March 15, 1960 R. ALLENBAUGH 2,928,671

COLLATING MACHINE

Filed July 16, 1957 4 Sheets-Sheet 1

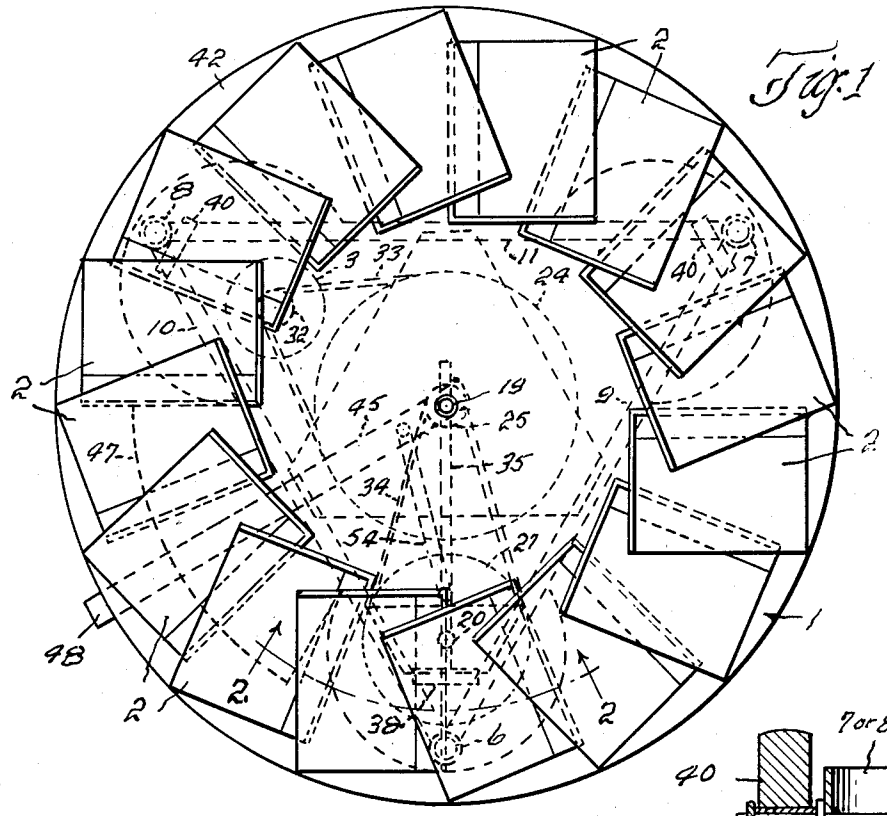


Fig. 1

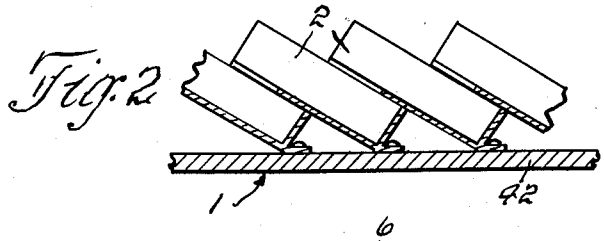


Fig. 2

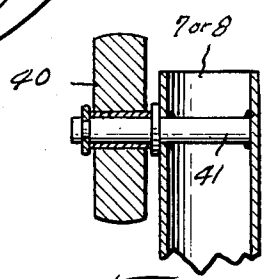


Fig. 7

