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AUTOMATIC SELF-CENTERING ROLL

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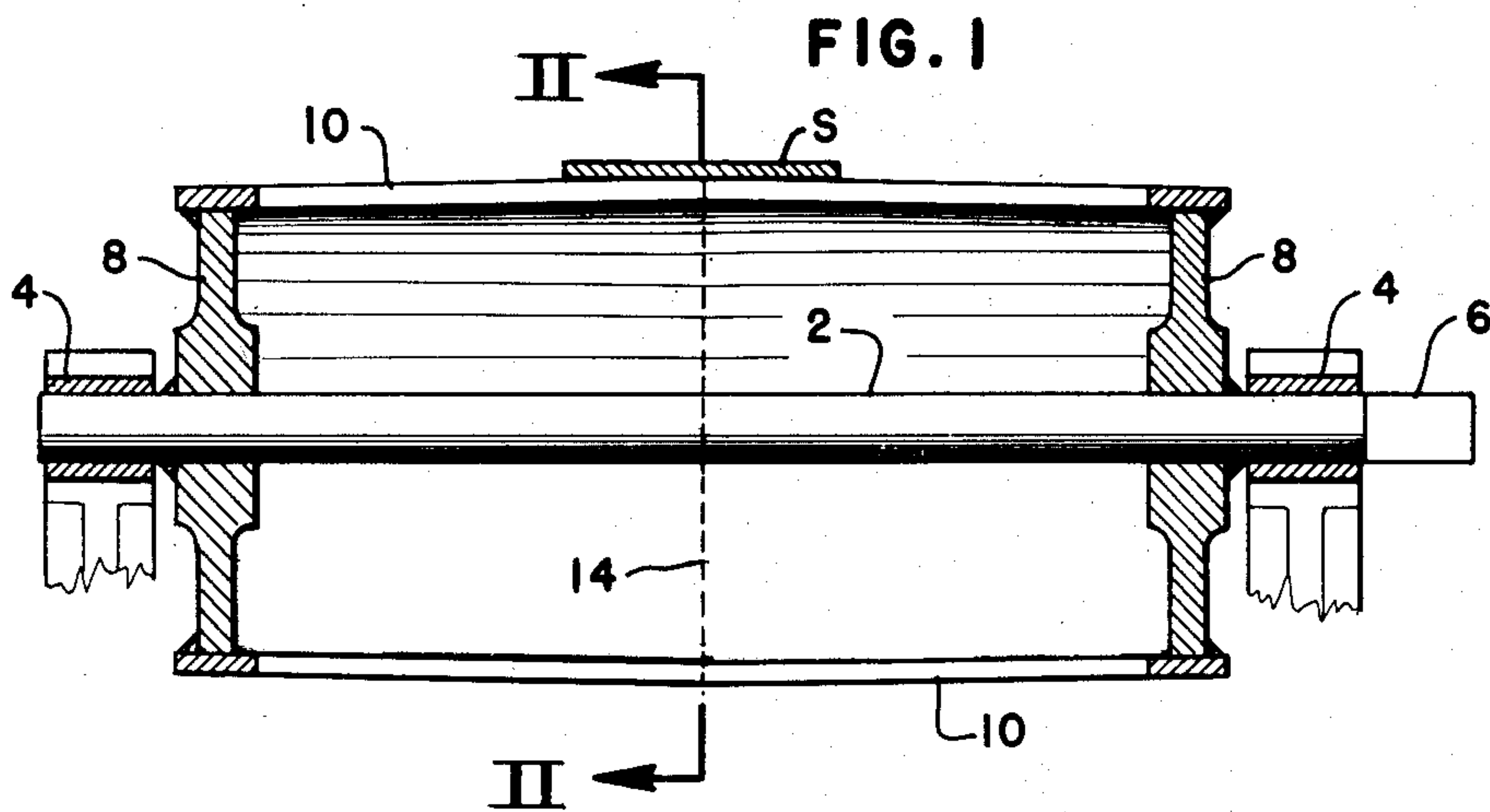


