

Dec. 29, 1936.

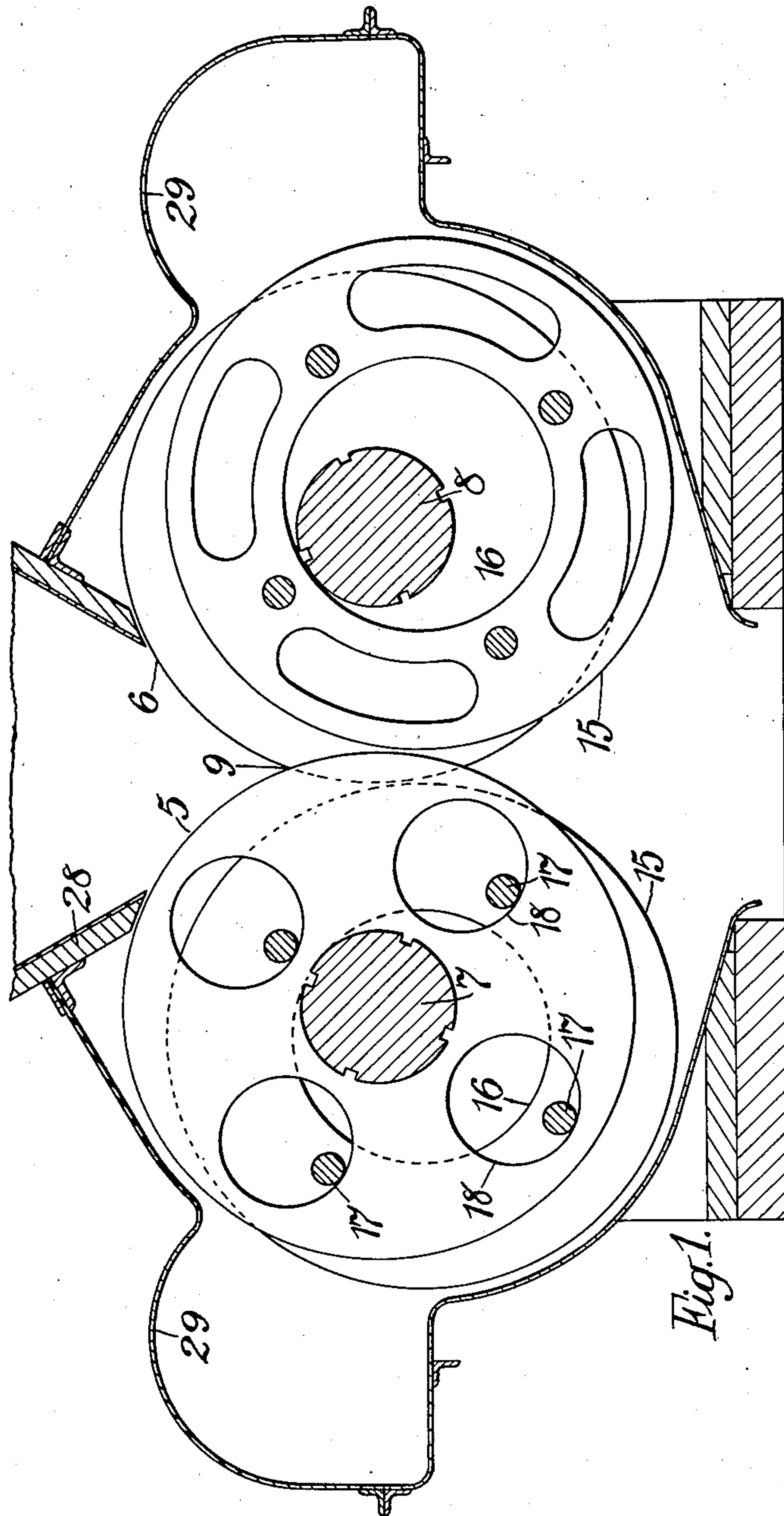
A. PODMORE

2,066,053

APPARATUS FOR CUTTING TOBACCO AND THE LIKE

