E. W. DUSTON.

COLLAPSIBLE SPOOL.

APPLICATION FILED JAN. 30, 1920.

1,346,812. **Patented July 20, 1920.**

Fig. 1

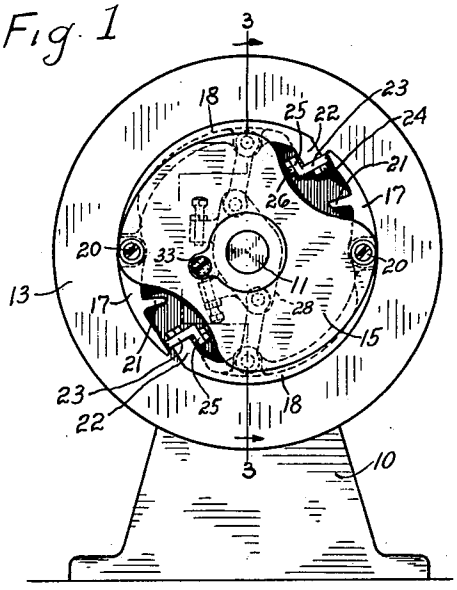


Fig. 2

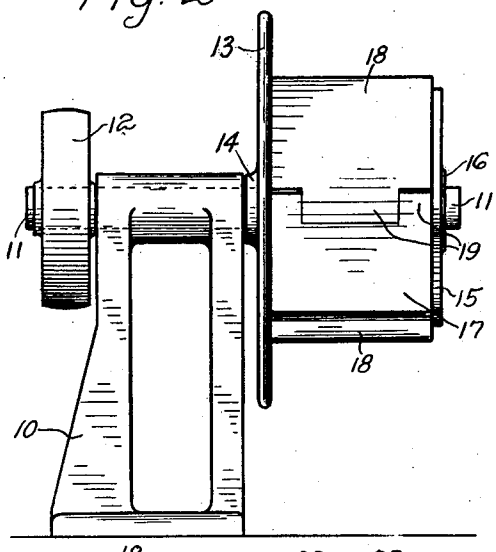
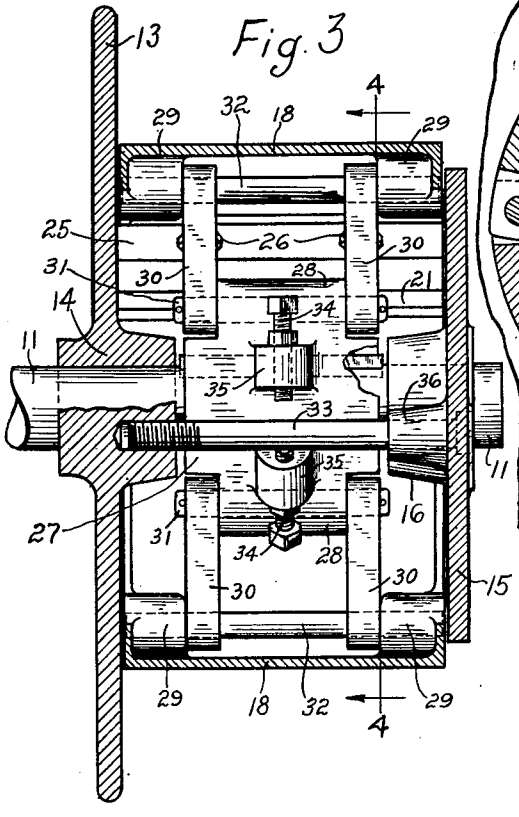


Fig. 3



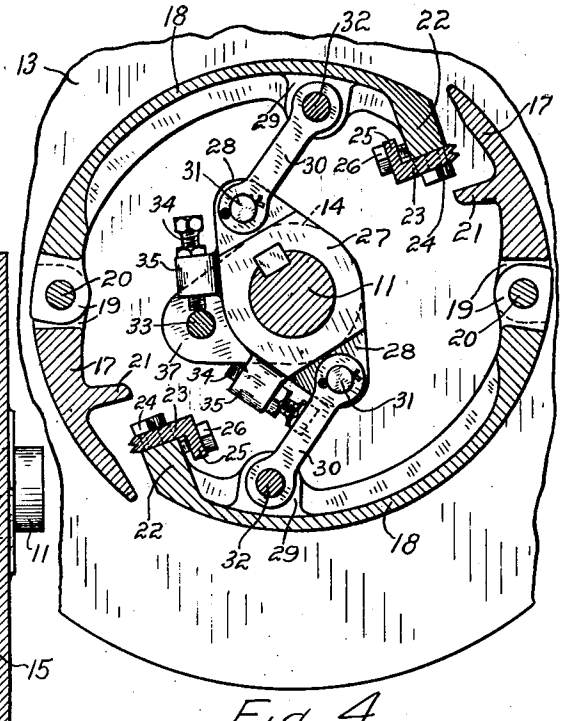


Fig. 4

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COLLAPSIBLE SPOOL.