FIG. 2

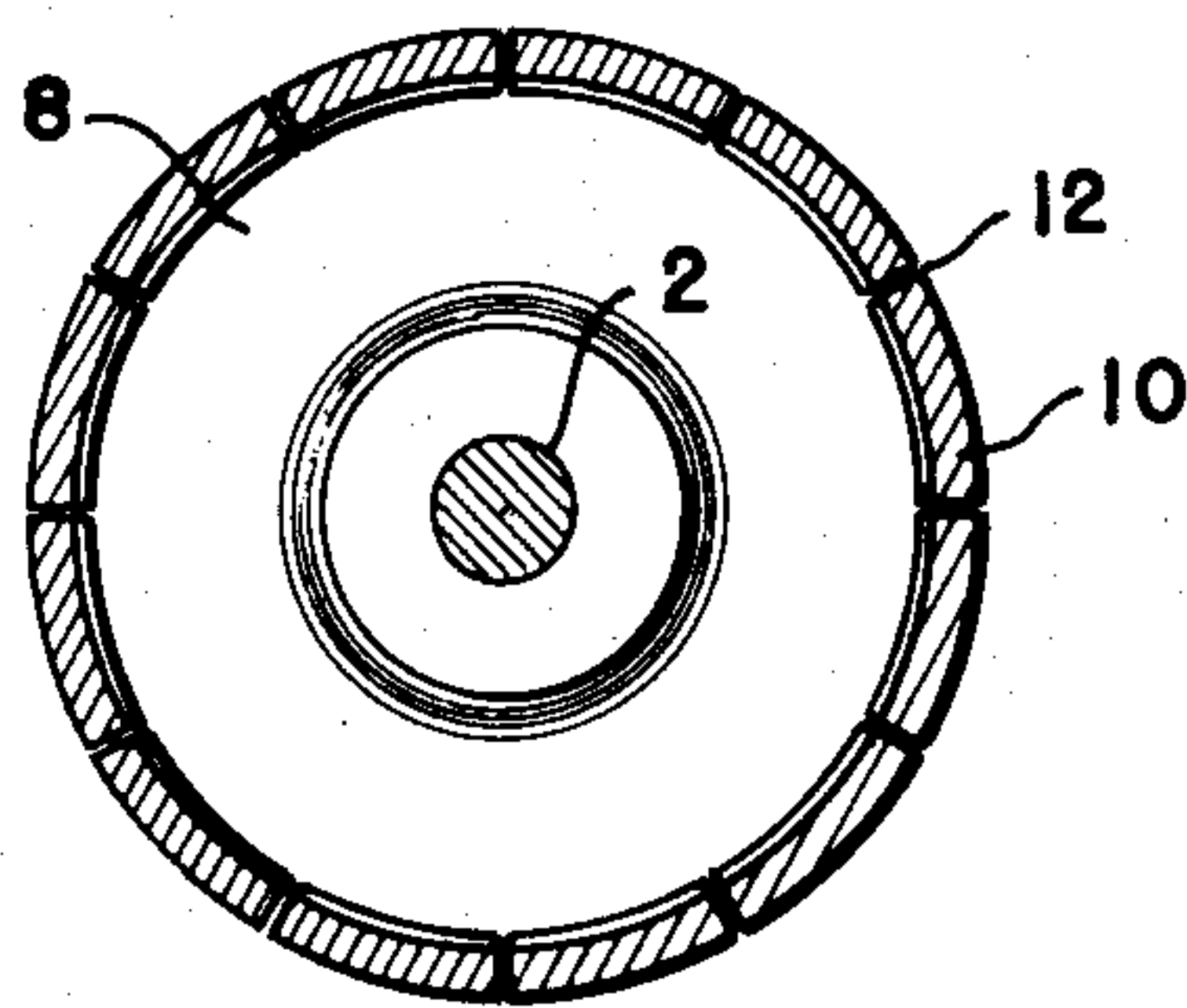
