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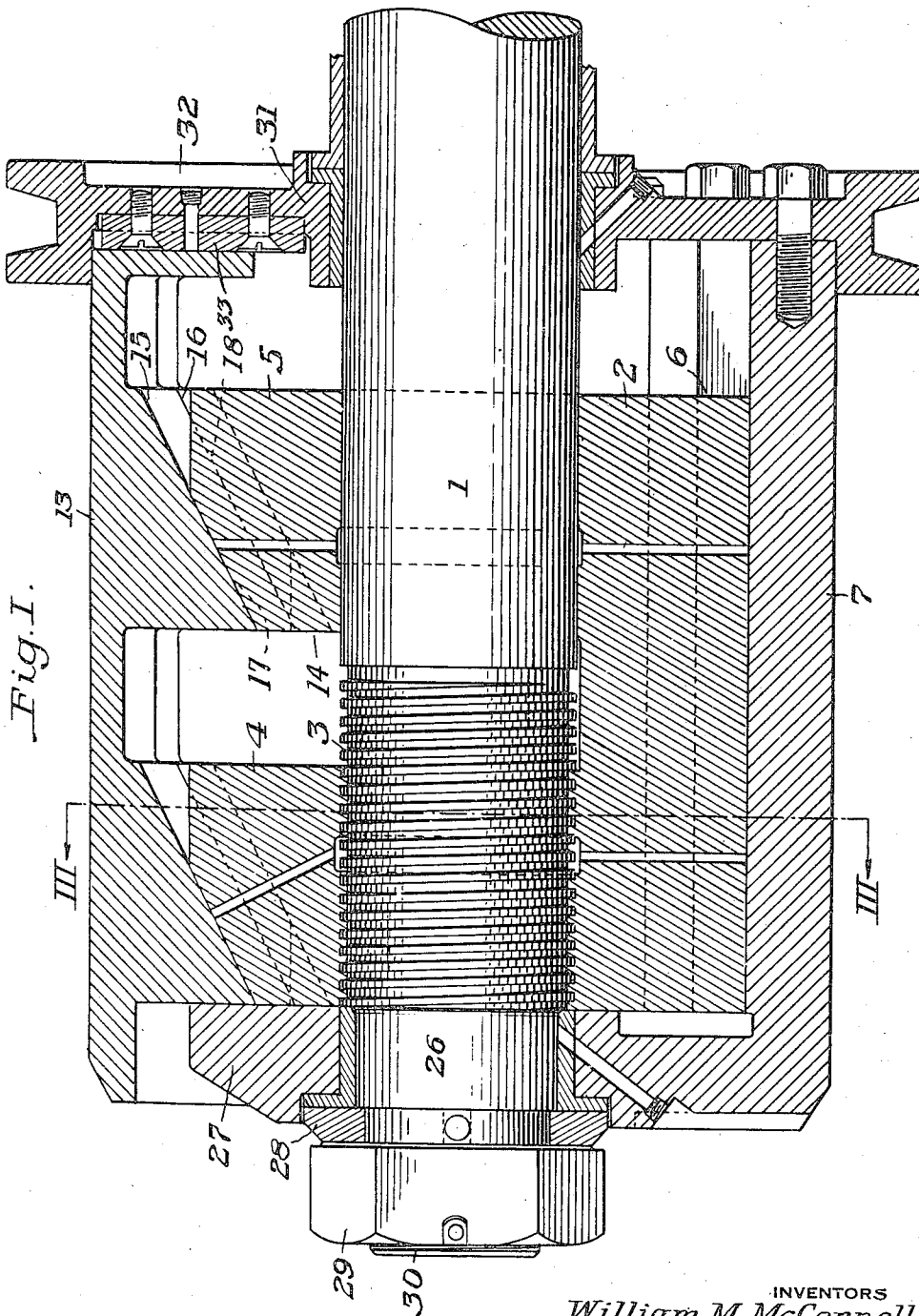
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2,483,144

