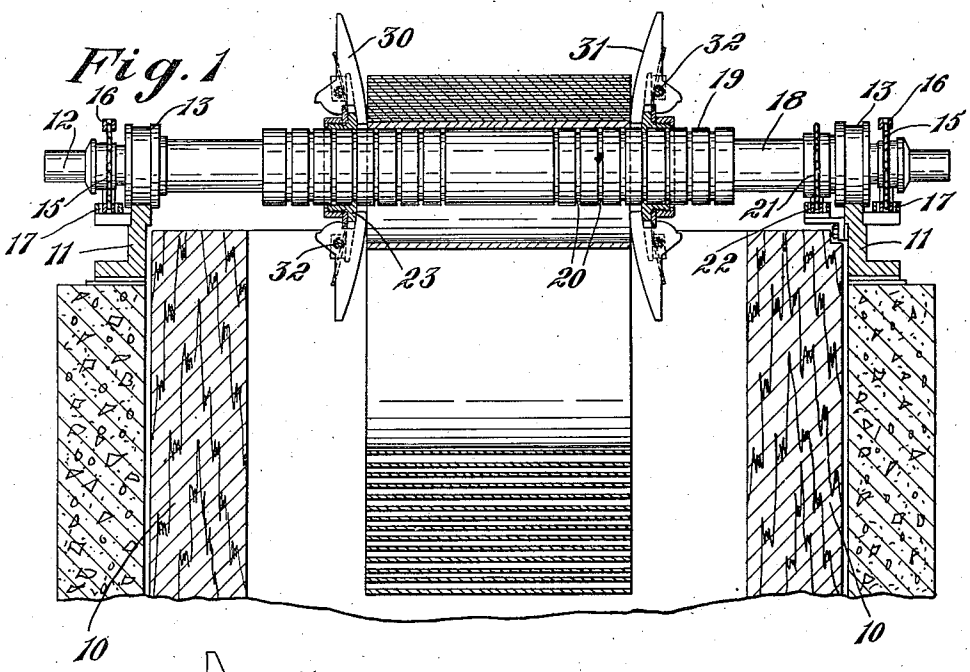
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MANDREL FOR PICKLING MACHINES

