coil is adapted to rest and a relatively reciprocatory arbor, said part being mounted for tilting for moving said reciprocatory arbor into and out of substantially axial alignment with said arbor of said coil winder for positioning it to receive a coil and then upend the coil, said reciprocatory arbor having a position relative to said support in which it projects from the plane of said support for receiving a coil and another position in which it is withdrawn from the coil, said part comprising a cylinder in fixed relation to said support having therein a reciprocatory piston for reciprocating said reciprocatory arbor, a second cylinder mounted for tilting and having a reciprocatory piston therein, and a connection between the last mentioned piston and said part for tilting the latter.

RAYMOND O. KRENGEL.