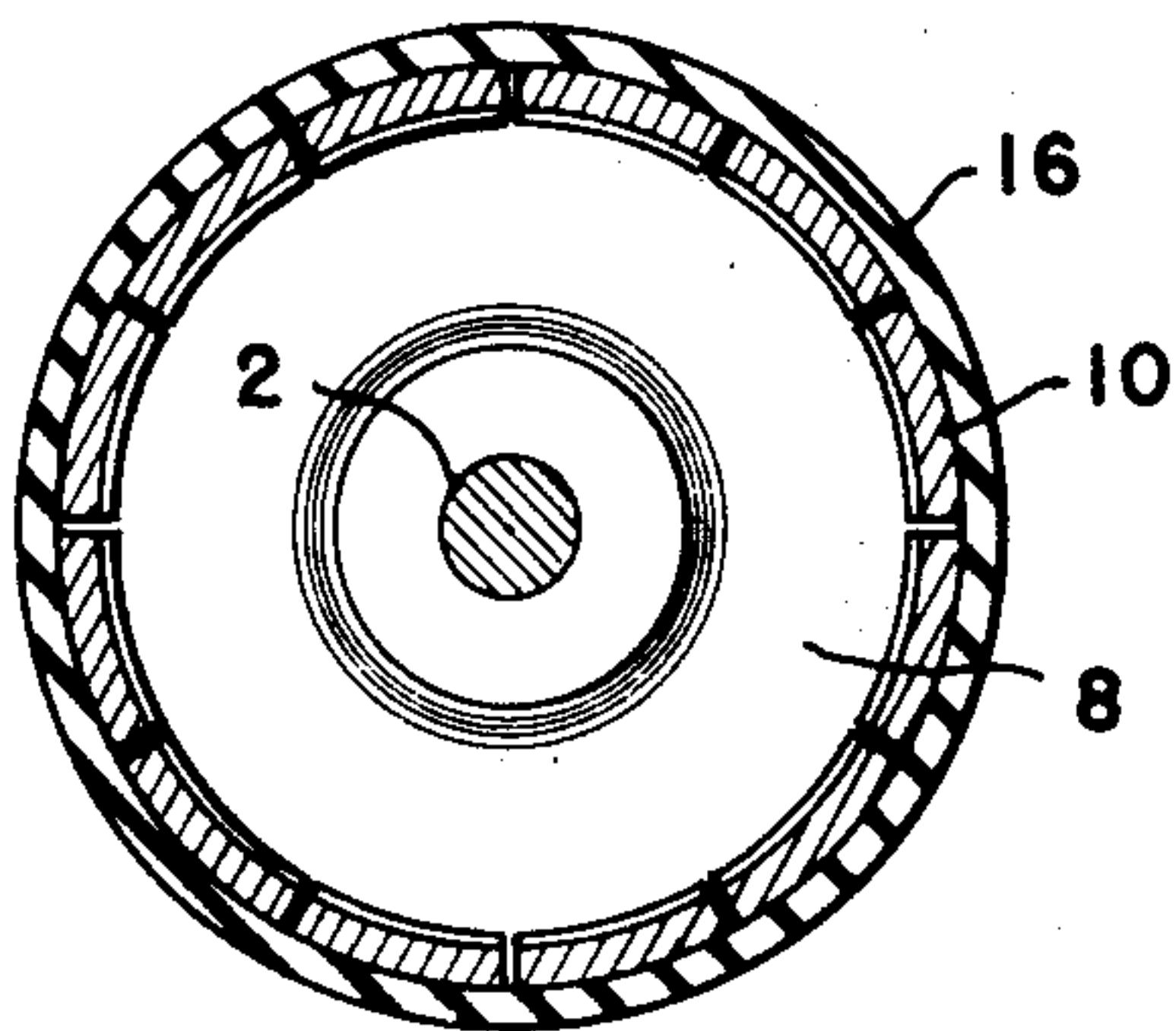


