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2,544,301

AGITATION OF PULPS AND THE LIKE

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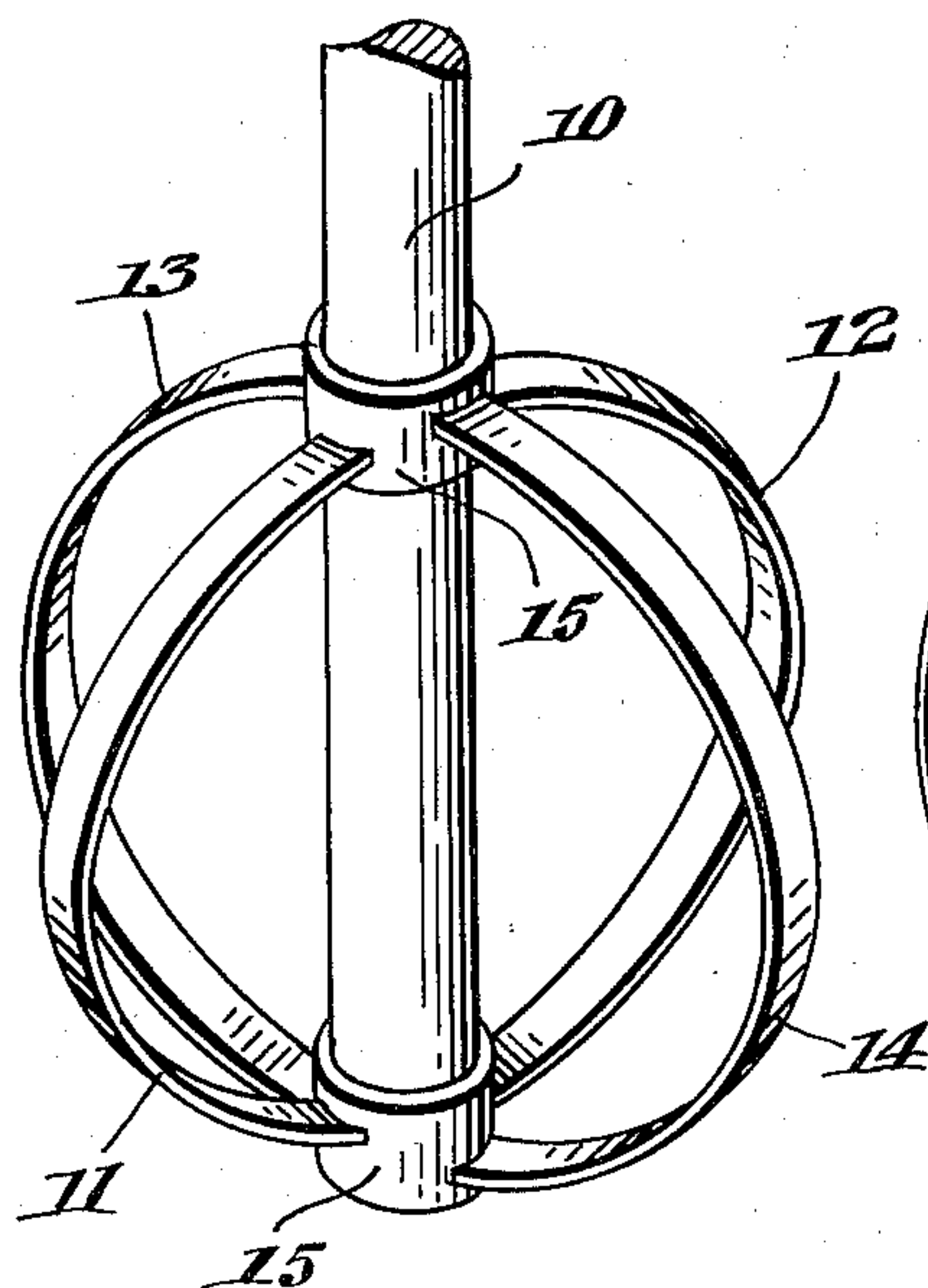


FIG. 1.