STRIP COILER

Filed Oct. 11, 1945

5 Sheets-Sheet 1



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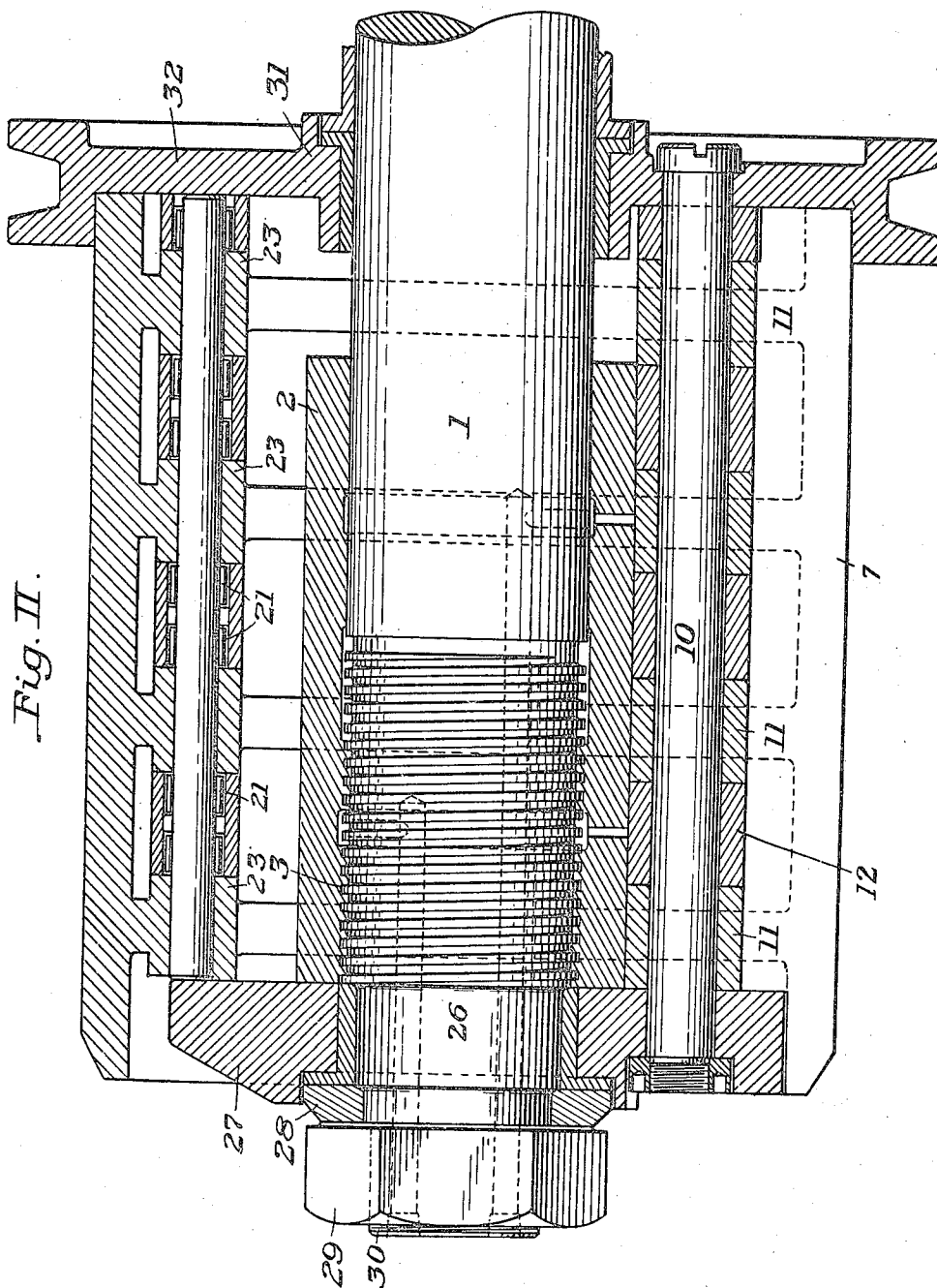
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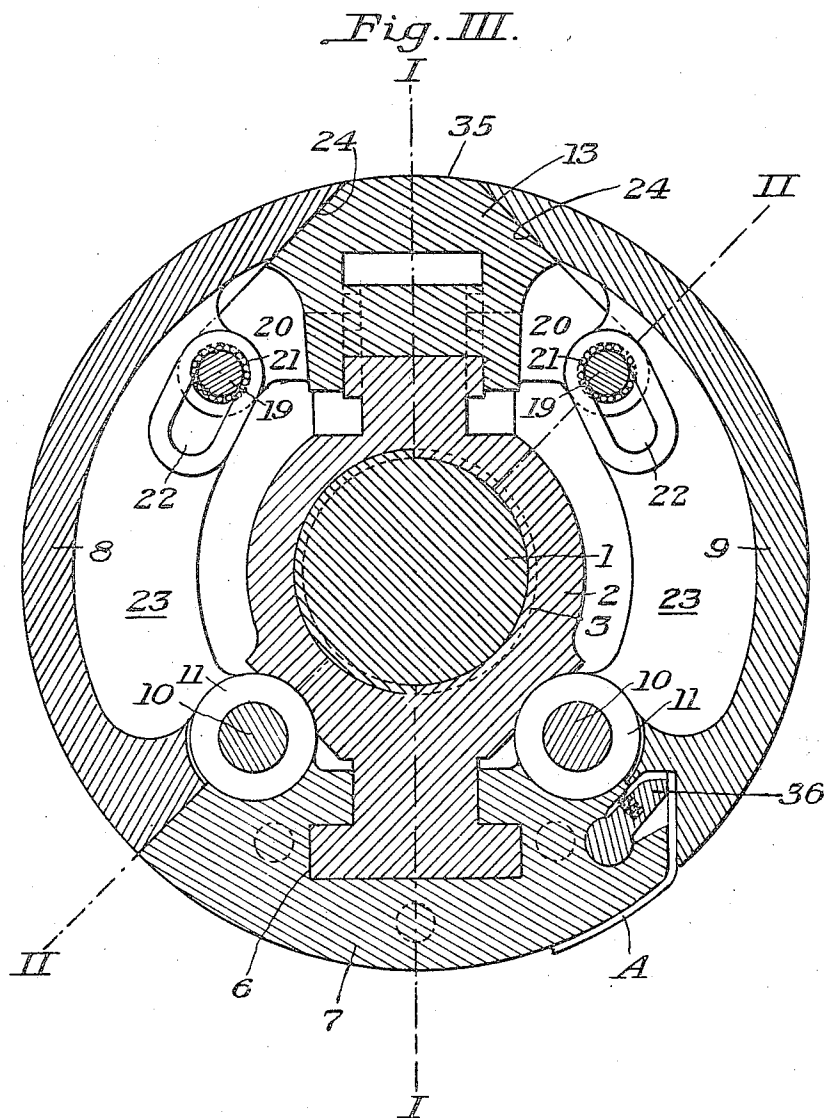
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Fig. IV.