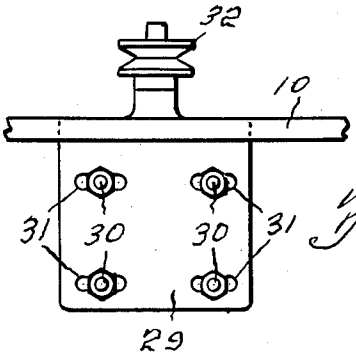


Fig. 8

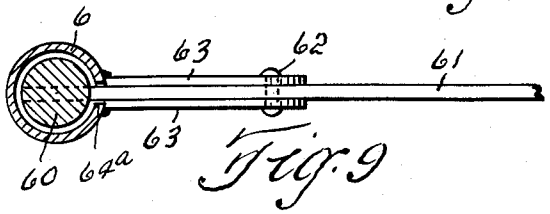


Fig. 9

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COLLATING MACHINE

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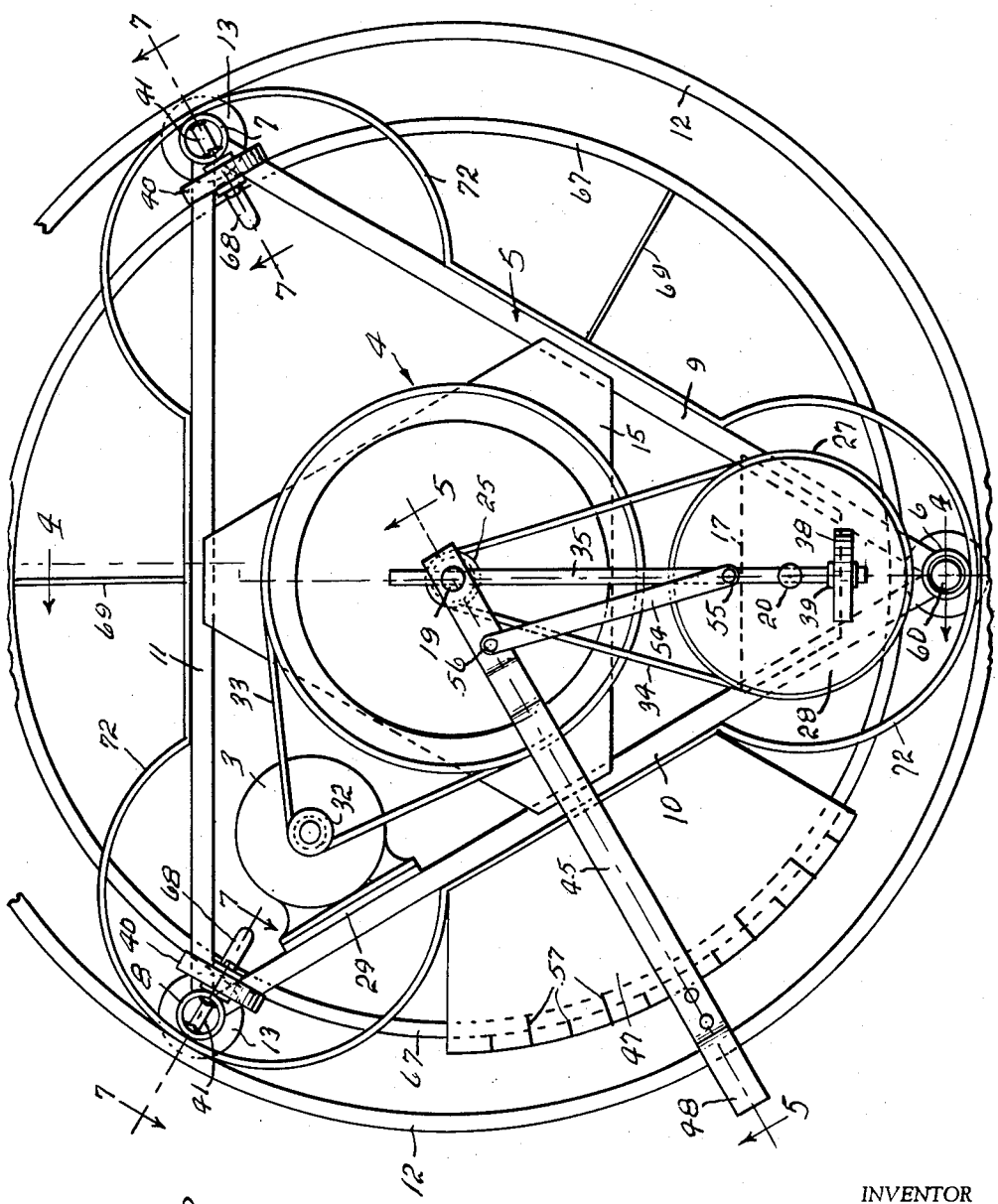