1,346,812. Specification of Letters Patent. Patented July 20, 1920.

Application filed January 30, 1920. Serial No. 355,137.

To all whom it may concern:

Be it known that I, ERNEST W. DUSTON, a citizen of the United States, residing at 15 Roseland Ave., Waterbury, county of New Haven, State of Connecticut, have invented an Improvement in Collapsible Spools, of which the following is a specification.

This invention relates to the class of spools, so called, or drums, which are used for coiling strip metal and wire, and the invention has for its object to provide a spool of this character which shall be strong and durable and adapted to stand the hardest kind of usage, and which will automatically grip an end of wire or strip metal when power is applied to the shaft and automatically release said wire or strip when the rotation of the spool ceases.

With these ends in view I have devised the novel collapsible spool which I will now describe referring to the accompanying drawing forming a part of this specification and using reference characters to indicate the several parts.

Figure 1 is an end elevation as seen from the right in Fig. 2, the parts being in the gripping position;

Fig. 2 a side elevation;

Fig. 3 a section on an enlarged scale, on the line 3—3 in Fig. 1, looking in the direction of the arrows; and

Fig. 4 is a section on the line 4—4 in Fig. 3, looking in the direction of the arrows, the movable parts being shown in the releasing position.

10 denotes a frame which may be of any ordinary or preferred construction, 11 a shaft mounted to rotate therein, and 12 a belt pulley on the shaft.

13 denotes a flange having a hub 14 which is mounted loosely on the shaft, and 15 an end plate having a hub 16 which is also mounted loosely on the shaft. The periphery or bearing portion of the spool comprises a plurality of arc-shaped plates, four in the present instance, two of which are formed integral with or rigidly secured to the flange and are called fixed plates as they are fixed relatively to the flange, the other two plates being hinged to the fixed plates and called hinged plates. 17 denotes the fixed carrying plates, which extend across and fill the space between the flange and the end plate, and 18 the hinged carrying plates. Plates 17 and 18 are provided with interlocking hinge knuckles 19 and the hinges are completed by cross bolts 20 which pass through the end plate and the knuckles and engage the flange. Fixed carrying plates 17 are provided with stops 21 against which the end of wire or strip abuts when inserted, as will be more fully explained. The free ends of the carrying plates are offset inward, as at 22, and carry gripping plates 23. The gripping plates are locked to the hinged carrying plates by means of set screws 24 which pass through slots in the gripping plates and engage the ends of offsets 22. The gripping plates are provided with angle flanges 25 and are adjusted by means of screws 26 which pass through the flanges and bear against the offset.

The gripping and releasing action of the hinged carrying plates is effected by a toggle action. 27 denotes a hub which is keyed or otherwise rigidly secured to the shaft. This hub is provided with oppositely extending arms 28 and the inner sides of the hinged carrying plates are provided with ears 29. 30 denotes links, the inner ends of which are pivoted to arms 28, as by cross pins 31, and their outer ends are pivoted to ears 29, as by means of cross pins 32. Arms 28 and the links comprise toggles, the action of which will presently be explained.

33 denotes a cross bolt which passes through an enlargement 36 of the end plate and engages an enlargement 37 of the hub of the flange. This cross bolt and the hinge cross bolts 20 connect the flange and the end plate rigidly together and brace and strengthen the structure as a whole. Cross bolt 33 furthermore coöperates with stop screws 34 carried by bosses 35 on hub 27 to limit the opening movement of the hinged carrying plates and as a safety stop to limit the pressure that can be exerted by the toggles and hinged carrying plates against the fixed carrying plates.

The operation is as follows: The end of wire or strip metal is inserted between either of the fixed carrying plates and the corresponding offset on a hinged carrying plate, the stop 21 limiting the inward movement of the end of wire or strip of metal. Power is then applied to rotate the shaft, the operation of the spool then being automatic. The first effect of rotation of the shaft will be to cause the toggle to throw

the swinging carrying plates to their gripping position, the offsets and the fixed carrying plates coöperating as fixed and movable gripping jaws. As soon as the toggle has effected the gripping action, rotation of the shaft will be transmitted through the toggles to the spool as a whole and the wire or strip of metal will be coiled thereon, the carrying portion of the spool being now practically circular as the hinged carrying plates will be in the operative position as in Fig. 1. The parts will remain in the gripping or operative position so long as power is applied to the shaft. Rotation of the shaft will cease immediately after the power is cut off. Momentum however will carry the flange, end plate and carrying plates forward after the shaft has ceased to rotate, the effect of which is to cause the spool to collapse automatically, as in Fig. 4. Links 30 will swing inward carrying the free ends of the hinged carrying plates with them, the offsets, carrying the gripping plates, swinging away from the fixed carrying plates and leaving the inner end of the coil wholly disconnected from the spool so that it may be readily slipped off therefrom, and over the end plate which is of less diameter than the carrying portion of the spool. The end plate is preferably cut away, as clearly shown in Fig. 1, to give convenient access to the set screws and adjusting screws of the gripping plates. The operation of stop screws 34 and cross bolt 33 will be readily understood from Fig. 4. One of these stop screws is set and locked to limit the inward movement of the hinged carrying plates, the other being set as a safety stop to limit the pressure that can be exerted by the toggles and the hinged carrying plates against the fixed carrying plates.

