Sept. 27, 1949. W. M. McCONNELL ET AL 2,483,143

STRIP COILER

Filed Oct. 11, 1945 2 Sheets-Sheet 1

Fig. I.

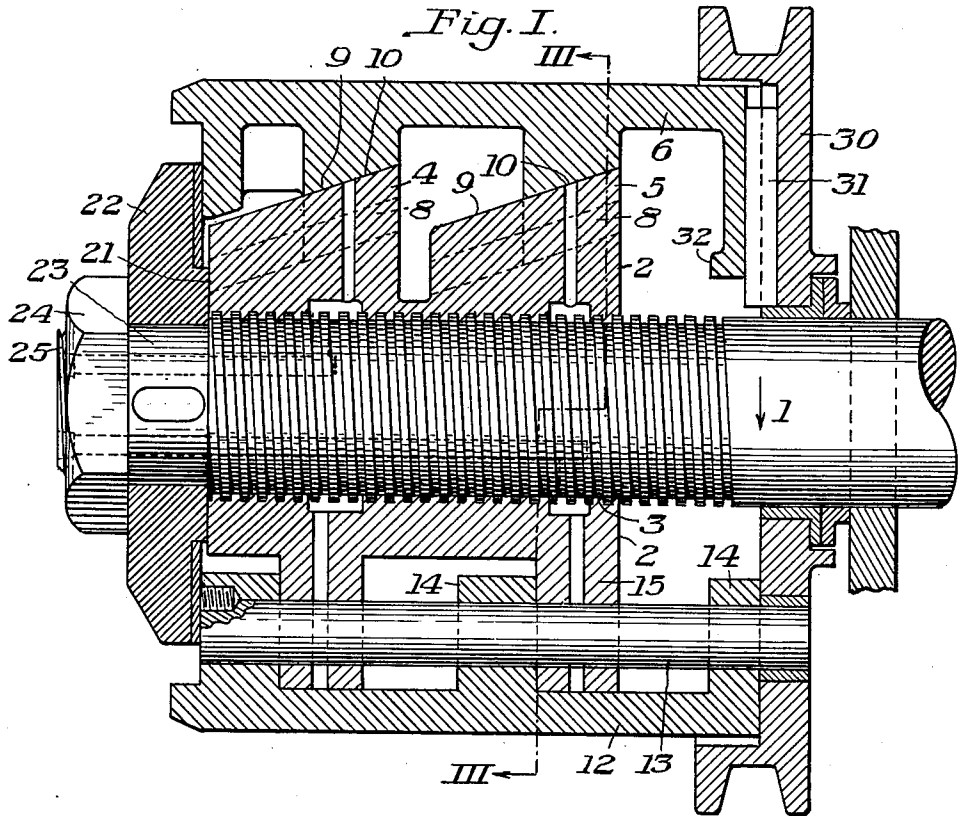
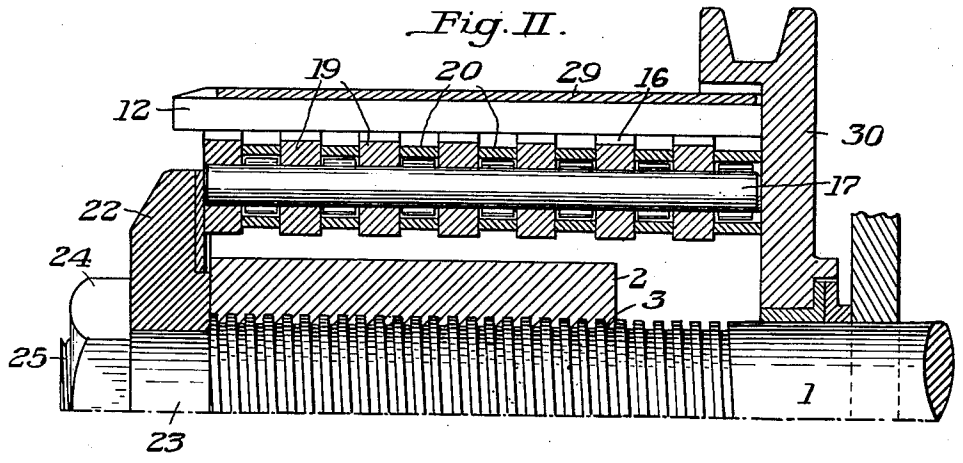


Fig. II.