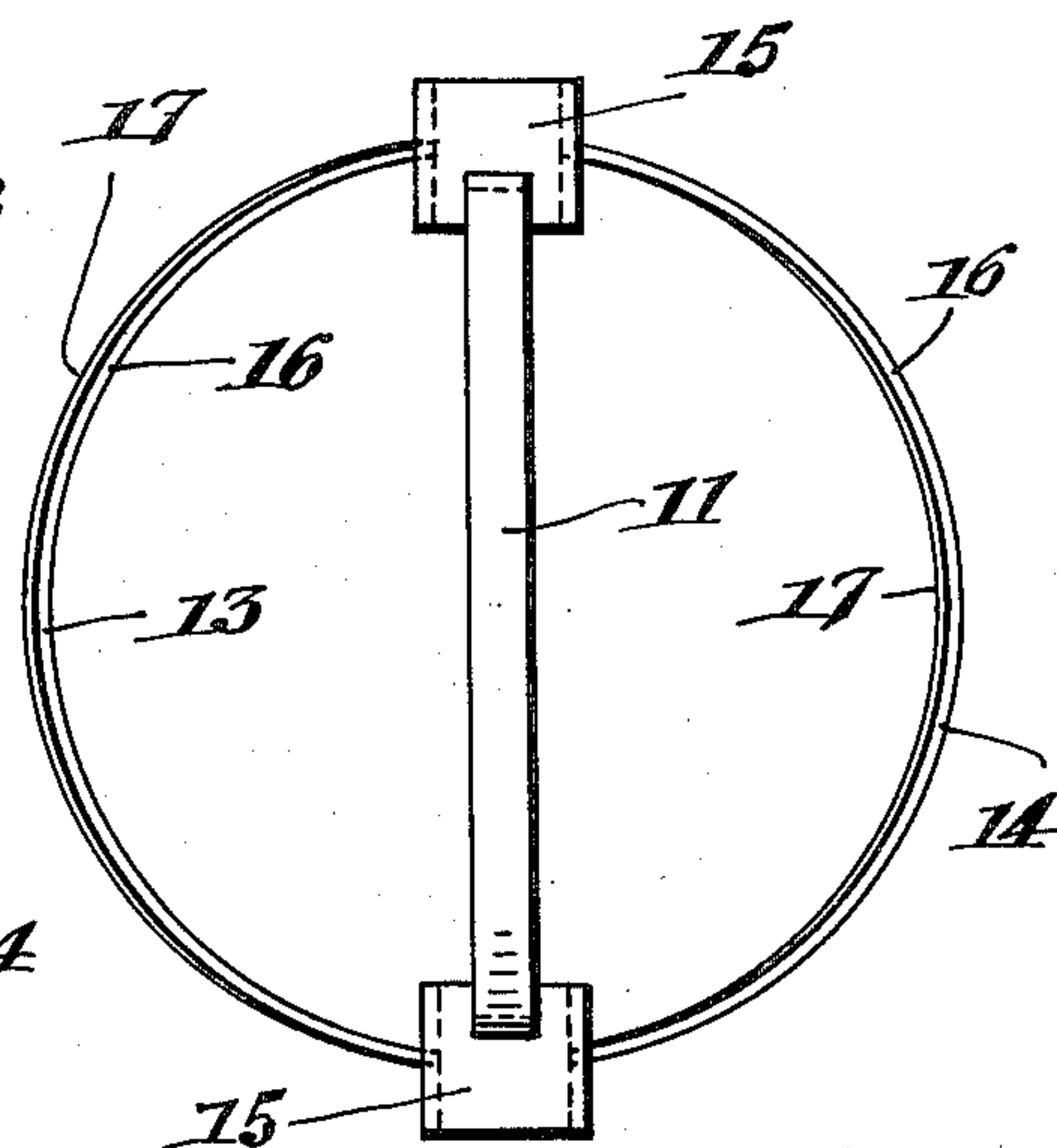


FIG. 2.

