March 4, 1924. 1,485,418

S. KORBULY

SHREDDING MACHINE

Filed Nov. 29, 1920 2 Sheets-Sheet 1

Fig. 1

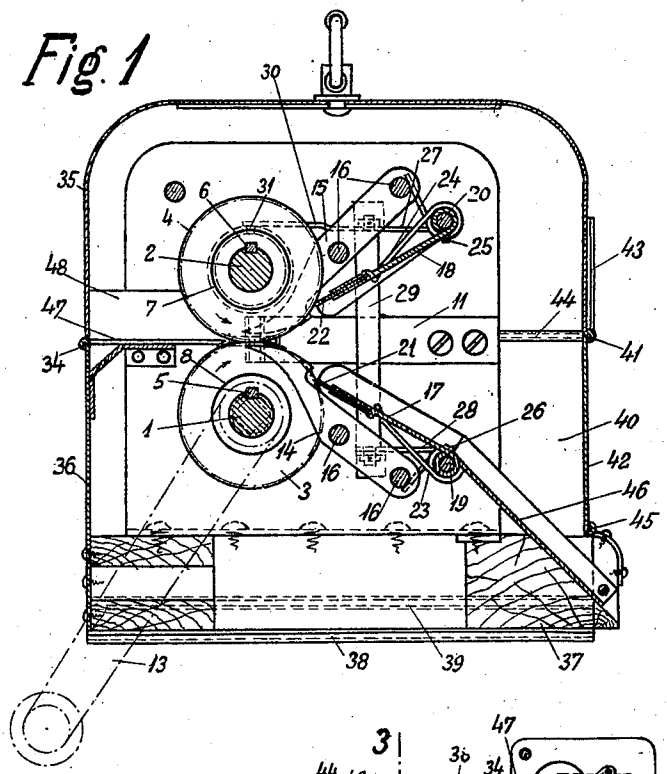


Fig. 2

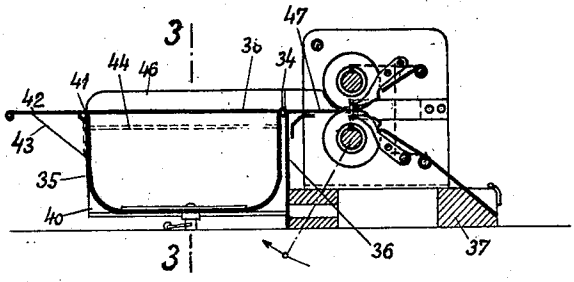
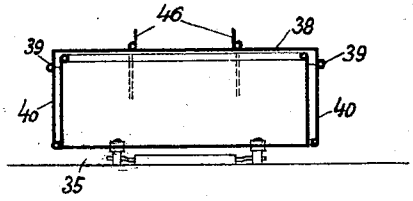


Fig. 3



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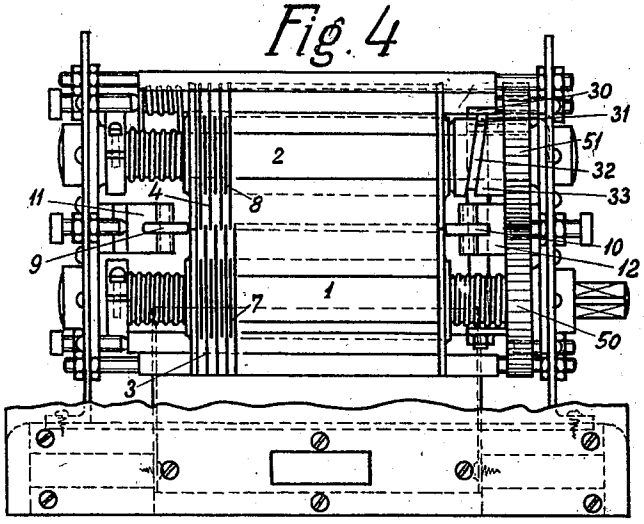
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Fig. 4



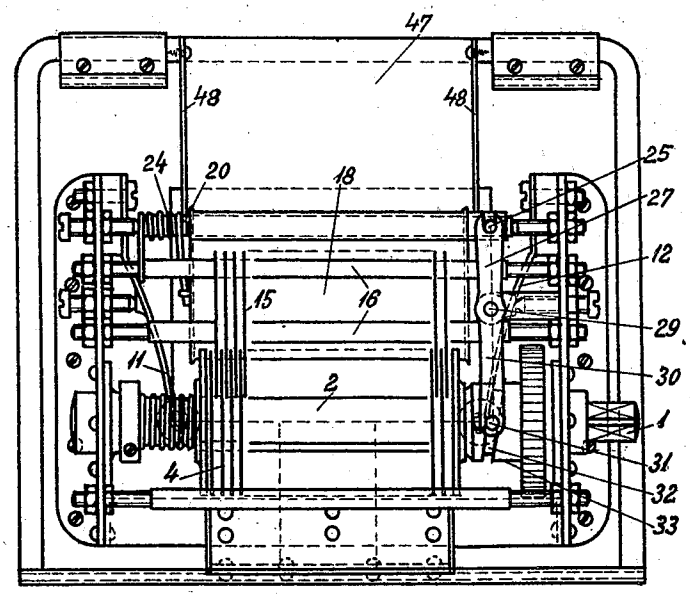


Fig. 5

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Patented Mar. 4, 1924. 1,485,418

UNITED STATES PATENT OFFICE.