Fig. 3

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COLLATING MACHINE

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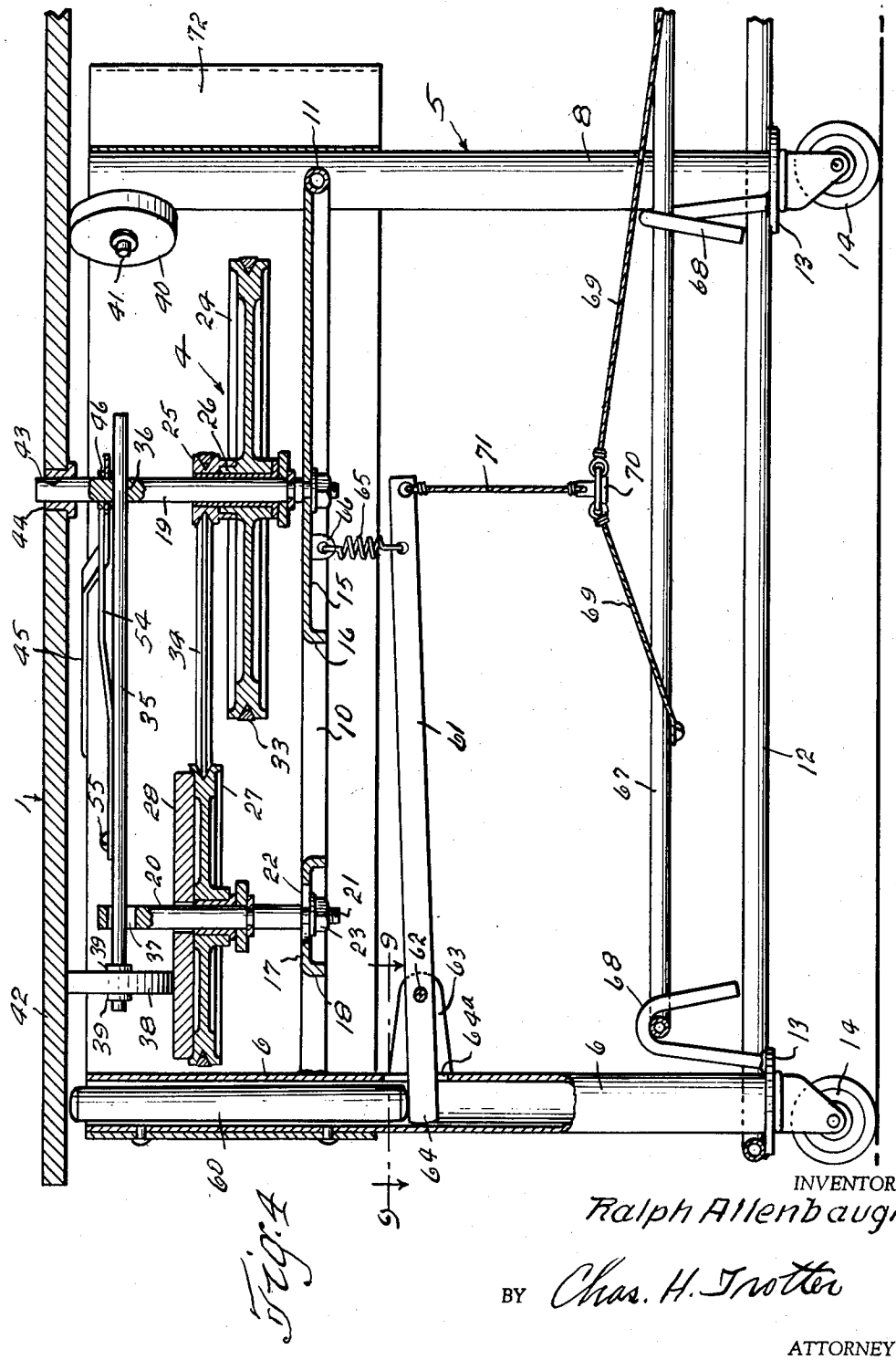