FIG. 3



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AUTOMATIC SELF-CENTERING ROLL

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4 Claims. (Cl. 271—2.6)

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This invention relates to an automatic self-centering roll for centering and aligning moving objects, especially strip and strip-like materials. In the processing of metal strip, the strip is conveyed over rolls in the uncoiled condition. When the strip is conveyed over a roll to the processing equipment it is likely that the strip will be fed at a slight angle to the roll. Because of this, the strip will work its way across the face of the roll. In addition, the camber and/or lateral curvature which is present in the finished strip due to rolling difficulties causes the strip edges and longitudinal center line to approach the roll at an angle, this also causing the strip to move across the face of the roll. In order to keep the strip in the desired path of travel, various expedients have been resorted to. One of the most common is the use of stationary or rotatable side guides against which the edges of the strip bear. In some instances side guides have been used in conjunction with looper pits to force the strip back on the desired center line. The use of abnormally high strip tension has also been tried in an attempt to keep the strip aligned. Another method of operation is to periodically slip or slue the strip back into its approximate proper position on the conveying roll. All of the above methods of centering strip tend to abrade and mutilate the strip edges and in some instances cause the edges of the strip to be stretched beyond the elastic limit of the metal. Diagonal or lateral surface scratches are also formed on finely finished flat products of all kinds, these scratches being detrimental to subsequent operations and together with edge damage result in the scrapping of a large percentage of the material being processed. The problems discussed above also exist in belt conveyors and drive belts used in conjunction with belt pulleys. If the belt is made of rubber or other relatively soft material, it is more easily damaged. In addition to the methods of aligning strip mentioned above, crown rolls have been used to center materials having a low modulus of elasticity such as textiles, rubber and composition belts.

Various types of apparatus for satisfactorily centering and aligning strip are shown in my copending applications, Serial No. 97,218, filed June 4, 1949, now Patent No. 2,593,157, Serial No. 138,389, filed January 13, 1950, now Patent No. 2,592,581, and Serial No. 145,648, filed February 23, 1950, now Patent No. 2,593,158.

It is an object of the present invention to provide apparatus for automatically centering moving objects without damage thereto.

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

Figure 1 is a sectional view of one specific embodiment of my device;

Figure 2 is a sectional view taken on the line II—II of Figure 1; and

Figure 3 is a view, similar to Figure 2, showing a slight modification of my device.

Referring more particularly to the drawings the reference numeral 2 indicates a shaft which is rotatably mounted in bearings 4. The shaft may be provided with a driving extension 6 at one end thereof. Spaced apart web portions 8 are welded to the shaft 2 adjacent the bearings 4. A plurality of spaced apart leaves 10 extend between and are welded to the web portions 8. These leaves 10 may be made by providing longitudinal slots 12 in a metal tube as shown or they may be formed individually and welded individually to the web portions 8. If desired, the leaves 10 may be split at 14 on the transverse center of the roll. Also, as shown in Figure 3, the entire rim portion of the roll may be covered with resilient lagging 16 which is made of rubber or similar material.

The operation of the device is as follows:

As the roll rotates the spring-like leaves 10 are slightly expanded by centrifugal force adjacent the transverse center of the roll. When a strip S is passed over or around the roll, the leaves 10 in contact with the strip S are depressed slightly to their static position, thus causing the strip to be centered on the transverse center line of the roll in much the same manner as in my above identified copending Patent No. 2,593,158. The roll also operates in essentially the same manner if it is split on its transverse center line or if it is covered with resilient lagging.

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. A rotatable roll for automatically centering an object passing thereover comprising a shaft supported in spaced apart bearings, a pair of web members spaced longitudinally of said shaft and supported thereon, said web members being arranged substantially at right angles to the axis of said shaft, the outer periphery of said web members being substantially circular, and a plurality of resilient leaf-like elements extend-

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ing between and supported by said web members about the periphery thereof substantially parallel to the axis of said shaft, the outer surfaces of said leaf-like elements being convex and substantially forming a cylinder, said leaf-like elements being arranged closely adjacent each other but spaced sufficiently from each other to permit independent flexing thereof transverse to the axis of said shaft.

2. A rotatable roll for automatically centering an object passing thereover according to claim 1 in which the leaves are split on a plane midway between and perpendicular to the axis of the roll.

3. A rotatable roll for automatically centering an object passing thereover according to claim 2 in which the leaves are covered with a thin and highly flexible layer of rubber-like material.

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4. A rotatable roll for automatically centering an object passing thereover according to claim 1 in which the leaves are covered with a thin and highly flexible layer of rubber-like material.

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