Oct. 9, 1956

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APPARATUS FOR AUTOMATICALLY CENTERING AND ALIGNING MOVING ELONGATED OBJECTS

2,766,041

Filed Aug. 21, 1952

3 Sheets-Sheet 1

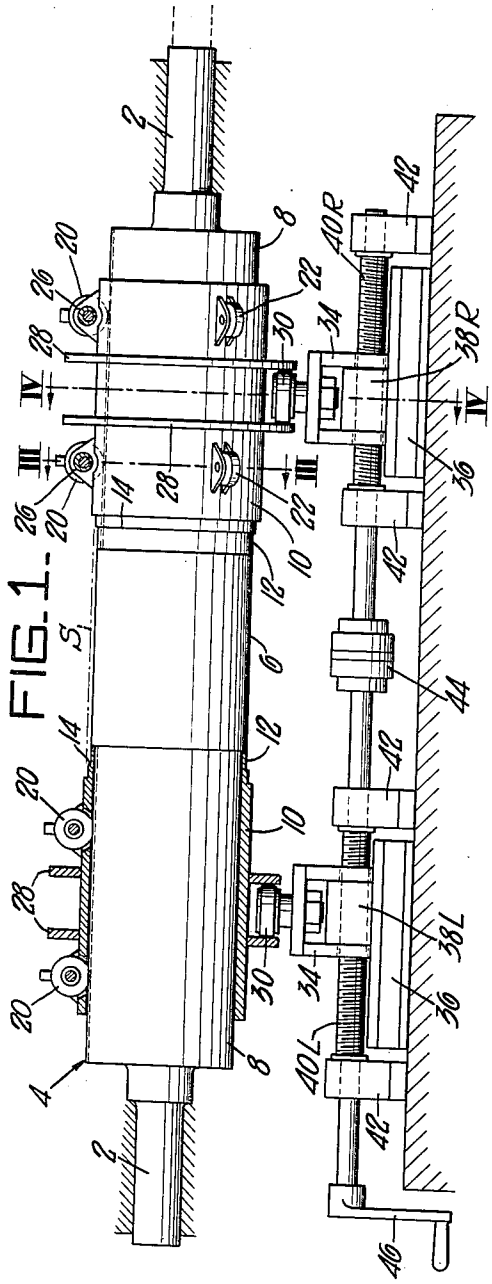


FIG. 1.

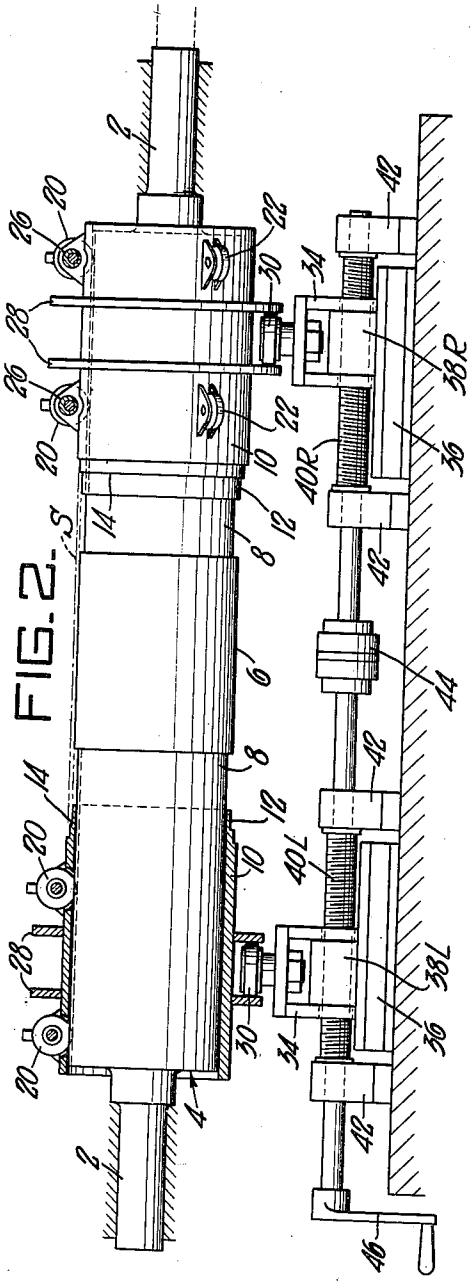


FIG. 2.