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Fig. 1



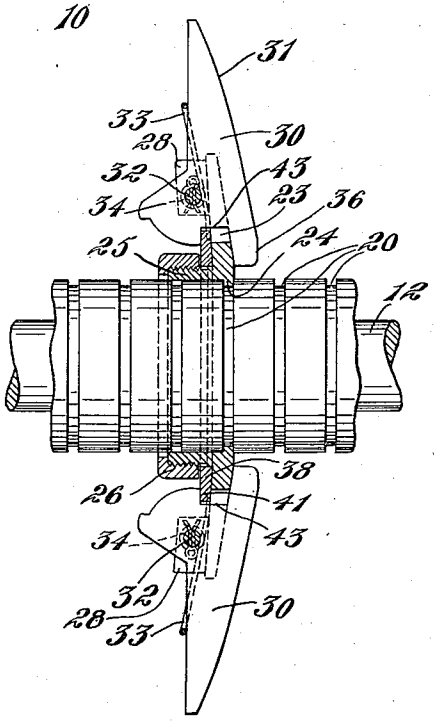


Fig. 2

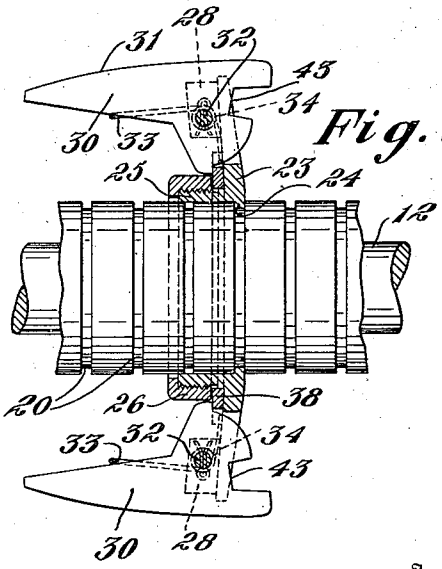


Fig. 3

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Fig. 4

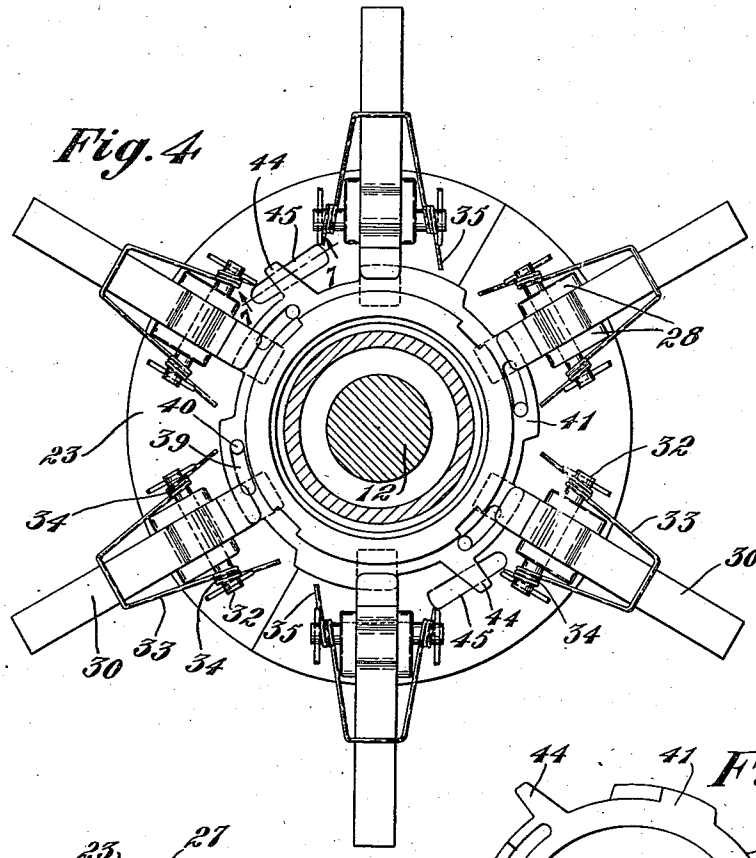
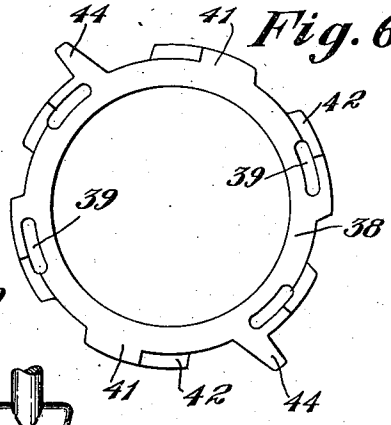


Fig. 6



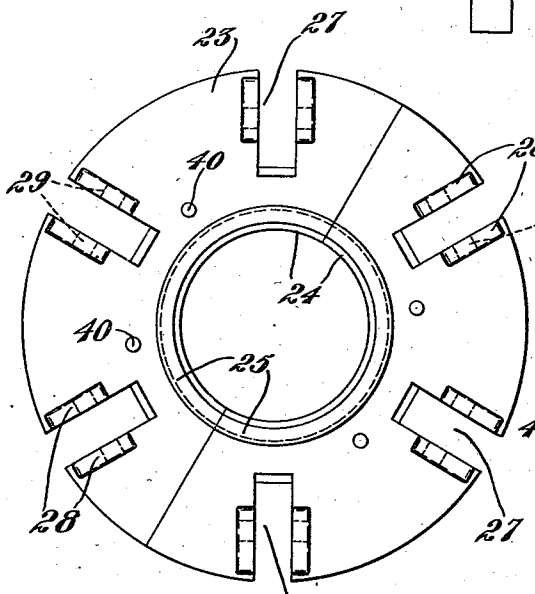
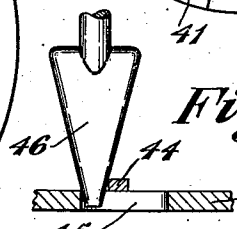


Fig. 5

Fig. 7



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Patented July 29, 1941 2,250,494

UNITED STATES PATENT OFFICE

2,250,494

MANDREL FOR PICKLING MACHINES

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Application October 11, 1939, Serial No. 298,954

8 Claims. (Cl. 242—84)

The invention relates to apparatus for pickling coils of metal, and more particularly to certain improvements upon the mandrels for use in machines of the type of Greer Patent No. 2,091,921 issued August 31, 1937; Shoemaker Patent No. 2,120,843, issued June 14, 1938; and Greer Patent No. 2,196,210, issued April 9, 1940.

Apparatus of the general character referred to includes mandrels upon which the coils of metal are supported and rotated as they are passed through the several tanks in which the metal is pickled, washed, neutralized or otherwise treated; and it is therefore, necessary to insert a mandrel into the open center of each coil before it is charged into the first tank of the machine, and to remove the mandrel from the coil after it has been discharged from the last tank of the machine.