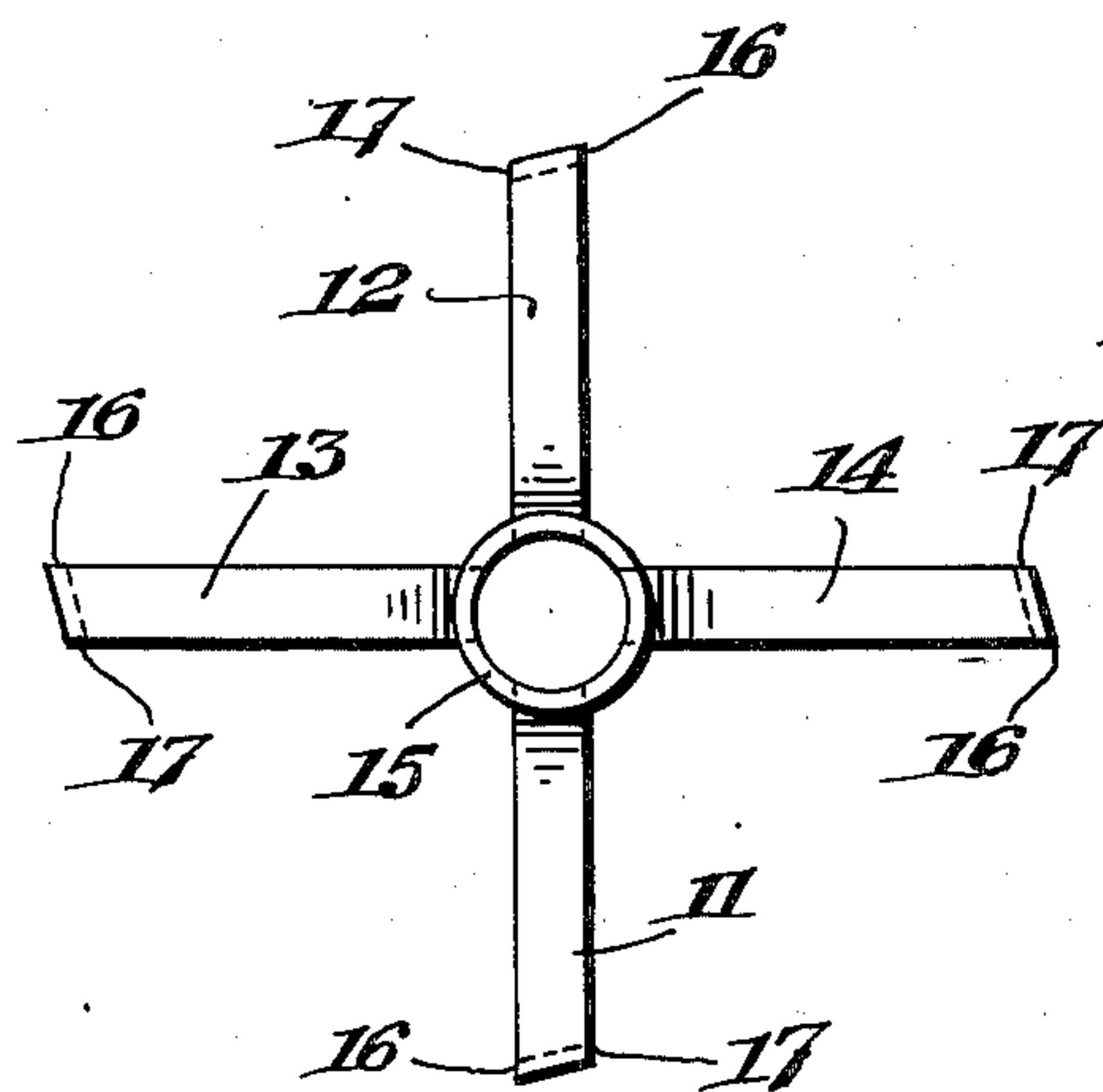


FIG. 3.