Fig. 4

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COLLATING MACHINE

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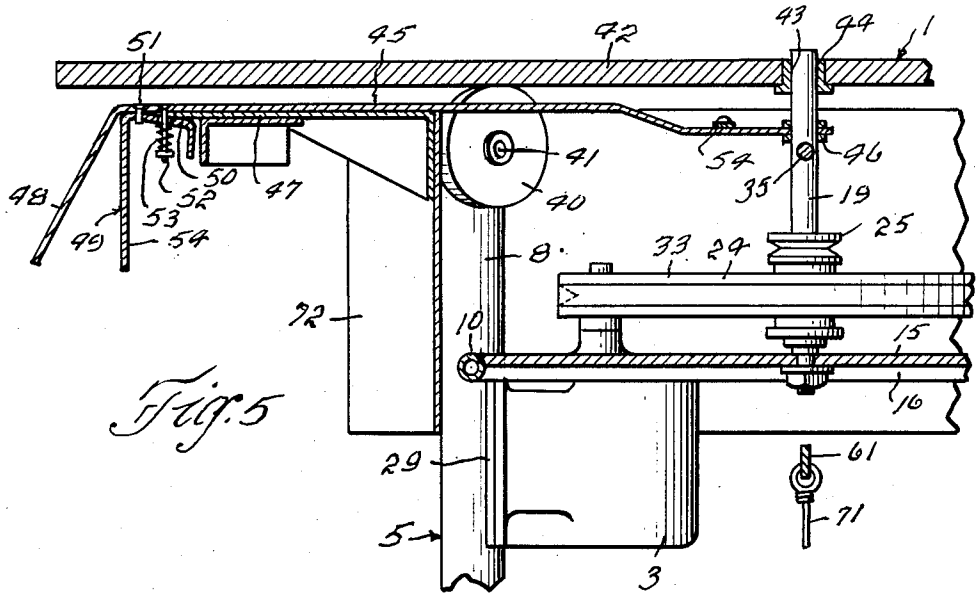


Fig. 5

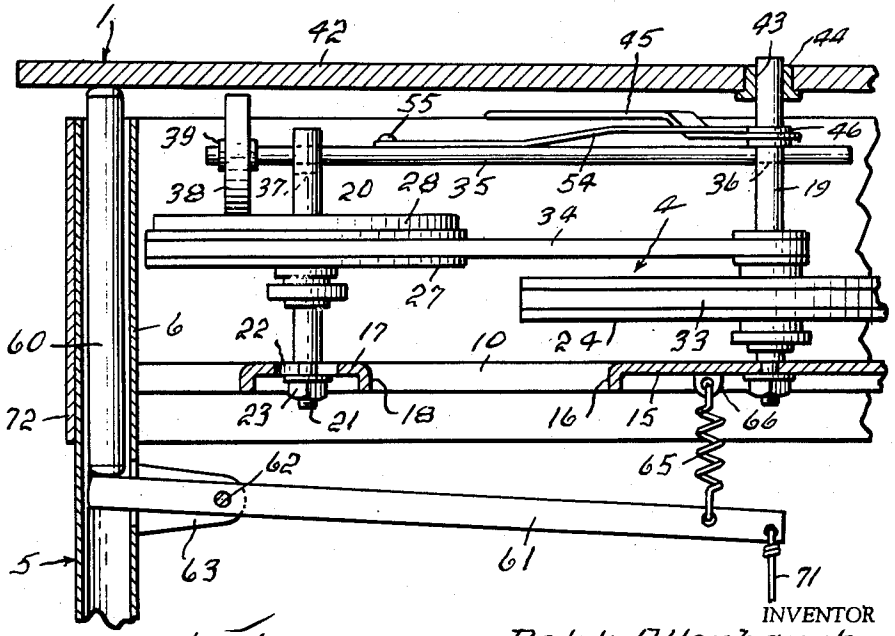


Fig. 6

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2,928,671

COLLATING MACHINE

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Application July 16, 1957, Serial No. 672,321

7 Claims. (Cl. 270—58)

This invention relates to rotary collating machines and is a modification and improvement of the collating machine disclosed in my copending application Serial No. 363,497 which was filed on June 23, 1953, and issued as Patent No. 2,799,496 on July 16, 1957. Collating machines of this character may be used in collating various different articles. They are generally used for collecting together the successive pages of catalogs, advertising pamphlets, instruction books and the like. But they are equally well adapted for use in assembling small mechanical or electrical articles.