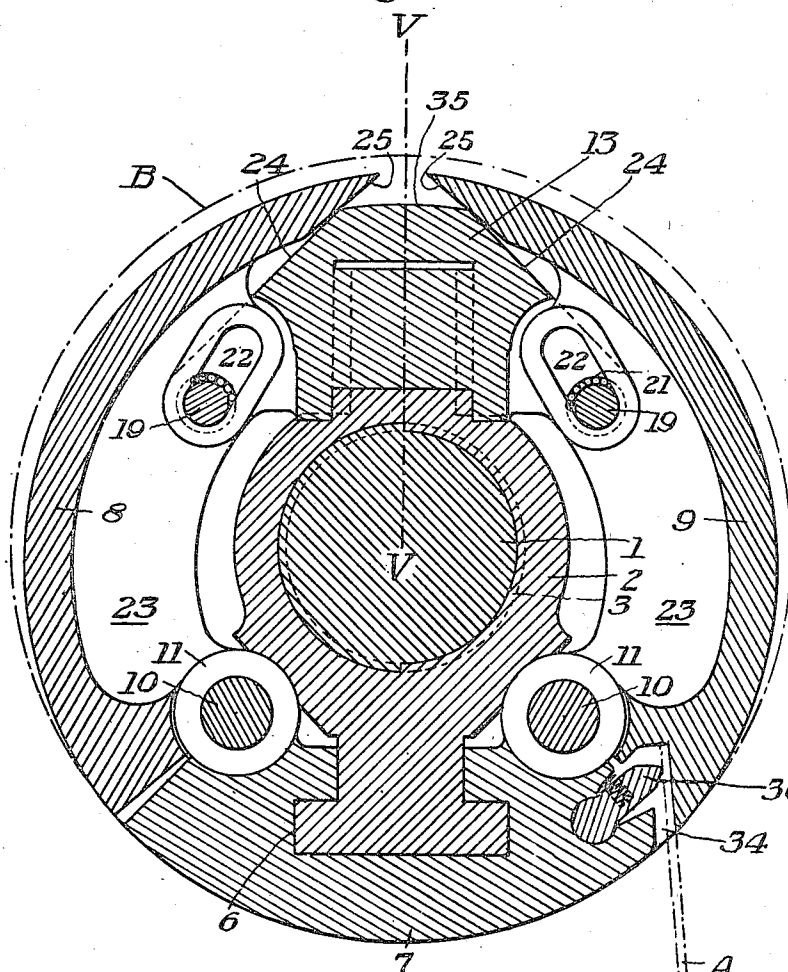
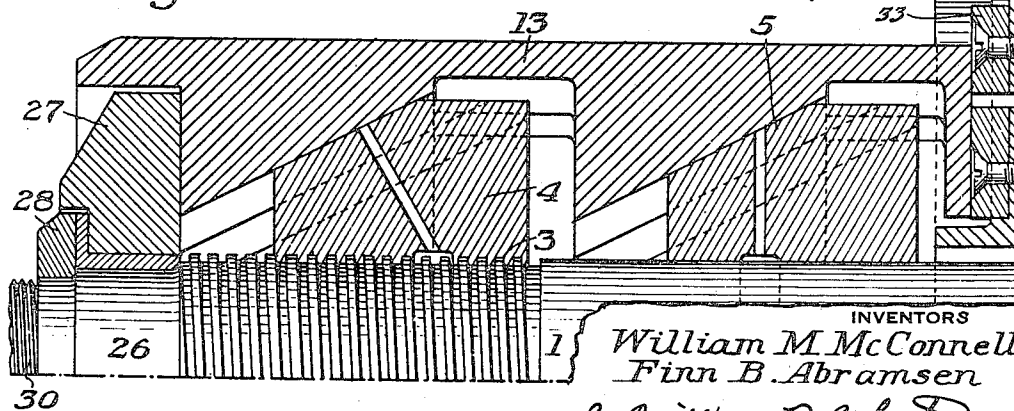