INVENTORS

William M. McConnell

Finn B. Abramsen

by William B. Wharton

their attorney

Sept. 27, 1949. W. M. McCONNELL ET AL 2,483,143

STRIP COILER

Filed Oct. 11, 1945 2 Sheets-Sheet 2

Fig. III

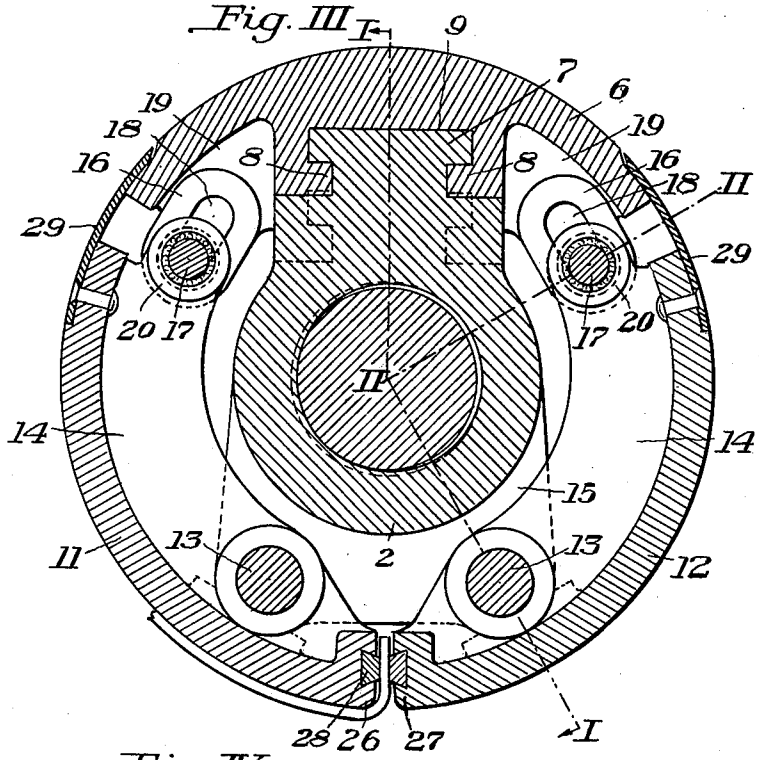
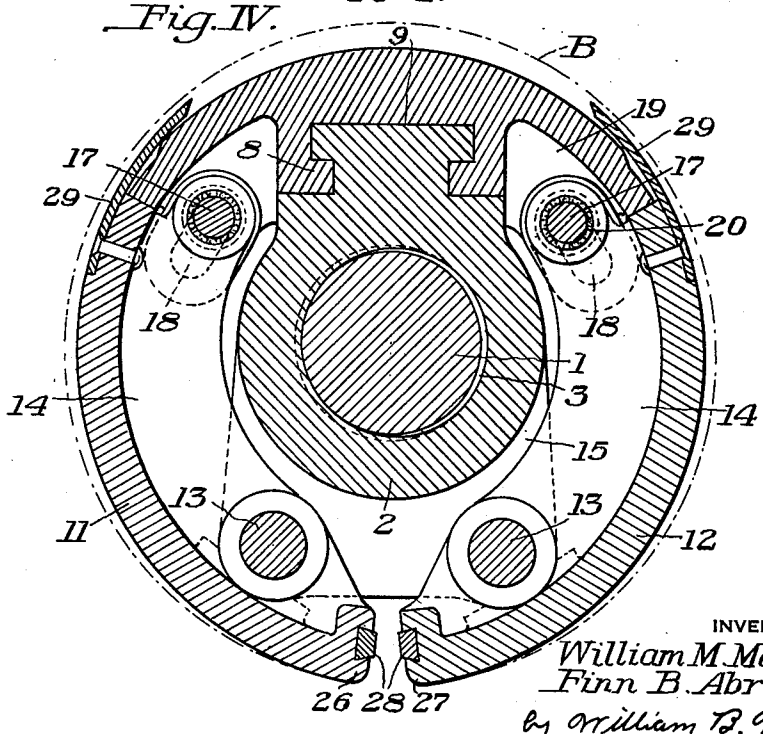


Fig. IV.



INVENTORS
William M. McConnell
Finn B. Abramsen
by William B. Wharton
their attorney

Patented Sept. 27, 1949 2,483,143

UNITED STATES PATENT OFFICE

2,483,143

STRIP COILER

William M. McConnell, McKeesport, and Finn B. Abramsen, Baldwin Township, Allegheny County, Pa., assignors to Mackintosh-Hemphill Company, Pittsburgh, Pa., a corporation of Delaware

Application October 11, 1945, Serial No. 621,804

7 Claims. (Cl. 242—72)

1

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

The 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, 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 through the coiler, taken in the plane of the section line I—I of Fig. III, showing the coiler in expanded condition.