The collating machines disclosed in the aforesaid copending application and in this application are quite similar in construction and operation and each generally comprises a stand on which are rotatably mounted a plurality of spaced rollers arranged in an annular row. A suitable turntable is seated upon the rollers and interengaging means between the stand and the turntable are provided by which the turntable is constrained for rotation about a fixed vertical axis. One of the aforesaid rollers is driven by a motor through suitable speed reduction mechanism, which motor and mechanism are mounted upon the stand under the turntable. The driven roller when rotated is operative to rotate the turntable. The turntable has a plurality of trays of suitable receptacles mounted thereon which are arranged in an annular row adjacent the periphery of the turntable. The size, construction and arrangement of the trays or receptacles are dependent upon the article being collated. The collating machine is adapted to be simultaneously used by a plurality of collators who are stationed around the turntable. The various sheets or articles being collated are placed in successive trays or receptacles in the order in which they are to be withdrawn from the machine, it being understood that each tray or receptacle contains a plurality of identical sheets or parts.

In operation it is necessary to regulate the speed of rotation of the turntable in conformity with the article being collated and the agility of the operators. Also during operation it is frequently necessary to momentarily quickly stop the rotation of the turntable.

It is therefore one of the principal objects of the invention to provide in a collating machine of the aforesaid character new and improved means by which the driving connection to the turntable through the driven roller may be quickly broken by any one of the several operators simultaneously using the machine, independently of the other operators.

Another object of the invention is to provide in a collating machine of the aforesaid character braking means by which the rotation of the turntable due to inertia is quickly stopped after the driving connection to the table has been broken.

Another object of the invention is to provide in a collating machine of the aforesaid character improved means by which the speed of rotation of the turntable may be quickly and easily adjusted in accordance with requirements.

Still another object of the invention is to provide a collating machine of the aforesaid character which can be adapted for collating various different types of articles and which is efficient in operation, is of simple construction, is relatively inexpensive to manufacture and which will give long uninterrupted service without requiring adjustment or repair.

The principal objects of the invention having been stated, other and more limited objects of the invention will be apparent from the following specification and the accompaning drawing forming a part thereof in which:

Fig. 1 is a top plan view of a collating machine embodying the instant invention;

Fig. 2 is a fragmentary detail section taken on the line 2—2 of Fig. 1 showing one arrangement of trays or receptacles upon the turntable;

Fig. 3 is a plan view, on a slightly larger scale, showing the machine with the cover removed;

Fig. 4 is a vertical section, on a still larger scale, taken on the line 4—4 of Fig. 3;

Fig. 5 is a vertical section, on the same scale as Fig. 4, taken on the line 5—5 on Fig. 3;

Fig. 6 is a view similar to Fig. 4 showing the driving connection to the turntable broken and the brake applied to the turntable to stop the rotation thereof due to inertia;

Fig. 7 is an enlarged detail section taken on either of the lines 7—7 on Fig. 3;

Fig. 8 is a fragmentary detail view showing the manner of adjustably mounting the driving motor upon its supporting plate; and

Fig. 9 is a horizontal section, on a slightly reduced scale, taken on the line 9—9 on Fig. 4.

Referring now to the drawings by reference characters, the collating machine as shown herein comprises generally a turntable 1 having a plurality of trays or suitable receptacles 2 permanently secured thereon in an annular row adjacent the periphery thereof, a motor 3, speed reduction means 4 through which the turntable is rotated by the motor 3, and a stand generally indicated by the numeral 5 upon which the turntable and the driving mechanism therefor are suitably mounted.

The stand 5 is preferably built up of metal tubing and comprises the tubular legs 6, 7 and 8 which are arranged in an equilateral triangle and are rigidly connected together adjacent the upper end thereof by tubular struts 9, 10 and 11 which are welded or otherwise permanently secured to and between the legs 6, 7 and 8. As shown, the strut 9 is connected to and between the legs 6 and 7, the strut 10 to and between the legs 6 and 8, and the strut 11 to and between the legs 7 and 8. The lower ends of the legs 6, 7 and 8 are permanently connected to a tubular ring 12, disposed around the legs 6, 7 and 8 through the medium of disks 13 which are suitably secured to the lower ends of the legs 6, 7 and 8 and are welded to the ring 12. A castor 14 is removably secured in the lower end of each of the legs 6, 7 and 8 to facilitate the movement of the machine from place to place as desired.