Filed Feb. 26, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

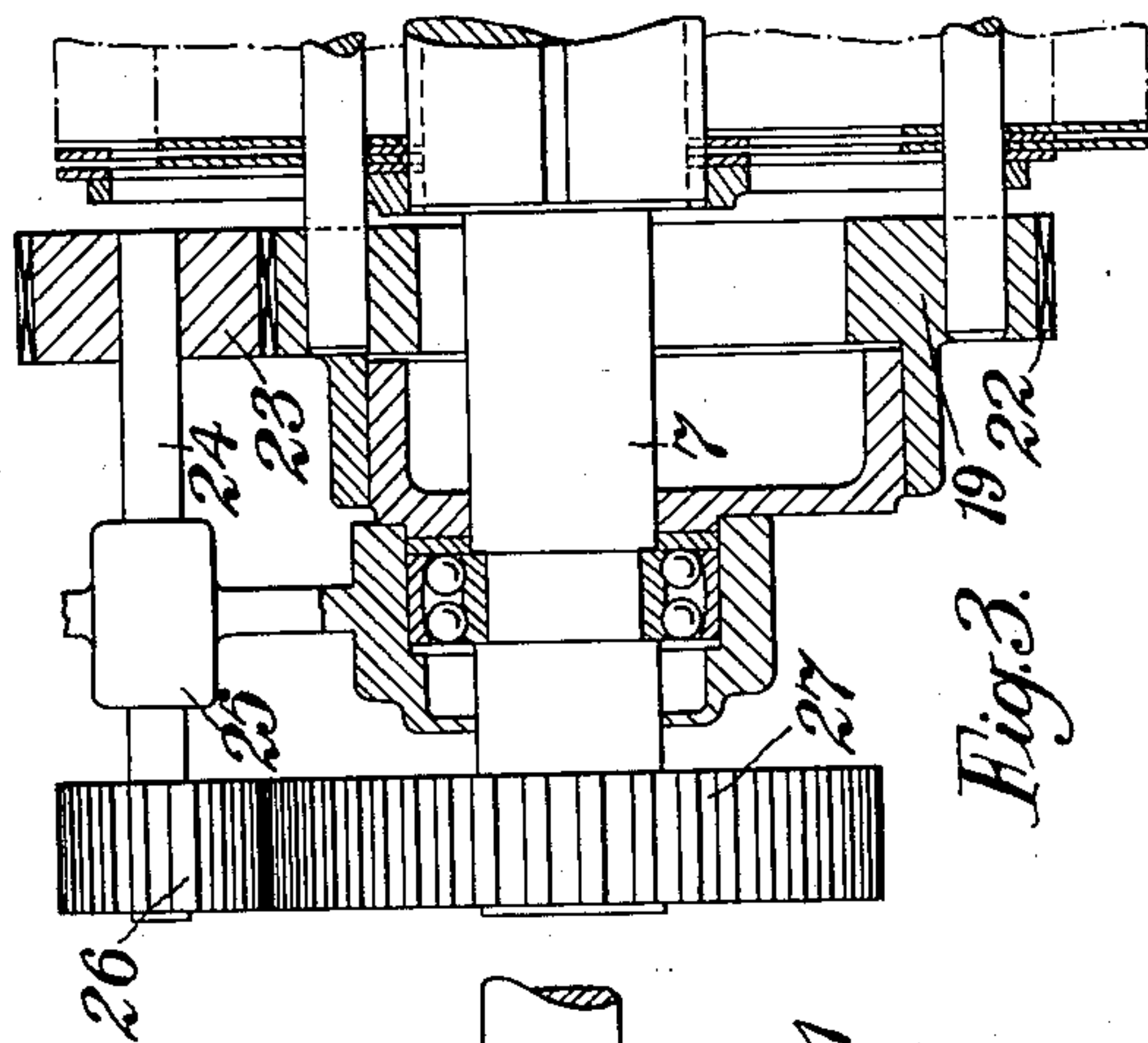


Fig. 3.