Fig. V.



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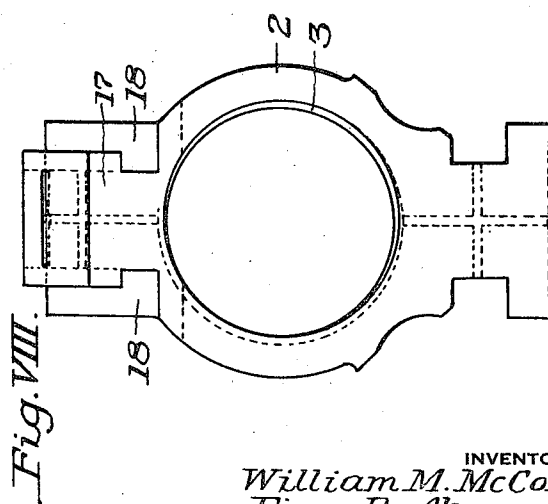
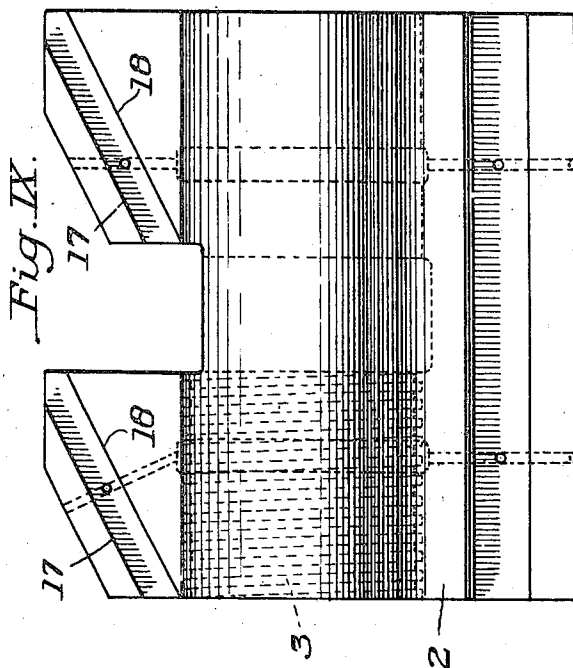
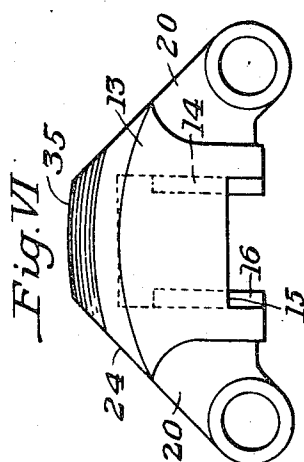
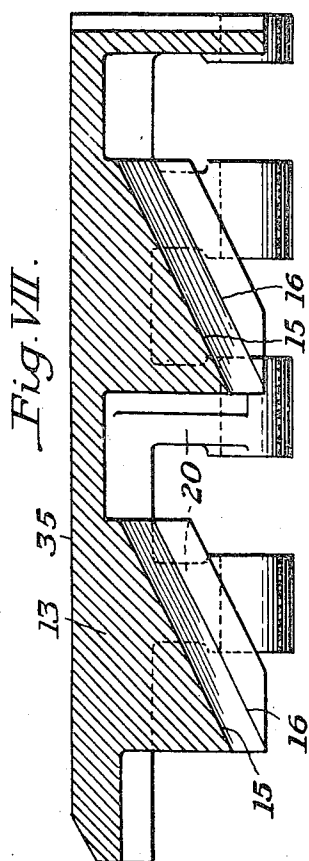
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STRIP COILER