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FIG. 3.

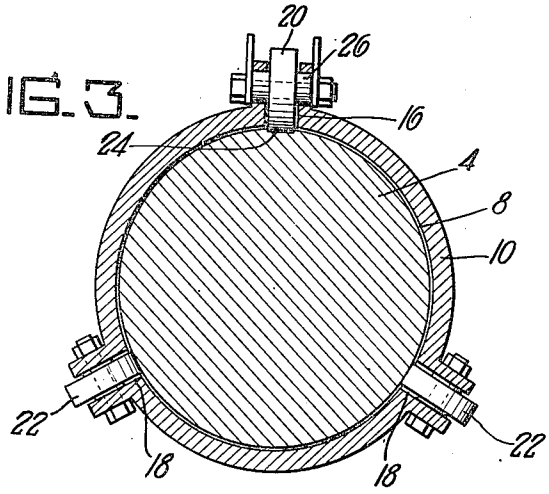
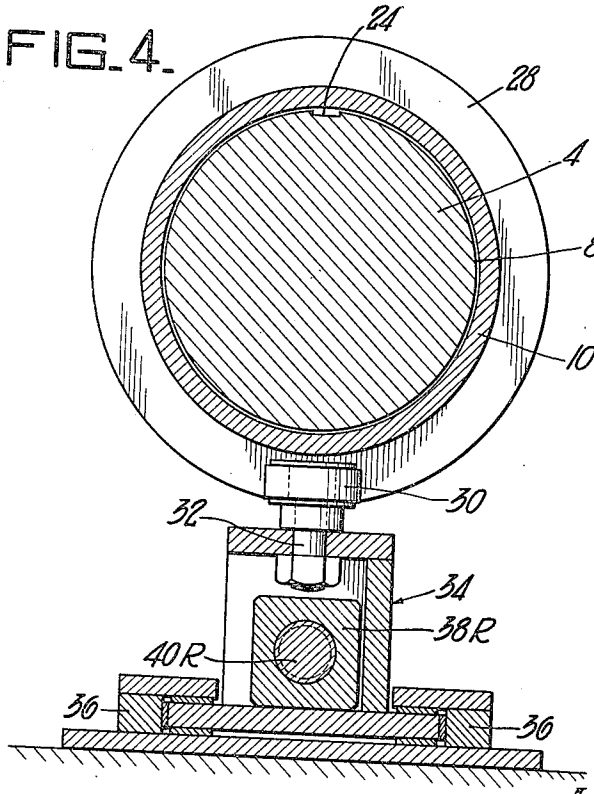


FIG. 4.



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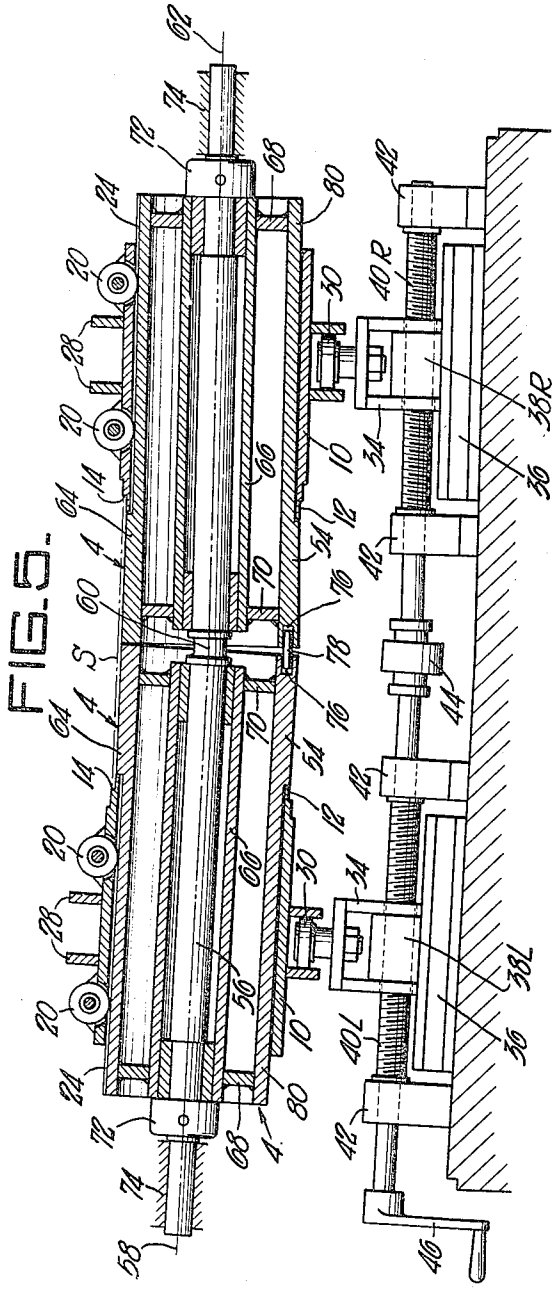
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FIG. 5.