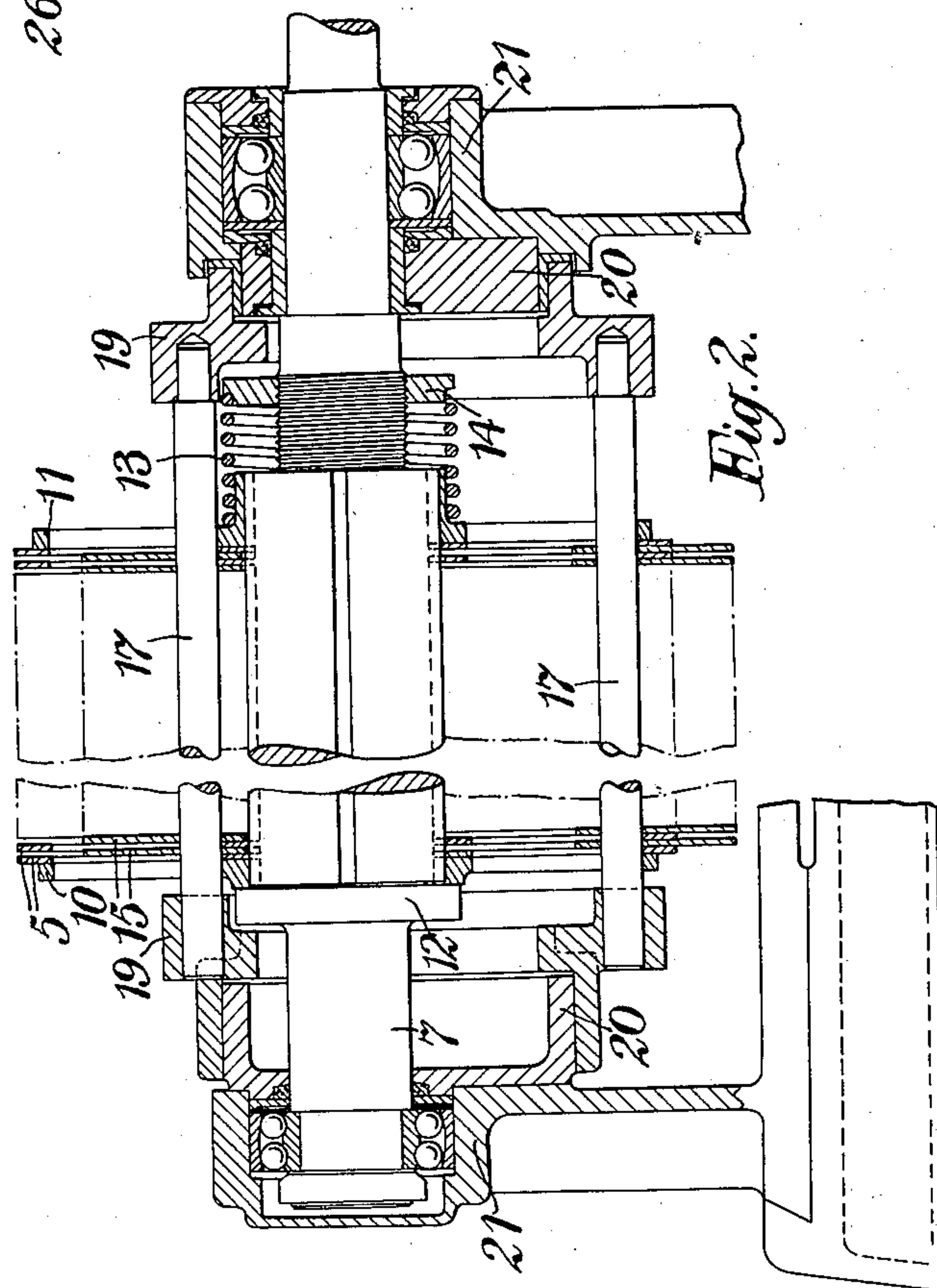


Fig. 2.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR CUTTING TOBACCO AND THE LIKE

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3 Claims. (Cl. 146—122)

This invention relates to apparatus for cutting or shredding tobacco and the like in which the tobacco is fed between a series of intermeshing disc cutters arranged on parallel shafts, the adjacent overlapping edges of the interspaced cutters operating to cut the tobacco or other material into strips by a rotary shearing action.

One of the objects of the invention is to provide improvements in connection with the clearing of the tobacco and the like from between the cutters of apparatus of the above kind and another object is to provide improved scraper or cleaning means for the cutters in which friction is reduced to minimum.