Fig. II is a fragmentary longitudinal sectional view taken to the longitudinal axis of the coiler in the plane of the 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 showing the coiler in expanded condition.

Fig. IV is a cross-sectional view taken in the same plane as that in which Fig. III is taken and showing the coiler in contracted condition.

In the drawings reference numeral 1 designates a central shaft which by its rotation serves both to rotate the coiler and to effect expansion and contraction thereof. Surrounding shaft 1 there is a longitudinally-movable wedge nut 2 having threaded engagement 3 with the central shaft. Longitudinally-movable nut 2 carries two wedge shoes 4 and 5, each of which has interlocked engagement with a radially movable segment 6 by means of lateral extensions 7 on the shoes 4 and 5 and inward extensions 8 of the segment 6. Matching surfaces of the shoes and the segment 6, including the broader surfaces 9 and 10 of the shoes and of the segment respectively and the surfaces of the interlocking extensions of the shoes and segment, are inclined to the longitudinal axis of the coiler. Two swinging segments 11 and 12 have hinged mounting adjacent one of their ends on wedge nut 2 by means of pintles 13 which are carried by hubs 14 of the segments and pass through hubs 15 of the wedge nut. Adjacent the free ends of the segments 11 and 12, hubs 16 on webs 19 of each segment carry a longitudinally extended pin 17 which is embraced by interposed elongate inclining eyes 18 carried by radially movable segment 6. The eyes 18 incline divergently outward at equal angles to the center line of the coiler which stands vertically in the drawings. Desirably as shown pins 17 are rotatably mounted in quill bearings 20. Eyes 18 and pin 17 are elements which provide connection between radially movable segment 6 and swinging segments 11 and 12 and which provide inclined ways for relative travel of the pins and eyes during expanding and collapsing movement of the coiler segments.

2

In the expanded condition of the coiler shown in Figs. I and III of the drawings, the forward surfaces of hubs 15 of wedge nut 2 abut the rearward surface of hubs 14 of the hinged segments 11 and 12. The forward end of shoe 4 of the wedge nut lies against an abutment 21 of a cap 22, which is keyed to a reduced zone 23 of the shaft 1. A retaining nut 24 on a further reduced and threaded zone 25 of the shaft locks cap 22 in place. The adjacent surfaces 26 and 27 of hinged segments 11 and 12, which act as gripping jaws, grip the end of the strip which is coiled. Desirably the cooperative surfaces 26 and 27 of the hinged segments are provided with wear-resisting inserts 28. It will be seen in Fig. III that when the coiler is expanded, there are gaps between the longitudinal edges of the radially movable segment 6 and the adjacent longitudinal edges of the hinged segments 11 and 12. These gaps are bridged by cover plates 29, the use of which is well known in the art, to complete the peripheral surface of the coiler.

In this expanded strip-winding condition of the coiler, rotation of shaft 1 rotates the assembly of the coiler as a whole to build up the coil of strip thereon. During the winding operation, rotation of shaft 1 in a counter-clockwise direction with reference to the drawings, serves forcibly to maintain the elements of the coiler in expanded condition. When the desired length of strip has been wound on the coiler, the coiler can be collapsed to release the coil for removal. In such action brake drum 30 which freely surrounds shaft 1 is held. This brake drum has a radially keyed engagement 31 with radially movable segment 6, so that when it is held against rotation, rotation of segment 6 also is prevented, while permitting radial movement of the segment. Because of the interengagement of the several elements of the coiler, wedge nut 2 and swinging segments 11 and 12 also are held against rotation.

To collapse the coiler into contracted condition for removal of the coil, brake drum 30 being held, shaft 1 is rotated clockwise. This rotation of shaft 1 runs longitudinally-movable wedge nut 2 rearwardly, or to the right with reference to the showing of Fig. I. Such rearward movement

draws segment 6 radially inward, until in fully collapsed condition of the coiler it reaches the position shown in Fig. IV of the drawings. Rearward movement of wedge nut 2 is limited by contact of its shoe 5 with an abutment 32 on segment 6 and by abutment of its hubs 15 with hubs 14 of the swinging segments 11 and 12. In collapsing the coiler into contracted condition, as segment 6 moves radially inward the inclined eyes 18 which it carries move downwardly on pins 17 carried by the hinged segments, as a necessary accommodation to the shortening effect of the movement. Pins 17 thus travel upward and inward with respect to the inclined ways provided by eyes 18. This action swings segments 11 and 12 about their hinged connection with wedge nut 2, so that when the adjacent edges of segment 6 and of the hinged segments meet, the gripping jaws provided by the cooperative surfaces 26 and 27 at the hinged ends of the segments have been separated to release the strip. The meeting of the adjacent edges of segment 6 and segments 11 and 12 closes the longitudinal gap between those segments which exists in expanded condition of the coiler.