A centrally disposed triangular supporting plate 15 having the downturned stiffening flanges 16 is welded to and between the struts 9, 10 and 11, and a plate 17 having the downturned stiffening flanges 18 is welded to and between the struts 9 and 10. An upwardly extending vertical stud 19 is secured to the plate 15 at the geometric center of the triangle formed by the legs 6, 7 and 8, and an upwardly extending vertical stud 20 having a reduced threaded lower end 21 is adjustably mounted in an elongated slot 22 in the plate 17 and is clamped in adjusted position by a nut 23.

The speed reduction means 4 comprises a relatively large grooved pulley 24, having a relatively small grooved pulley 25 rigidly secured upon the hub 26 thereof, and

is rotatably mounted upon the stud 19; and a third grooved pulley 27, of slightly less diameter than the pulley 24, is rotatably mounted upon the stud 20. The pulley 27 has a flat circular disk 28 permanently secured thereto in order to provide the upper face thereof with a smooth flat surface. If desired the pulley 27 may be formed with a smooth flat upper surface, in which case the disk 28 may be dispensed with. The driving motor 3 is adjustably secured to a vertically disposed plate 29, which is welded to the strut 10 and extends downwardly therefrom adjacent the leg 8, by a plurality of bolts 30 which extend through elongated slots 31 in the plate 29. The motor 3 has a small grooved pulley 32 secured to the armature shaft thereof which is operatively connected to the relatively large pulley 24 by a belt 33 which extends around the pulleys 24 and 32; and the small pulley 25 is operatively connected to the pulley 27 by a belt 34 which extends around the pulleys 25 and 27. During operation the motor 3 through the pulley 32 and belt 33 rotates the pulleys 24 and 25 in unison at a greatly reduced r.p.m. and the pulley 25 through the belt 34 rotates the pulley 27 at a further reduced r.p.m. The tension of the belt 33 may be adjusted by loosening the bolts 30 and then shifting the motor 3 one way or the other upon the plate 29; and the tension of the belt 34 may be adjusted by loosening the nut 23 and then shifting the stud 20 one way or the other in the slot 22.

A substantially horizontally disposed, small diameter, elongated rod 35 is slidably mounted adjacent the inner end thereof in an aperture 36 through the stud 19 and adjacent the outer end thereof in a vertically elongated aperture 37 in the stud 20.

A roller 38 is rotatably mounted upon the outer end of the rod 36 between collars 39 and is adapted to bear against the upper smooth flat face of the disk 28 between the stud 20 and the periphery of the disk 28. Means to be described hereinafter are provided to slide the rod 35 back and forth in the apertures 36 and 37 to thereby adjust the point of contact of the roller 38 with the disk 28 towards and away from the stud 20. Rollers 40, similar to the roller 38, are rotatably mounted upon radially disposed horizontal studs 41 carried by the legs 7 and 8 at the upper ends thereof.

The turntable 1 consists of a large circular disk 42, of plywood or other light strong material, having a central aperture 43 in which is mounted a bushing 44. The turntable disk 42 is rotatably sealed upon the two rollers 40 carried by the legs 7 and 8 and upon the roller 38 carried by the rod 35 with the stud 19 extending up through the bushing 44 whereby the turntable is constrained for rotation about a fixed vertical axis. During ing operation the turntable disk 42 is rotated in a counterclockwise direction (Fig. 1) about the stud 19 by the pulley 27 and disk 28 through the roller 38. The disk 28 rotates the roller 38 and it in turn rotates the turntable 1.