The invention consists in apparatus for cutting or shredding tobacco or the like comprising intermeshing disc cutters arranged on parallel shafts, scraper or cleaning elements located between the cutter discs and means for rotating the scraper elements about axes eccentric to the axes of the cutters and at substantially the same speed as the cutters.

According to the invention, disc or disc-like scraper elements, preferably of circular form, are located between the cutter discs in eccentric relation thereto so that the periphery of the scraper element lies partly within and partly without (or coincident with) the peripheries of the adjacent cutters and are rotated at substantially the same speed as the said cutters.

The scraper elements are rotated, according to another feature of the invention, by coupling the series of scrapers associated with each cutter carrying shaft together by means of members extending through apertures in the cutter discs so that as the latter rotate the edges of the said apertures engage the coupling members passing through them and thus drive the scraper elements at the same speed, while the relative displacement of the scrapers during each revolution due to their rotation about an axis eccentric to that of the shaft is allowed for by suitably proportioning the apertures in the cutter discs.

According to a further feature of the invention, the coupling members comprise a plurality of bars equally spaced about the central axis of each series of scrapers and connected at each end to an annular member which is journaled upon a bearing element carried in the frame. This bearing element may be connected to or form part of the fixed portion of the bearing assembly for the shaft which carries the cutters. The bearing for the member driving the bars thus forms a sleeve encircling the shaft and mounted eccentrically in relation to the axis of the shaft.

In another mode of driving the scraper elements according to the invention, one or both of the annular members to which the scraper coupling bars are connected is provided with or formed as a toothed gear which meshes with a second gear mounted on an auxiliary shaft carried in the frame, a gear wheel mounted on the cutter shaft meshing with another gear on the auxiliary shaft and the ratio of the gears being chosen so that the annular member is driven at the same speed as the shaft. The advantage of this form of drive is that it obviates the relatively high stresses which are liable to occur when the rotational effort is transmitted directly from the relatively thin cutter discs to the driving or coupling bars, due to the small area of contact between the engaging elements.

It will be understood that the invention provides an improved scraper arrangement in which the wear is limited to that due to relative displacement (apart from rotation) between the scrapers and adjacent cutters, while at the same time the construction is simple and does not comprise any parts of great delicacy or such as are liable to be subject to excessive wear.

In the accompanying drawings which illustrate intermeshing disc cutters provided with improved clearing means according to the invention.

Figure 1 is a cross sectional elevation.

Figure 2 is a longitudinal section through one of the drive shafts.

Figure 3 is a detail of a modified drive for the clearing elements.

In carrying the invention into effect according to one convenient mode, two series of disc cutters 5 and 6 are mounted on a pair of parallel shafts 7 and 8, the edges of the discs on the respective shafts overlapping and intermeshing at their peripheries at 9 so that material fed between the discs will be cut into strips by the rotary shearing action of the sharpened edges of the cutters. The shafts 7 and 8 are splined for the purpose of driving the cutters 5 and 6 which may have a certain degree of longitudinal freedom and are held in cutting engagement by spring clamping devices; any suitable form of clamp may be provided such as end plates 10 and 11, slidably keyed on the shafts. One of the plates (10) abuts against a collar 12 while the other plate (11) is pressed against the end cutter disc by a spring 13 which is adjusted by a collar or nut 14. Means are also provided for sharpening the cutters and for adjusting the lateral spacing of the two shafts, but such means

and the details of the drive for the shafts form no part of the present invention.

Between each cutter and the next on the same shaft is mounted a scraper or cleaner element 15 which consists preferably of a circular disc, the thickness of which is very slightly less than the normal clearance between adjacent cutters. For convenience of illustration the scrapers are shown as filling the spaces between the cutters but it will be understood that a slight clearance is provided.

The scraper discs 15 may conveniently be somewhat less in diameter than the cutters and are mounted eccentrically with respect thereto so that the peripheries of the scrapers extend beyond the peripheries of the cutters at a position away from the cutting zone, the arrangement being such as to afford the maximum space on that side from which the material is fed between the cutters. The scraper discs have a large central aperture 16 through which the shaft 7 or 8 passes, to permit of their rotation while preserving an eccentric position in relation to the cutters, and they are maintained in this position by a series of coupling bars 17, say four in number, which pass through apertures in all the scrapers of each series. The bars 17 pass through apertures 18 in the cutter discs, which apertures are of sufficient size to allow for the relative displacement due to the eccentricity of the scrapers when the latter are rotated with the cutters.