It readily will be seen from a comparative inspection of Figs. III and IV of the drawings, that in collapsing the coiler radially movable segment 6 is drawn wholly within the inside diameter of the coil, and that the major portion of the arcuate surface of both hinged segments 11 and 12 is also drawn within the expanded periphery of the coiler, so that the inner turn of the coil indicated by broken line B of Fig. IV is freed from the coiler. To place the coiler again in expanded coil-winding condition, the end of a fresh strip is inserted between the jaws 26 and 27 of hinged segments 11 and 12. Brake drum 30 still being held, shaft 1 is rotated counter-clockwise to run nut 2 forwardly, or to the left in Fig. I, until the abutting relations shown in Fig. I are established. During this action, the cooperatively inclined surfaces of segment 6 and shoes 4 and 5 of nut 2 force segment 6 radially outward into the position shown in Figs. I and III. Simultaneously, eyes 18, by the inclined ways with which they embrace pins 17, move those pins outwardly. This swings the upper ends of the segments 11 and 12 outwardly about their hinged connection, into the expanded position shown in Fig. III. Swinging movement of the hinged segments also brings their clamping surfaces 26 and 27 into gripping engagement with the end of the strip which has been inserted between them. Upon release of brake drum 30, the coiler is in condition again to coil the strip which it grips.

It will readily be seen that the organization of the coiler is simple and sturdy and that the weight of the coil is sustained by a well balanced distribution of the coiler parts about the axis of the coiler. Because of the manner of interlocking the several elements of the coiler structure, both the expanding action and the collapsing action are positive.

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 coiler 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 coiler the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a radially movable segment having a wedging surface cooperative with the wedging surface of said longitudinally-movable nut and interlocked engagement therewith, two segments having hinged connection with said longitudinally-movable wedge nut, and cooperative connecting elements carried by said hinged segments and said radially movable segment including inclined ways by which expanding and contracting radial movement of the said radially movable segment causes outward and inward swinging movement of the said hinged segments.

2. In a coiler the combination of a rotatable shaft, a longitudinally-movable nut having a wedging surface threaded on said shaft, a radially movable segment having a wedging surface cooperative with the wedging surface of said longitudinally-movable nut and interlocked engagement therewith, two segments having hinged connection with said longitudinally-movable wedge nut, and cooperative connecting elements carried by said radially movable segment and said hinged segments comprising inclined embracing eyes and embraced longitudinally extended pins by which expanding and contracting radial movement of the said radially movable segment causes outward and inward 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 radially movable segment having a wedging surface cooperative with the wedging surface of said longitudinally-movable nut and interlocked engagement therewith, two segments having hinged connection with said longitudinally-movable wedge nut, cooperative connecting elements carried by said hinged segments and said radially movable segment including inclined ways by which expanding and contracting radial movement of the said radially movable segment causes outward and inward swinging movement of the said hinged segments, and means for holding said radially movable 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 radially movable segment having a wedging surface cooperative with the wedging surface of said longitudinally-movable nut and interlocked engagement therewith, two segments having hinged connection with the said longitudinally-movable wedge nut, cooperative connecting elements carried by said radially movable segment and said hinged segments comprising inclined embracing eyes and embraced longitudinally extended pins by which expanding and contracting radial movement of the said radially movable segment causes outward and inward swinging movement of the said hinged segments, and means for holding said radially movable 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, and a plurality of 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 a substantially circular coil-supporting surface.

6. 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, and a plurality of additional segments arranged to be brought into relation with the said first segment in its radially outward position by rotation of said shaft transmitted through said wedge nut and the said radially movable segment interlocked therewith to form with the said first segment a substantially circular coil-supporting surface.

7. 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, the said wedge nut and segment being rotatable with said shaft in outward position of the segment, 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 said shaft is rotated.

WILLIAM M. McCONNELL.
FINN B. ABRAMSEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,905,178	Kohler	Apr. 25, 1933
2,061,109	Sieger	Nov. 17, 1936
2,219,818	O'Brien	Oct. 29, 1940
2,352,042	Vander Linde	June 20, 1944