The speed of rotation of the turntable may be varied as desired by shifting the roller 38 toward or away from the stud 19. For this purpose I provide a lever 45 having the inner end thereof pivotally mounted upon the stud 19 above the rod 35 as shown at 46. From the stud 19 the lever 45 extends radially outwardly under the turntable disk 42 and over an arcuate indexing plate 47. The outer free end of the lever 45 is turned downwardly to provide a handle grip 48 and is provided with a clamping member 49 which is adapted to releasably clamp the lever 45 to the indexing plate 47. The clamping member 49 comprises a horizontally disposed arm 50 which is pivotally secured to the lever 45 adjacent the handle grip 48 as indicated at 51 and extends radially inwardly therefrom and under the indexing plate 47. The lever 45 carries a stud 52 which extends downwardly therefrom through an aperture in the arm 50 and is provided with a coiled spring 53 which is operative to resiliently hold the arm 50 in clamping engagement with the under side of the indexing plate 47. The outer end of the horizontal arm 50 is provided with an integral downwardly extending arm 54 which is adapted to be grasped and rocked toward the handle 48 to thereby rotate the inner end of the arm 50 downwardly against the upward pressure of the spring 53 and out of engagement with the indexing plate 47. The lever 45 is operatively connected to the rod 35 by a link 54 which has one end thereof pivotally connected to the rod 35 as shown at 55, and the other end thereof pivotally connected to the lever 45 as shown at 56. The rotation of the lever 45 about its pivot 46 will through the link 54 shift the rod 35 radially inwardly or outwardly and thereby shift the roller 38 carried by the rod 35 toward or away from the stud 20. Obviously the closer the roller 38 is to the stud 20 the slower the rotation of the roller 38 will be for a given r.p.m. of the pulley 27 and disk 28. The indexing plate 47 is provided with indicia 57 by which the lever 45 may be set to obtain a known r.p.m. of the turntable 1.

As previously stated, it is frequently necessary during operation of the machine to momentarily stop the rotation of the turntable. For this purpose I slidably mount a plunger 60 in the upper end of the leg 6 and provide a lever 61 by which the plunger 60 is adapted to be raised and lowered into and out of engagement with the underside of the turntable disk 42. The lever 61 is pivotally mounted, as shown at 62, between a pair of bracket arms 63 secured to the leg 6. The outer end 64 of the lever 61 extends into the leg 6 through a slot 64 and has the lower end of the plunger 60 seated thereon. From the pivot 62 the lever 61 extends radially inwardly and terminates substantially in the axis of the stud 19. The inner end of the lever 61 is yieldingly held in upper position as shown in Fig. 4 by a coiled spring 65 which has one end thereof connected to the lever 61 and the other end thereof connected to a boss 66 on the underside of the supporting plate 15. Downward movement of the inner end of the lever 61 will raise the outer end 64 thereof which in turn will elevate the plunger 60 into engagement with the turntable disk 42 and lift the turntable disk 42 up out of contact with the roller 38 thereby breaking the driving connection to the turntable. After the driving connection to the turntable has been broken the plunger 60 acts as a brake, to quickly stop the rotation of the turntable due to inertia, by the frictional engagement of the upper end of the plunger 60 with the underside of the turntable disk 42.

In order that any one of several operators simultaneously using the machine may stop the rotation of the turntable independently of the other operators, I mount a foot ring 67 within the confines of the legs 6, 7 and 8 slightly above the ring 12, by means of inverted U-shaped guides 68 having one leg thereof secured to the plates 13 at the lower ends of the legs 6, 7 and 8. The foot ring 67 is connected by a plurality of equally spaced radially extending flexible cables or chains 69 to a centrally disposed block 70 which in turn is connected to the inner end of the lever 61 by a vertically disposed cable or chain 71. The spring 65 is operative not only to hold the inner end of the lever 61 in raised position but also to yieldingly hold the ring 67 in uppermost position within the guides 68. The ring 67 is adapted to be foot depressed by any operator and the depressing thereof at any point thereon will rock lever 61 to raise the plunger 60 and thereby quickly stop the rotation of the turntable as previously described. As soon as the foot ring 67 is released the turntable will return by gravity back to normal position in contact with the roller 38 and the operation of the machine will resume as previously described.

From the foregoing it will be apparent to those skilled in this art that I have provided a very simple and efficient mechanism for accomplishing the objects of my invention, and it is to be understood that I am not limited to the specific construction shown and described herein,

as various modifications may be made therein within the spirit of the invention and the scope of the appended claims.