SÁNDOR KORBULY, OF BUDAPEST, HUNGARY, ASSIGNOR TO BORIS AIVAS, OF BUDAPEST, HUNGARY.

SHREDDING MACHINE.

Application filed November 29, 1920. Serial No. 427,193.

To all whom it may concern:

Be it known that I, SÁNDOR KORBULY, engineer, a citizen of Hungary, residing at Budapest, in the Kingdom of Hungary, have invented certain new and useful Improvements in Shredding Machines, of which the following is a specification.

The invention relates to a machine for shredding tobacco or other thin leaves or sheet substances such as paper or metal foil. The machine employs co-operating rotary disc cutters arranged on two parallel spindles.

The improved shredding machine is characterized by disc cutters mounted in a longitudinally adjustable manner on the cutter spindles and provided with identical cutting edges on both sides, said cutters being pressed into intimate contact with each other at the cutting point by pressure devices acting in the axial direction, so that the disc cutters cut with both edges, and the cutters or knives of one spindle, form distance pieces determining the distance apart of the cutters of the other spindle. Owing to this arrangement, it is possible to build a very simple machine for simultaneously cutting a comparatively large number of narrow strips, which may have a width as low as 0.3 mm.

The accompanying drawing shows by way of example a tobacco shredding machine for hand operation.

Figure 1 is a cross-section of the machine arranged within a closed casing.

Figure 2 shows the machine on a smaller scale with the casing open.

Figure 3 is a longitudinal section of the casing on line 3—3 of Figure 2.

Figures 4 and 5 are respectively a front elevation and plan of the machine, without the casing.

On the two parallel spindles 1 and 2 are mounted a series of cutter discs 3 and 4 preferably stamped out of sheet iron or steel. The cutter discs are mounted in such a manner that they are loosely adjustable in the axial direction, but prevented from turning relatively to the spindles say by means of the keys 5, 6. Between the disc cutters 3 and 4 are arranged spacing discs 7 and 8 of a considerably smaller diameter than that of the disc cutters. These spacing discs are also longitudinally adjustable on the cutter spindles. The distance between the cutter spindles is less than the diameter of the disc cutters, so that the cutters of one spindle engage between the cutters of the other spindle.

The disc cutters have a cylindrical surface, so that they cut at both edges.

At each end of the series of cutter discs is arranged a pressure roller 9 or 10 supported by spring arms 11 or 12, secured to the machine frame. The pressure rollers 9, 10 exercise at the point of engagement of the disc cutters a pressure in the axial direction which forces the cutting edges of the cutters into close contact with each other. The spacing discs limit the pressure of the cutters against each other, as they are very slightly less in thickness than the cutters. As all the discs are splined onto the spindles, the pressure of the pressure rollers is uniformly distributed on all the disc cutters and remains uniform during the rotation of the cutters. The cutters of one spindle completely fill the intervals between the cutters of the other spindle, and the width of the strips cut corresponds to the thickness of the cutter discs.

On one of the cutter spindles is mounted an operating crank 13. The other spindle may be driven by friction or by means of toothed wheels 50, 51. Divergent take-off fingers 14, 15 project at the discharge side between the cutters. The take-off fingers are also stamped out of thin sheet metal and are mounted on rods 16 parallel to the cutter spindles. The take-off fingers are provided with guide plates 17 or 18 which are hinged about rods 19, 20.

Owing to the cutter discs being cylindrical, it is possible to keep the cutters very sharp in a very simple manner and to sharpen them during the working. To that end, the guide plates 17, 18 are provided with interchangeable thin steel blades 21, 22 which are pressed by springs 23, 24 against the peripheries of the disc cutters 3, 4, and grind them during rotation. In order to prevent the edges of the cutter discs from eating into the grinding blades and from becoming themslves ground to round shape, the grinding blades 21, 22 are automatically oscillated longitudinally during the working of the machine. To that end, in the construction illustrated, the guide plates 17, 18 are mounted for instance on the rods 19, 20 in a longitudinally movable manner and

engage by means of pins 25, 26 with the bifurcated ends of levers 27 or 28. The levers 27, 28 are mounted on a rotatable vertical spindle 29. The arm 30 of the lever 27 engages by means of a pin 31 with a groove 32 in a cam-drum 33 mounted on the cutter spindle 2 which during the rotation of the spindle, imparts an oscillating motion to the said levers.