Having thus described my invention, I claim:

1. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto and completing the carrying portion of the spool, means on the hinged carrying plates coöperating with the fixed carrying plates to grip an end of wire or strip metal, and means for automatically throwing the hinged carrying plates inward when rotation ceases, thereby releasing the end of wire or strip metal and permitting removal of a coil from the spool.

2. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto, a hub having arms extending therefrom, and links pivoted to said arms and to the hinged carrying plates, said arms and links comprising toggles, so that when rotation of the hub ceases momentum will cause the toggles to swing the free ends of the hinged carrying plates to their releasing position.

3. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto, the free ends of said hinged plates being offset inward and cooperating with the fixed carrying plates as gripping jaws, a hub having arms extending therefrom, and links pivoted to said arms and to the hinged carrying plates, said arms and links comprising toggles and causing the jaws to grip an end of wire or strip metal, when the hub is causes to rotate and to release the same when the hub ceases to rotate.

4. A spool of the character described comprising a flange and an end plate each having a hub, a shaft on which said hubs are loosely mounted, a hub adapted to be fixed to the shaft and having arms, carrying plates integral with the flange, other carrying plates hinged to said fixed plates, and links pivoted to the arms and to said hinged plates, said arms and links comprising toggles and the hinged carrying plates and the contiguous fixed carrying plates comprising gripping jaws, the toggles causing gripping action of the jaws when the hub is rotated and releasing action when the hub ceases to rotate.

5. A spool of the character described comprising a flange and an end plate each having a hub, a shaft on which said hubs are loosely mounted, carrying plates integral with the flange, other carrying plates hinged to said fixed plates, a hub adapted to be fixed to the shaft, toggle connections between the hub and the hinged carrying plates, which act to swing the free ends of the hinged carrying plates into gripping position when the hub is rotated and to swing said plates into releasing position when the hub ceases to rotate, and means for limiting the swinging movements of said plates.

6. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto, said hinged plates and the contiguous fixed plates comprising gripping jaws, a hub having arms extending therefrom and bosses carrying stop screws, links pivoted to said arms and to the hinged plates, said arms and links comprising toggles, so that rotation of the hub will cause gripping action of the jaws and stoppage of rotation will cause releasing action, and a cross bolt coöperating with the stop screws to limit the gripping and releasing movements of the hinged plates.

7. A spool of the character described comprising a flange and an end plate each having a hub, a shaft on which said hubs are loosely mounted, cross bolts connecting said flange and end plate, a hub adapted to be fixed to the shaft and having arms, fixed carrying plates integral with the flange, other carrying plates hinged to said fixed plates, links pivoted to the arms and to the hinged plates, said arms and links com-

prising toggles and the hinged plates and contiguous fixed plates comprising gripping jaws, and stop screws carried by the hub and coöperating with one of the cross bolts to limit the gripping and releasing action of the swinging plates.

8. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto and offset inward at their free ends, adjustable gripping plates carried by said offsets and coöperating with contiguous fixed plates as gripping jaws, a rotary hub having arms, and links pivoted to said arms and to the hinged plates and comprising toggles substantially as described for the purpose specified.

9. A spool of the character described comprising fixed carrying plates, other carrying plates hinged thereto and offset inward at their free ends, adjustable gripping plates carried by said offsets and coöperating with contiguous fixed plates as gripping jaws, a rotary hub having arms, links pivoted to said arms and to the hinged plates, said arms and links comprising toggles whereby the hinged plates are swung to gripping position when the shaft is rotated and to releasing position when rotation of the shaft ceases, and stops for limiting the gripping and releasing movement of the hinged plates.

10. A spool of the character described comprising fixed and hinged carrying plates, each of said hinged carrying plates being hinged at one of its ends to a fixed carrying plate, the opposite ends of each of said hinged carrying plates being free and being offset inwardly so that they may engage fixed carrying plates which are contiguous said free ends, means comprising toggles for holding said free ends in engagement with said contiguous fixed carrying plates, and means for swinging said hinged carrying plates away from said contiguous fixed carrying plates and toward the center of the spool, said last mentioned means being forced to act by reason of the momentum of the spool.

In testimony whereof I affix my signature.

ERNEST W. DUSTON.