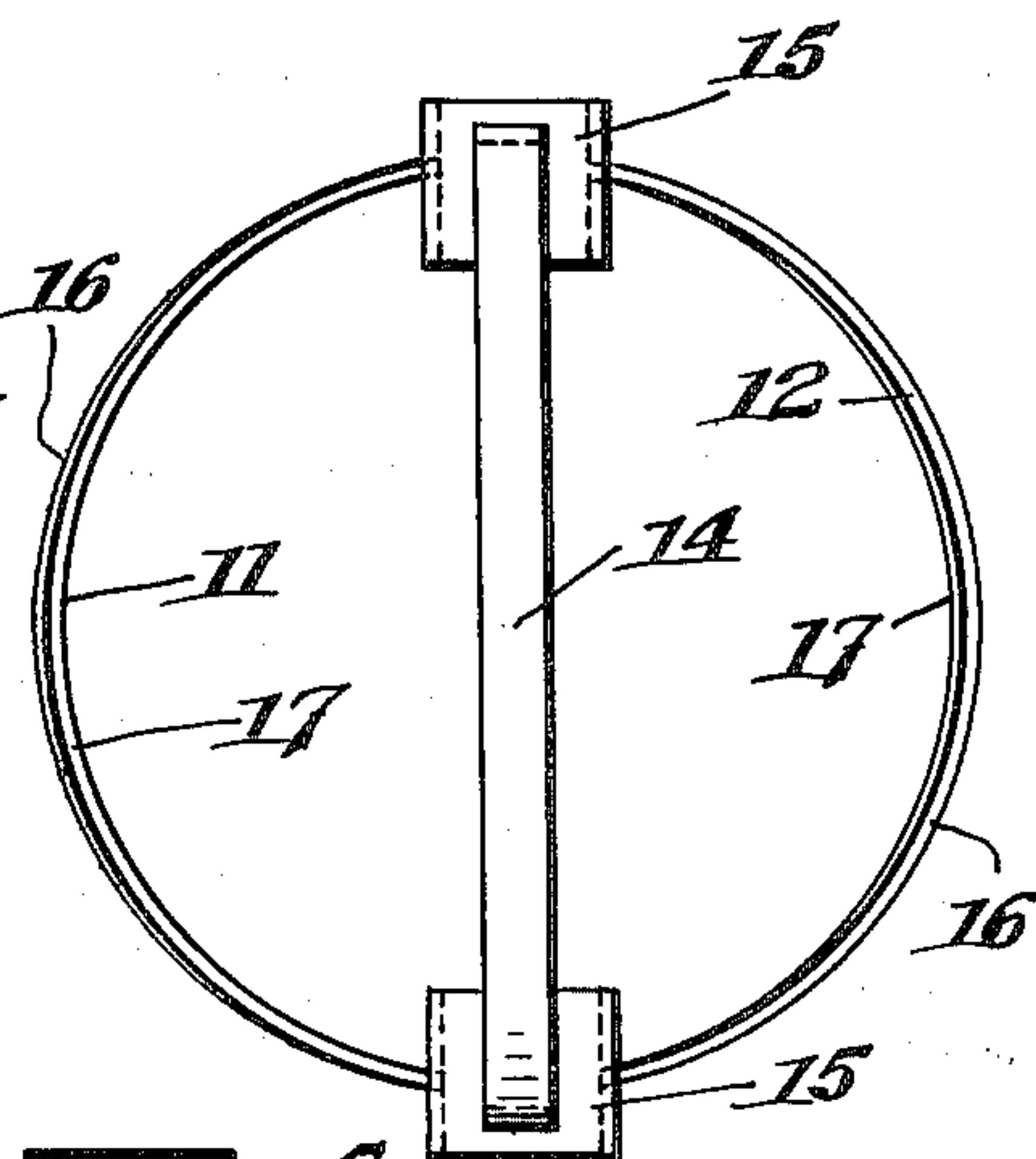


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UNITED STATES PATENT OFFICE

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AGITATION OF PULPS AND THE LIKE

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1 Claim. (Cl. 259—133)

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This invention relates to an agitating device having particular value in the field of agitation of pulps in the processes of ore concentrations by flotation procedures.