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5 Claims. (Cl. 242—72)

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This invention relates to an expansible and contractible coiler for steel strip and other strip metal.

The general object of the invention is to provide a strip coiler which is simple and sturdy in construction, which is positive in its expanding and contracting action, which provides in its expanded condition a coil supporting surface which closely approaches a true circle without open joints which must be covered to provide an uninterrupted peripheral surface for the strip as it is wound, and which provides contracting movement adequately to free the inside diameter of a coil of strip wound on it.

In the accompanying drawings, illustrative of an embodiment of our invention:

Fig. I is a longitudinal sectional view, taken in the plane of the section line I—I of Fig. III.

Fig. II is a longitudinal sectional view, taken in the plane of section line II—II of Fig. III.

Fig. III is a cross-sectional view taken in the plane of the section line III—III of Fig. I, and together with Figs. I and II showing the coiler in expanded, strip-winding condition.

Fig. IV is a cross-sectional view, taken in the same plane of Fig. I as that in which Fig. III is taken but showing the coiler in contracted coil-releasing condition.

Fig. V is a longitudinal sectional view, taken along one radius of the coiler structure in the plane of the section line V—V of Fig. IV.

Fig. VI is a front elevation of a radially movable segment forming an element of the structural organization of the coiler.

Fig. VII is a central longitudinal sectional view of the segment shown in Fig. VI.

Fig. VIII is a front elevation of a longitudinally movable wedge nut forming an element of the structural organization of the coiler.

Fig. IX is a side elevation of the wedge nut shown in Fig. VIII.

In the accompanying drawings, reference numeral 1 designates a central shaft which functions both to rotate the coiler in winding the strip thereon and as means for producing expanding and collapsing action of the coiler segments. A longitudinally-movable nut 2 is threaded at 3 on rotatable shaft 1 and carries wedge shoes 4 and 5. At its lower end nut 2 has an interlocked sliding engagement 6 with a fixed segment 7 which does not participate in either longitudinal movement or expanding and collapsing action of the coiler elements, but which serves as an anchor for the movable elements of the coiler. Two swinging segments

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8 and 9 are hinged adjacent one of their ends to the fixed segment 7, by pintles 10 which are carried by hubs 11 of the segments 8 and 9 abutting hubs 12 on segment 7.

Positive expanding and collapsing action of the coiler is effected by longitudinal movement of wedge nut 2 in cooperation with a radially movable segment 13. As shown, segment 13 has an interlocked sliding engagement at 14 with shoes 4 and 5 of longitudinally-movable nut 2, and has forwardly inclined surfaces 15 and 16 cooperatively matching the forwardly inclined surfaces 17 and 18 of the shoes. There is an interconnection between radially movable segment 13 and the hinged swinging segments 8 and 9 by means comprising inclined ways. As shown, this connection is by means of pins 19 carried by segment 13 in hubs 20 provided with quill bearings 21, which hubs lie between elongate inclined eyes 22 which are formed as extensions of webs 23 on hinged segments 8 and 9, and extend divergently outward at equal angles to the center line of the coiler which stands vertically in the drawings. These elongate inclined eyes 22 embrace the pins 19 carried by radially movable segment 13. Eyes 22 and pins 19 thus are elements which provide connection between radially movable segment 13 and swinging segments 8 and 9 and which provide inclined ways for relative travel of the pins and eyes during expanding and collapsing movement of the coiler segments. On its outer face, segment 13 is provided with inwardly divergent faces 24 which ride upon, and in expanded condition of the coiler match with, inwardly divergent faces 25 at the free ends of the segments 8 and 9.