The mandrels may be of the same construction as illustrated and described in detail in said Greer application, in which flanges or fingers are adjustably mounted at spaced points upon the mandrel to receive the coil between the same and prevent any considerable end movement of the coil upon the mandrel.

These flanges or fingers must be of sufficient width to accommodate coils of maximum diameter, as otherwise there is a tendency for the outer convolutions of the coils to move endwise over the flanges or fingers, causing difficulty in the passage of the coils through the machine.

However, owing to the fact that the diameter of the open centers of the coils is necessarily held to certain maximum limits, difficulty is experienced in readily inserting the mandrels within the coils, and removing them therefrom as the diameter of the flanges or fingers upon the mandrels is nearly as large as the center openings in the coils.

Therefore, it is the object of the present invention to provide a mandrel of such construction that the above difficulties in operation of the same are overcome.

Another object is to provide such a mandrel with pivoted fingers which may be quickly and easily swung downward against the mandrel to permit the mandrel to be easily inserted into a coil.

Still another object is to provide spring means for returning the fingers to normal, or extended, position after the mandrel has been inserted into or removed from the coil.

A further object is providing locking means for normally holding the fingers rigidly in extended position during the pickling or other treating operations.

A still further object of the invention is to provide means for permitting the pivoted fingers to collapse against the mandrel as the mandrel is withdrawn from the center of a coil.

The above objects, together with others which will be apparent from the drawings and following description, or which may be later referred to, may be accomplished by constructing the improved mandrel in the manner illustrated in the accompanying drawings, in which

Figure 1 is a longitudinal sectional elevation of a mandrel constructed in accordance with the invention, showing the same supporting a coil within the pickling tank of the machine;

Fig. 2, an enlarged detail sectional elevation of a portion of the mandrel showing the pivoted fingers locked in extended position;

Fig. 3, a similar view showing the fingers in collapsed position;

Fig. 4, an enlarged transverse sectional view through the improved mandrel, showing the fingers locked in extended position;

Fig. 5, a detached elevation of the flange which carries the pivoted fingers;

Fig. 6, a detached elevation of the locking ring; and

Fig. 7, a fragmentary sectional view of the flange and locking ring, showing the manner in which a spud, or similar tool may be inserted to operate the locking ring.

Similar numerals refer to similar parts throughout the several views.

A portion of the pickling tank is shown in section in Fig. 1, in which the upper parts of the side walls are indicated at 10, the rails 11 being mounted thereon for supporting the mandrels as they pass over the same to convey the coils through the pickling acid in the tank.

The mandrels to which the invention pertains may be of the same construction as disclosed in detail in said Greer Patent No. 2,196,210, and as shown in the accompanying drawings, may include the mandrel shaft 12, provided near each end with a roller 13 adapted to travel upon the rails 11.

Sprocket wheels or gears 15 may be fixed upon the end portions of the shaft, to be driven by the drive chains 16, and to travel upon the toothed tracks 17, so as to positively advance the mandrel along the tank.

A mandrel sleeve 18 may be rotatably mounted upon the mandrel shaft, between the rollers 13, and is preferably provided with the enlarged

central portion 19, having a plurality of spaced, annular grooves 20, for adjustably mounting the flanges or fingers to which the present invention pertains.

A sprocket wheel or gear 21 may be fixed upon one end portion of the sleeve 18, and is adapted to engage the toothed track 22, or the reversing mechanism (not shown) as disclosed in said Greer Patent No. 2,196,210, for positively rotating the sleeve in either direction, independently of the shaft.

The improved mandrel construction to which the invention pertains comprises the split flange 23, formed of two similar semi-circular halves, having the internal, annular rib 24 adapted to be received in any desired groove 20, so as to accommodate coils of any width.

Each half of the split flange is provided with an externally threaded neck portion 25, adapted to receive the nut 26 for adjustably securing the flange in position upon the mandrel to accommodate the desired size of coil.

A plurality of radial slots 27 is formed in the split flange, extending through the periphery thereof, and a spaced pair of ears 28 is located adjacent to each slot and provided with apertures 29 for the purpose of pivotally mounting the fingers 30, as will be later described.

Each of these fingers may be of the shape shown in the drawings, being tapered toward its outer end, and preferably inclined outwardly on the side toward the coil, as shown at 31.

The fingers are located in the slots 27, and are pivotally mounted upon the pins 32, which extend through the openings 29 in the ears 28, and are of sufficient length to extend beyond each ear, as shown in Fig. 4.