I claim:

1. A collating machine of the character described comprising a stand, a plurality of spaced rollers one of which is a driven roller rotatably mounted upon said stand in an annular row, a circular turntable removably seated on said rollers, interengaging means between said stand and said turntable by which said turntable is constrained for rotation about a fixed axis, a plurality of article holding trays mounted on said table adjacent the periphery thereof, driving means through which said driven roller is rotated, said driven roller being operative when rotated to rotate said turntable, and treadle actuated means by which said turntable is raised out of engagement with said driven roller to thereby stop the positive rotation of said turntable by said driven roller.

2. A collating machine as defined in claim 1 in which said treadle actuated means is also operative to stop the rotation of said turntable due to inertia after said turntable has been raised out of engagement with said driven roller.

3. A collating machine of the character described comprising a stand, a plurality of spaced rollers one of which is a driven roller rotatably mounted upon said stand in an annular row, a circular turntable removably seated on said rollers, interengaging means between said stand and said turntable by which said turntable is constrained for rotation about a fixed axis, a plurality of article holding trays mounted on said table adjacent the periphery thereof, driving means through which said driven roller is rotated, said driven roller being operative when rotated to rotate said turntable, a vertically disposed plunger reciprocally mounted under said turntable adjacent said driven roller, a lever pivotally secured to a fixed support intermediate the ends thereof with the outer end thereof disposed under said plunger and the inner end thereof connected to treadle means, said lever being operative when the inner end thereof is depressed by said treadle means to elevate said plunger up into engagement with the underside of said turntable to thereby raise said turntable out of engagement with said driven roller.

4. A collating machine of the character described comprising a stand, a plurality of spaced rollers one of which is a driven roller rotatably mounted upon said stand in an annular row, a circular turntable removably seated on said rollers, interengaging means between said stand and said turntable by which said turntable is constrained for rotation about a fixed axis, a plurality of article holding trays mounted on said table adjacent the periphery thereof, said driven roller being rotatably mounted in fixed position on a horizontally disposed shaft which is slidably mounted for back and forth movement, means by which said driven roller is driven at selected speeds, said means comprising; a pulley rotatably mounted below said driven roller for rotation about a fixed vertical axis, speed reduction means through which said pulley is rotated by a motor mounted on said stand, a disk secured to said pulley for rotation therewith with the upper surface of said disk in engagement with said driven roller to thereby rotate said driven roller, said driven roller being operative when rotated to rotate said turntable, a rotatably mounted arm, a link interconnecting said arm and said shaft through which said shaft is moved back and forth by said arm, the movement of said shaft being operative to vary the position of said driven roller between the axis of rotation of said disk and the periphery thereof to thereby adjust the speed of rotation of said turntable; means by which the driving connection between said driven roller and said turntable is broken to stop the positive rotation of said turntable by said driven roller, and by which the rotation of said turntable due to inertia is quickly stopped after the driving connection between said driven roller and said turntable has been broken.

5. A collating machine as defined in claim 4 in which the driving connection between said driven roller and said turntable is broken by treadle actuated means which is operative to raise said turntable out of engagement with said driven roller.

6. A collating machine as defined in claim 5 in which the means by which the driving connection between the driven roller and the turntable is broken and the rotation of the turntable due to inertia is quickly stopped comprises; a vertically disposed plunger reciprocally mounted under said turntable adjacent said driven roller, a lever pivotally secured to a fixed support intermediate the ends thereof with the outer end thereof disposed under said plunger and the inner end thereof connected to treadle means, said lever being operative when the inner end thereof is depressed by said treadle means to elevate said plunger up into engagement with the underside of said turntable to thereby raise said turntable out of engagement with said driven roller.

7. A collating machine as defined in claim 4 in which the means by which the driving connection between the driven roller and the turntable is broken and the rotation of the turntable due to inertia is quickly stopped comprises; a vertically disposed plunger reciprocally mounted under said turntable adjacent said driven roller, a lever pivotally secured to a fixed support intermediate the ends thereof with the outer end thereof disposed under said plunger and the inner end thereof connected to treadle means, said lever being operative when the inner end thereof is depressed by said treadle means to elevate said plunger up into engagement with the underside of said turntable to thereby raise said turntable out of engagement with said driven roller.

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