In the art of flotation concentration of ores, it is common knowledge that agitation of the pulp for example with alkalinizing agents, flotation agents, air or other agents is usually desirable to cause the mineral particles to become receptive to the desired subsequent response in froth flotation. This agitation or conditioning is commonly effected by mechanical stirring using one or more impellers submerged in the pulp and mounted on a rotating shaft. Such impellers are commonly of the propeller type such as used in marine propulsion, or four bladed bevelled cross impellers, or multiple stacked rotationally staggered twin blade arms of the type used in repulper machines.

The difficulty with the known impellers is that in order to obtain a satisfactory degree of agitation, they involve either an inordinately large consumption of power to drive the impellers, or excessive wear of the impellers and in some cases are subject to both of these important disadvantages.

According to the present invention there is provided an agitating device which overcomes these disadvantages and comprises in general terms a rotatable shaft, and mounted thereon at least four loop members of substantially the same configuration, each loop member being aligned with another to form a closed hoop member, and at least one loop member being spaced at any point therein closer to the shaft than the corresponding point in another loop member whereby the loop members travel at least two discrete paths on rotation of the shaft.

In the preferred form of the invention there are two such hoop members mounted at 90° to each other, and one hoop member is smaller than the other only by an amount such that the path travelled by one clears that travelled by the other. The two loop members of any hoop member may be identical in size, or the four loop members may be successively dimensioned so that the four loops will travel four distinct paths.

According to a further feature of the invention each loop is offset from the true tangential position in relation to the path which it travels, points in the leading edge of each loop member being more remote from the shaft than corresponding portions of the trailing edge.

The invention will now be described with reference to the accompanying drawings in which

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Figure 1 is an oblique view of an agitating device according to the invention,

Figure 2 is a plan view with the driving shaft removed,

Figure 3 is an elevation with the driving shaft removed, and

Figure 4 is an elevation with the driving shaft removed taken at 90° to Figure 3.

The device comprises a shaft 10 adapted to be rotated by suitable driving means and loop members 11, 12, 13 and 14 which in the form of the invention illustrated are mounted on hubs 15 suitably keyed to the shaft 10.

As illustrated, the loops are arranged in aligned pairs to form hoop members which may be circular, or of any other desired shape, provided that all of the loop members are of substantially the same configuration so that the path travelled by one loop member will not cut across the path travelled by any other loop member.

The two loop members of each pair forming a hoop member are of the same dimensions, but one hoop is smaller than the other. Thus, any point in each of the loop members 11 and 12 is spaced closer to the shaft 10 than the corresponding point in either of the loop members 13 and 14 so that while the two loop members 11 and 12 travel the same path as each other and the two loop members 13 and 14 travel the same path as each other, the two paths travelled are distinct. They are, however, closed and it is an important feature of the invention that the hoop member formed by the loop members 11 and 12 be smaller than the other hoop member only by an amount such that the path travelled by each hoop member clears that travelled by the other.

As illustrated in Figure 2, the loop members according to the preferred form of the invention are twisted or skewed so that the leading edge 16 is spaced farther from the shaft 10 than the trailing edge 17. It has been found that the best results are obtained if the angle which this twist or skew causes the loop member to depart from the true tangential position in relation to the path which it travels is of the order of 5° at the central portion of each loop tapering to zero at each end where it is connected to a hoop.

Instead of the two loops of an aligned pair being of the same size, the plurality of loops may be successively dimensioned so that each loop member travels a path distinct from any other. There may, of course, be more than two pairs of loop members.

What we claim as our invention is:

An agitating device comprising a rotatable

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shaft, a first pair of loop members mounted on said shaft to form an outer hoop member, a second pair of loop members mounted on said shaft to form an inner hoop member, said outer and inner hoops being arranged at an angle of substantially 90° to each other, said inner and outer hoop members being circular in configuration and a twist of each loop member decreasing gradually from a maximum at the central portion to zero at each end, said outer hoop being of greater diameter than said inner hoop so that any point on said inner hoop member is located closer to said shaft than the corresponding point on said outer hoop member, the difference in diameter between said hoop members being uniform at all points along their circumferences, and each of said loop members being twisted so that points on the lead-

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ing edge of each loop member lie more remote from said shaft than the corresponding points on the trailing edge.

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