At either end the bars 17 are attached to or screwed into a ring or annular member 19 which is rotatably carried on a bearing 20, the bearing being hollow, so that the cutter shaft may pass through it. The bearing 20 may be in the form of a sleeve which is carried by the frame and may be connected to or form part of the bearing assembly 21 for the shaft 7 or 8. It will be understood that the axis of the bearing 20 will be eccentric to that of the shaft by the same amount that the scrapers 15 are eccentric to the cutter 5 or 6.

The drive of the scrapers is effected by engagement between the cutters 5 or 6 and the coupling bars 17 which pass through them. The splined cutter shafts 7 and 8 are driven in opposite directions by well known means and the edges of the apertures 18 in the cutters engage the coupling bars 17 and thereby drive the scrapers at the same rotational speed. The apertures 18 in the cutters and the central apertures 16 of the scrapers are proportioned to permit the relative displacement (without rotation) necessary to enable the scrapers to rotate about the eccentric axes.

Various forms may be given to the ring member which connects the coupling bars in order to accommodate the former with the bearing provided for it.

In carrying the invention into effect according to a modified mode, see Figure 3, the drive of the scrapers 15 instead of being transmitted directly to the coupling bars by the cutters is effected by external means. Either or both of the ring members 19 are formed as, or provided with, gear teeth 22 which mesh with a gear wheel or pinion 23 attached to an auxiliary shaft 24 carried in fixed bearings 25 parallel to the cutter shaft. The auxiliary shaft is provided with a second pinion 26 which meshes with a gear wheel 27 mounted on the cutter shaft, the gear ratio of the train being 1:1 so that the ring member 19 and the scrapers will be driven at the same

speed as the cutters. It will be understood that each cutter shaft is provided with drive mechanism as described and if desired the drive may be effected simultaneously at each end of the shaft.

In a convenient arrangement of the cutters provided with either of the forms of drive described above, the two shafts lie in the horizontal plane and the tobacco or the like is fed vertically down through the cutters from an overhead hopper 28, the lower inclined sides of which approach the upper surface of each series of cutters. The central axes of the scrapers 19 will then be located below the axes of the shafts 5 and 6 and outside the vertical planes containing such axes. Hoods 29 are provided for carrying away dust under suction.

It will be understood that the examples described above may be widely modified in detail in accordance with practical requirements and necessities of design. More particularly, it will be appreciated that the external geared drive for the scrapers is described by way of example only, and other forms of drive transmission may be employed provided that the scrapers are driven at the same or substantially the same speed as the cutters.

I claim:—

1. Apparatus for cutting or shredding tobacco or the like, comprising rotary intermeshing disc cutters mounted upon parallel shafts, cleaning elements located between the cutter discs, and means for rotating the cleaning elements about axes eccentric to the axes of the cutters at substantially the same speed as the cutters, said means including two or more members supporting said cleaning elements and rotating bodily in a predetermined path about a fixed axis eccentric to the cutter axes, one of said shafts lying within said path, said means including two or more members supporting said cleaning elements and rotating bodily in a predetermined path about a fixed axis eccentric to the cutter axes, one of said shafts lying within said path.

2. Apparatus for cutting or shredding tobacco or the like comprising parallel shafts, series of rotary intermeshing disc cutters mounted upon said shafts, cleaning discs located between the cutter discs in eccentric relation thereto, said cleaning discs having central apertures through which said shafts pass, a framework carrying the cleaning discs including rotatable bearing members and a series of spaced bars carried by said bearing members, said cutter discs having apertures through which said bars pass, the edges of the apertures in the disc cutters engaging said bars whereby the cleaning discs are rotated from the disc cutters.

3. Apparatus for cutting or shredding tobacco or the like comprising parallel shafts, series of intermeshing disc cutters mounted upon said shafts, cleaning discs located between the cutter discs in eccentric relation thereto, said cleaning discs having central apertures through which the shafts pass, a framework carrying the cleaning discs including rotatable bearing members and a series of spaced bars carried by said bearing members, said cutter discs having apertures through which said bars extend, and gearing between the shafts and said bearing members adapted to rotate the framework.

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