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APPARATUS FOR AUTOMATICALLY CENTERING AND ALIGNING MOVING ELONGATED OBJECTS

Alfred Teplitz, Pittsburgh, Pa., assignor to United States Steel Corporation, a corporation of New Jersey

Application August 21, 1952, Serial No. 305,525

2 Claims. (Cl. 271—2.6)

This invention relates to apparatus for automatically centering and aligning moving elongated objects such as strip or strip like material. Apparatus suitable for this purpose is disclosed in the patents to Lorig Nos. 2,593,157 and 2,593,158 and also in Lorig application, Serial No. 301,321, filed July 28, 1952, now Patent No. 2,727,400 granted December 20, 1955.

In the above mentioned application rotating edge guide flanges are used which are integral with the roll. For many uses it has been found that the rotating flanges must be adjustable to provide for centering strip of various widths.

It is therefore an object of the present invention to provide apparatus for automatically centering a moving elongated object by using rotating edge guides which are movable with respect to the center line of the apparatus.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is an elevation, partly in section, of my apparatus with the edge guides in their innermost position;

Figure 2 is a view, similar to Figure 1, showing the edge guides in their outermost position;

Figure 3 is a sectional view taken on the line III—III of Figure 1;

Figure 4 is a sectional view taken on the line IV—IV of Figure 1; and

Figure 5 is a view, similar to Figure 1, showing a second embodiment of my invention.

Referring more particularly to the drawings, the reference numeral 2 indicates a shaft for supporting a rotatable object supporting member 4. In this instance the rotatable object supporting member 4 has a central cylindrical surface 6 for supporting a strip S. The roll is provided with a reduced diameter portion 8 on each side of the surface 6. A sleeve 10 is mounted on each of the surfaces 8 and since the sleeves are identical in structure only one of the sleeves will be described. Each of the sleeves 10 has an internal diameter slightly greater than the diameter of the surface 8 so that the sleeves may be moved axially thereon. The sleeve 10 has a reduced outer diameter portion 12 adjacent the surface 6. The outside diameter of the sleeve 10 is increased adjacent the surface 12 so as to provide a shoulder 14 which acts as a guide for the edge of strip S. The sleeve 10 has a plurality of longitudinally extending openings 16 and 18 through its outer wall and rollers 20 and 22 are mounted in the openings 16 and 18, respectively. The axis of each of the rollers 20 and 22 is in a plane perpendicular to the axis of the rotatable member 4. The roller 20 extends into a longitudinally extending groove 24 in the member 4 so that the sleeve 10 cannot rotate with respect to the member 4. The shaft of the roller 20 is preferably mounted in eccentric bushings 26 to provide for adjustment of the roll 20 radially of the member 4. Spaced apart circumferential rings 28 are secured to the outer surface of the sleeve 10 in order to provide a space

for receiving a roller 30. The roller 30 is mounted on a shaft 32 which in turn is mounted on a carriage 34. The carriages 34 are slidably mounted in guides 36. Nuts 38R and 38L are mounted in the carriages 34 and are oppositely threaded. Oppositely threaded screws 40R and 40L are threaded through the nuts 38R and 38L, respectively, and are supported in bearings 42. The screws 40R and 40L are connected by means of a flexible coupling 44. A crank 46 is mounted at the end of screw 40L.

The operation of the device is as follows: The crank 46 is turned which causes the carriages 34 to move in unison either toward or away from the transverse center line of the rotatable member 4 until the shoulders 14 are spaced apart the desired distance which will be slightly greater than the width of the strip S. Shoulders 14 act as guides to prevent the strip S from moving from the surface 6.