A substantially U-shaped spring 33, is associated with each finger, engaging the finger on the side away from the coil, and having coiled ends 34 located around the end portions of the pins 32, and terminating in the straight ends 35, bearing against the adjacent face of the split flange, so as to keep the spring under tension and normally hold the finger in extended position, as best shown in Fig. 2, with the depending lug 36 of the finger bearing against the opposite face of the flange, below the slot 27.

The locking ring 38 is rotatably mounted upon the neck 25 of the flange, between the nut 26 and the flange proper, and is provided with a plurality of arcuate slots 39, which receive the studs 40, upon the split flange, and limit the turning movement of the locking ring in each direction, relative to the flange.

Spaced, peripheral ears 41, corresponding in number and position to the fingers 30, are formed at intervals around the locking ring, and may be beveled on their leading ends, as shown at 42, so as to be easily received within the notches 43 in the fingers.

For the purpose of rotating the locking ring, one or more lugs 44 may extend radially from the ring, and across the slots 45 in the split flange, whereby a spud, or similar tool, as shown at 46, may be inserted between the lug 44 and either end of the slot 45, to rotate the locking ring in the desired direction to unlock or lock the fingers.

The improved flange and finger assembly may be mounted upon each end of the mandrel if desired, although it is only necessary that one end of the mandrel be so equipped, the flange construction such as shown in the patents and application referred to being suitable for use upon the other end of the mandrel.

When it is desired to insert the improved mandrel into a coil, the locking ring is first rotated to position to withdraw the ears 41 from the notches 43 of the fingers, after which two or three of the uppermost fingers may be manually swung down toward the mandrel so as to more easily insert the mandrel into the coil.

The springs 33 will return the fingers to normal position when released, after which the locking ring should be rotated to lock the fingers in extended position and the mandrel and coil may be charged into the pickling machine.

When it is desired to remove the mandrel from the coil, the locking ring is first rotated to unlocked position, whereby as the mandrel is withdrawn from the coil the fingers may swing upon their pivots to the required extent to permit easy removal of the mandrel.

According to the provisions of the patent statutes, we have explained the principle of our invention and described one embodiment thereof, but we desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described, the invention residing in the pivoted fingers upon the mandrels permitting easy insertion and removal of the mandrels by collapsing of the fingers, regardless of the structure by which this may be accomplished.

We claim:

1. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced pairs of ears upon the flange, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel each finger having a notch in its inner end, spring means for normally urging the fingers toward extended radial position, and a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches for locking said fingers in extended radial position.

2. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced pairs of ears upon the flange, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, each finger having a notch in its inner end and a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches for locking said fingers in extended radial position.

3. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced radial slots in the flange, ears at opposite sides of said slots, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, spring means for urging the fingers toward extended radial position, each finger having a notch in its inner end, and a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches.

4. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced radial slots in the flange, ears at opposite sides of said slots, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, individual spring means for urging

each of the fingers toward extended radial position, each finger having a notch in its inner end, and a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches.

5. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced radial slots in the flange, ears at opposite sides of said slots, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, spring means for urging the fingers toward extended radial position, each finger having a notch in its inner end, and a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches, a radial lug upon the locking ring, and the flange having a slot adapted to register with said radial lug for receiving a tool to rotate the locking ring.

6. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced pairs of ears upon the flange, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, each finger having a notch in its inner end, spring means for normally urging the fingers toward extended radial position, a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches for locking said fingers in extended radial position, a radial lug upon the locking ring and the flange having a slot adapted to register with said radial lug for receiving a tool to rotate the locking ring.

7. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced pairs of ears upon the flange, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, each finger having a notch in its inner end, a locking ring rotatably mounted upon the flange and provided with spaced, radial ears adapted to be received in said notches for locking said fingers in extended radial position, a radial lug upon the locking ring, and the flange having a slot adapted to register with said radial lug for receiving a tool to rotate the locking ring.

8. A mandrel for supporting a coil of metal in a pickling machine, an annular flange mounted around the mandrel, spaced radial slots in the flange, ears at opposite sides of said slots, radial fingers pivotally mounted between said ears and adapted to be swung upon their pivots toward the mandrel, spring means for urging the fingers toward extended radial position, each finger having a notch in its inner end, a locking ring rotatably mounted upon the flange and provided with spaced radial ears adapted to be received in said notches, there being arcuate slots in the locking ring and studs upon the flange received in said slots for limiting the movement of the locking ring in each direction.

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