Surrounding a forward unthreaded region 26 of shaft 1, and bearing against fixed segment 7 and the movable segments of the coiler, there is a collar 27 held in place by washer 28 and by a nut 29 on a further reduced and threaded zone 30 of the shaft 1. Longitudinal movement of nut 2 under rotation of shaft 1 is limited forwardly of the coiler by collar 27. Rearwardly of the coiler, the hub 31 of a brake drum 32 is freely mounted on shaft 1. Segment 13 has a radial keyed connection 33 with brake drum 32, so that when the brake drum is held, segment 13 can move radially but cannot rotate with the shaft. Because of the interlocked relation of the structural elements of the coiler, the holding of brake drum 32 and segment 13 against rotation prevents the rotation of the coiler as a whole with rotation of shaft 1.

Considering the coiler in its contracted condi-

tion with its movable segments collapsed as shown in Fig. IV of the drawings, a strip A which is to be coiled is inserted in a longitudinal slot-like gap 34 between adjacent edges of swinging segment 8 and fixed segment 7. Brake drum 32 is held against rotation, and shaft 1 is rotated counter-clockwise with respect to the showing of Figs. III and IV which are taken in a plane looking to the left in Figs. I, II and V. This rotation of shaft 1 causes longitudinally-movable wedge nut 2 to move forwardly, that is to the left in Fig. V, into the position shown in Fig. I. In this movement the inclined interlocking engagement of its shoes 4 and 5, cooperatively with the inclined surfaces of segment 13, carries that segment radially outward from the position shown in Fig. IV of the drawings to the position shown in Fig. III thereof.

In this radially outward movement, the inclined surfaces 24 of segment 13, sliding on the adjacent inclined surfaces 25 at the ends of swinging segments 8 and 9, force those segments outwardly until arcuate terminal face 35 of segment 13 forms part of the periphery of the collar and the inclined faces 24 and 25 on segment 13 and swinging segments 8 and 9 respectively lie in matching contact to form a continuous coil-supporting structure. This action positively forces segments 8 and 9 to swing about their hinged connection with fixed segment 7, to bring them into the position shown in Fig. III. In this action radial movement of segment 13 and swinging movement of segments 8 and 9 are positively related in manner to insure and control swinging of the ends of the hinged segments by the described connection, including the inclined eyes 22 in which the embraced pins 19 ride. Thus as segment 13 moves radially outward, pins 19 which it carries moving outwardly with the segment, relate the broadest extent of segment 13 defined by its pins 19 with the ultimate position of the swinging segments 8 and 9. Swinging of segments 8 and 9 causes the edge of strip A inserted into gap 34 between adjacent edges of segment 9 and fixed segment 7 to be engaged by those edges, and for the sake of security desirably to be engaged by one or more spring-urged dogs 36 mounted in a cavity of the fixed segment. If so desired, provision for gripping the strip may be provided additionally or alternatively between swinging segment 8 and fixed segment 7.

It will be noted that in its expanded strip-coiling condition the periphery of the collar provides what is in effect a perfectly circular, continuous surface for the coil. In the coiling operation, brake drum 32 is released and shaft 1 is rotated counter-clockwise with respect to Fig. III. This rotation of shaft 1 rotates the collar as a whole to wind the strip, and in this rotation there is a continuing tendency to force wedge nut 2 forwardly, that is to the left in Fig. I, the more firmly to lock the collar segments in their expanded relation. When the desired length of strip has been coiled, rotation is discontinued and brake drum 32 again is held. Brake drum 32 being held, shaft 1 is rotated clockwise with respect to Fig. III. The segments being held against rotation by keyed engagement 33 of segment 13 with the brake drum, this rotation of shaft 1 moves nut 2 rearwardly, that is to the right in Fig. I, bringing its shoes 4 and 5 into the position shown in Fig. V of the drawings. In this movement the interlocked inclined engagement of shoes 4 and 5 on wedge nut 2 draws

radially movable segment 13 inwardly to the collapsed position shown in Figs. IV and V.