For facilitating transport, the machine is enclosed into a casing which is utilized as the feed table during working.

At the level of the nip of the two cutter rollers, the casing is divided and connected by a hinge 34 by means of which the trough-shaped upper part 35 is formed, said part being hinged to the rear wall 36. The latter is secured to a bed plate 37 preferably made of wood, to which the machine is bolted. The hollow space in the bed 37 is utilized for housing the crank 13 and other auxiliaries such as lubricators, spanners etc., and is closed at the bottom by a detachable plate 38. To the upper part 35 of the casing are connected, by means of hinges 44, side flaps or plates 40 and by means of a hinge 41, the front flap 42. The bottom edges of the flaps 40 and 42 are connected by suitable means at 39 to the bottom plate 38, or at 45 to the bed plate 37.

The method of arranging the machine for working is as follows:

After disconnecting the locking devices at 39 and 45, the bottom plate 38 is removed, and the upper part 35 of the casing is turned about the hinges 34 into the position shown in Figure 2. The front flap 42 is brought into horizontal position (Figure 2) and secured by laterally turning support 43, whilst the lateral flaps 40 depend vertically downwards (Figure 3). The bottom plate 38 is then turned with its inner side downwards and placed on the turned down upper part 35 (Figure 3), so that the said bottom plate can be used as a feed table for the material to be cut. To that end, the plate 38 is provided with hinged guide strips 46 which together with the guide strips 48 provided on the table plate 47 of the machine, form a limit for the feeding, corresponding to the length of the cutter rolls. The crank 13 is mounted on the spindle 1 and secured in a suitable manner.

The machine is then ready for working and is operated in the following manner:

The tobacco leaves to be cut are placed on the table 38, 47 and, the crank 13 being rotated, the tobacco leaves are fed towards the cutter rolls. The cutter rolls draw the leaves between them and cut them into narrow strips, the width of which corresponds to the thickness of the cutter discs. The take-off fingers 14, 15 guide the cut tobacco between the plates 17, 18, whereupon it slides down the plate 46.

During the rotation of the spindle 2, the cam groove 32 oscillates the steel grinding strips 21, 22 which keep the cutter discs sharp.

The improved machine is distinguished not only by its great output, compared to the well known tobacco cutting machines working like shavers or planers, but also by the fact that stoppages during working due to the frequent sharpening of the cutters, are dispensed with, and further by the fact that the machine works perfectly notwithstanding the variation in the proportion of moisture in the tobacco.

The machine may also be used with advantage for cutting materials other than tobacco, for instance damaged paper, or for destroying documents to be pulped.

What I claim is:

1. In a shredding machine, a rotary shaft, axially movable cutter discs thereon forming a cutting roller, a second rotary shaft parallel with the first one and axially movable cutter discs thereon projecting into the spaces between the adjacent cutter discs of the first cutting roller, means to prevent the rotation of the cutter discs on their respective shafts, pressure rollers acting against the lateral faces of the cutting rollers in the plane of their nip and springs acting on said pressure rollers.

2. In a shredding machine, a rotary shaft, axially movable cutter discs thereon, a second rotary shaft parallel with the first one and axially movable cutter discs thereon projecting into the spaces between the adjacent cutter discs of the first rotary shaft, means to prevent the rotation of the cutter discs on their respective shafts, yielding means to exert a pressure in axial direction on said cutter discs in the plane of their nip, blades of harder metal than the cutter discs pressed against the periphery of the cutter discs and means to reciprocate said blades in axial direction.

3. In a shredding machine, a rotary shaft, axially movable cutter discs with symmetrical cutting edges thereon, a second rotary shaft parallel with the first one and axially movable cutter discs thereon projecting into the spaces between the adjacent cutter discs of the first rotary shaft, means to prevent the rotation of the cutter discs on their respective shafts, yielding means to exert a pressure in axial direction on said cutter discs in the plane of their nip, blades of harder metal than the cutter discs pressed against the periphery of the cutter discs and means to reciprocate said blades in axial direction.

4. In a shredding machine, a rotary shaft, axially movable cutter discs thereon forming a cutting roller, a second rotary shaft parallel with the first one and axially movable cutter discs thereon projecting into the

spaces between the adjacent cutter discs of the first cutting roller, means to prevent the rotation of the cutter discs on their respective shafts, pressure rollers acting against the lateral faces of the cutting rollers in the plane of their nip and springs acting on said pressure rollers, blades of harder metal than the cutter discs pressed against the periphery of the cutter discs and means to reciprocate said blades in axial direction.

In testimony whereof I affix my signature in presence of two witnesses.

SÁNDOR KORBULY.

Witnesses:
EUGENE HARSANYI,
CHAS. MEDGYES.