In some instances the shoulders 14 are not sufficient to prevent sideways movement of the strip S and it is necessary to use the shoulders 14 in conjunction with the self-centering rolls of the type disclosed in the above mentioned Lorig patents. Figure 5 shows an arrangement of my adjustable guides with a self-centering roll of the type shown in the Lorig Patent No. 2,593,157. In this embodiment the rotatable member 4 consists of a pair of opposed rotatable rolls 54 which are mounted on a non-rotating bent shaft 56. The rolls 54 will rotate about the axes 58, 60 and 60, 62. The axes 58, 60 and 60, 62 intersect at a point 60 between the rolls 54 and diverge away from the direction of approach of the belt S. Each of the rolls 54 has a rim portion 64 which is connected to a hub portion 66 by means of webs 68 and 70. A set collar 72 is fastened on the shaft 56 at each end thereof and bears against the adjacent hub. The shaft 56 is supported in bearings 74. The adjacent ends of the rims 64 are provided with openings 76 for receiving a pin 78 which causes the rolls to rotate in the same direction and at the same angular velocity. Each of the rolls 54 has a cylindrical portion 80 at its outer end corresponding to the cylindrical portion 8 of the rolls of Figure 1. Sleeve 10 is mounted on each of the cylindrical portions 80 and the construction of the sleeve and the means for moving the sleeves are otherwise the same as shown in Figure 1. The screws 40R and 40L are arranged parallel to the axes 60, 62 and 58, 60, respectively. The slight amount of misalignment between screws 40R and 40L is taken care of by means of the flexible coupling 44. The rolls increase in diameter from their outer ends toward their adjacent ends as described in the above mentioned Lorig application. The operation of this embodiment is the same as that described in the above mentioned Lorig application. In other words the strip S will ordinarily be centered on the rolls in the manner described in Lorig Patent No. 2,593,157. If the strip S is forced off center by external forces the shoulders 14 will exert a slight pressure in the opposite direction to combat these external forces, thus maintaining the strip on the center pass line of the roll. If the strip should move over one of the shoulders 14 it will be recentered when the outside pressure is removed because the diameter of the sleeve at this point is less than the diameter of the rolls at their adjacent ends.

While several embodiments of my invention have been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for automatically centering moving elongated objects comprising a rotatable object supporting structure, a sleeve slidably mounted on said structure at each side of its object supporting surface, means for positively causing said sleeves to rotate with the object sup-

porting structure, a flange on each of said sleeves having a diameter greater than the diameter of said object supporting surface adjacent thereto to provide a shoulder, means operable when said structure is rotating for moving said sleeves axially, said object supporting structure including a pair of opposed rotatable rolls over which the object passes, the axes of rotation of said rolls under load intersecting at a point between the rolls and diverging away from the direction of approach of the object, and means for positively causing said rolls to rotate in the same direction and at the same angular velocity, each of said rolls increasing in diameter from said shoulder toward its inner end.

2. Apparatus for automatically centering a moving elongated object comprising a rotatable object supporting structure, a sleeve slidably mounted on said structure at each side of its object supporting surface, a flange on each of said sleeves having a diameter greater than the diameter of said object supporting surface adjacent thereto to provide a shoulder, each of said sleeves having a plurality of openings through the wall thereof, a roller mounted in each of said openings with its axis in a plane perpendicular to the axis of said structure, said rollers extending inwardly beyond the wall of said sleeve and bearing on the said rotatable structure, said object supporting structure having a longitudinally extending groove in its outer surface for receiving one of said rollers, means operable when said structure is rotating for moving said sleeves axially, said object supporting structure including a pair of opposed rotatable rolls over which the object passes, the axes of rotation of said rolls under load intersecting at a point between the rolls and diverging away from the direction of approach of the object, and means for positively causing said rolls to rotate in the same direction and at the same angular velocity, each of said rolls increasing in diameter from said shoulder toward its inner end.

References Cited in the file of this patent

UNITED STATES PATENTS

296,222	Schubiger	Apr. 1, 1884
1,802,708	Dina	Apr. 28, 1931
2,226,187	Van Derhoef et al.	Dec. 24, 1940
2,242,336	Atwood	May 20, 1941
2,337,854	Price	Dec. 28, 1943
2,473,599	Liebel	June 29, 1949
2,539,205	Rickley	Jan. 23, 1951
2,593,157	Lorig	Apr. 15, 1952

FOREIGN PATENTS

614,574	Great Britain	Dec. 17, 1948