As segment 13 moves radially inward, its broadest extent is related to the position of swinging segments 8 and 9 by movement of pins 19 along the inclined ways provided by eyes 22. This serves positively to define the relative positions of radially movable segment 13 and swinging segments 8 and 9, as segment 13 is withdrawn inwardly along inclined surfaces 25 at the free ends of the swinging segments. Simultaneously the swinging movement of segment 9 opens the gap 34 between a side edge of segment 7 and the adjacent edge of the swinging segment, and releases the edge of the coiled strip A from engagement by dog 36.

Several advantages of the collar should be noted in connection with the structural embodiment herein illustrated and described. It has been mentioned above that in the expanded condition of the collar its segments form a perfect circle, which is completed by the arcuate outer surface 35 of segment 13 and its matching relation with the free ends of segments 8 and 9 to give an uninterrupted colling surface in expanded condition of those elements. When the segments are collapsed it will be seen by reference to Fig. IV of the drawings that the segments move out of contact with the inner turn of the coil, indicated by broken line B, to a maximum adjacent the free ends of segments 8 and 9 and that the space between the outer surfaces of those segments and the inner turn of the coil decreases very gradually along the arcuate extent of the swinging segments so that approximately the entire surface of those segments is collapsed inwardly out of contact with the coil.

Having illustrated and described one physical embodiment of our invention it is to be understood that we do not strictly limit ourselves to the specific organization of the collar as so illustrated and described, but that such illustration and description is susceptible to substantial modification while remaining within the statement of the claims appended hereto.

We claim as our invention:

1. In a collar the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a fixed segment having interlocked sliding engagement with the said longitudinally-movable wedge nut, two swinging segments having hinged connection with said fixed segment, a fourth segment having a wedging surface cooperative with the wedging surface of the said longitudinally-movable nut and radially movable between free terminals of the said hinged segments into and out of expanded position, and cooperative connecting elements carried by said hinged segments and said fourth segment including inclined ways positively relating radial inward and outward movement of the said fourth segment with inward and outward swinging movement of the said hinged segment.

2. In a collar the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a fixed segment having interlocked sliding engagement with the said longitudinally-movable nut, two swinging segments having hinged connection with the said fixed segment, a fourth segment having a wedging surface cooperative with the wedging surface of the said longitudinally-movable nut and interlocking engagement therewith, the said fourth segment being radially movable between

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free terminals of the said hinged segments into and out of expanded position, and cooperative connecting elements carried by said hinged segments and said fourth segment comprising inclined embracing eyes and embraced pins positively relating radial inward and outward movement of the said fourth segment with inward and outward swinging movement of the said hinged segments.

3. In a coiler the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a fixed segment having interlocked sliding engagement with the said longitudinally-movable wedge nut, two swinging segments having hinged connection with said fixed segment, a fourth segment having a wedging surface cooperative with the wedging surface of the said longitudinally-movable nut and interlocked engagement therewith, the said fourth segment being radially movable between free terminals of the said hinged segments into and out of expanded position, cooperative connecting elements carried by said hinged segments and said fourth segment including inclined ways positively relating radial inward and outward movement of the said fourth segment with inward and outward swinging movement of the said hinged segments, and means for holding said segment against rotation with said shaft to cause radial movement thereof by longitudinal movement of said wedge nut when the shaft is rotated.

4. In a coiler the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a fixed segment having interlocked sliding engagement with the said longitudinally-movable wedge nut, two swinging segments having hinged connection with the said fixed segment, a fourth segment having a wedging surface cooperative with the wedging surface of the said longitudinally-movable nut and interlocking engagement therewith, the said fourth segment being radially movable between free terminals of the said hinged seg-

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ments into and out of expanded position, cooperative connecting elements carried by said hinged segments and said fourth segment comprising inclined embracing eyes and embraced pins positively relating radial inward and outward movement of the said fourth segment with inward and outward swinging movement of the said hinged segments, and means for holding said segment against rotation with said shaft to cause radial movement thereof by longitudinal movement of said wedge nut when the shaft is rotated.

5. In a coiler the combination of a rotatable driving shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a segment having interlocked wedging engagement with said wedge nut for radial outward and inward movement with respect to said shaft, means for holding said segment against rotation with said shaft to cause radial movement thereof by longitudinal movement of said wedge nut when said shaft is rotated, a fixed segment, and additional segments arranged to be brought by rotation of said shaft into relation with the said first segment in its radially outward position to form with said first segment and said fixed segment a matching structure presenting outwardly an uninterrupted substantially circular coil-supporting surface.

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