June 4, 1940. B. V. EDWARDS 2,202,843

SHREDDING MACHINE

Filed April 6, 1937 2 Sheets-Sheet 1

Fig. 1.

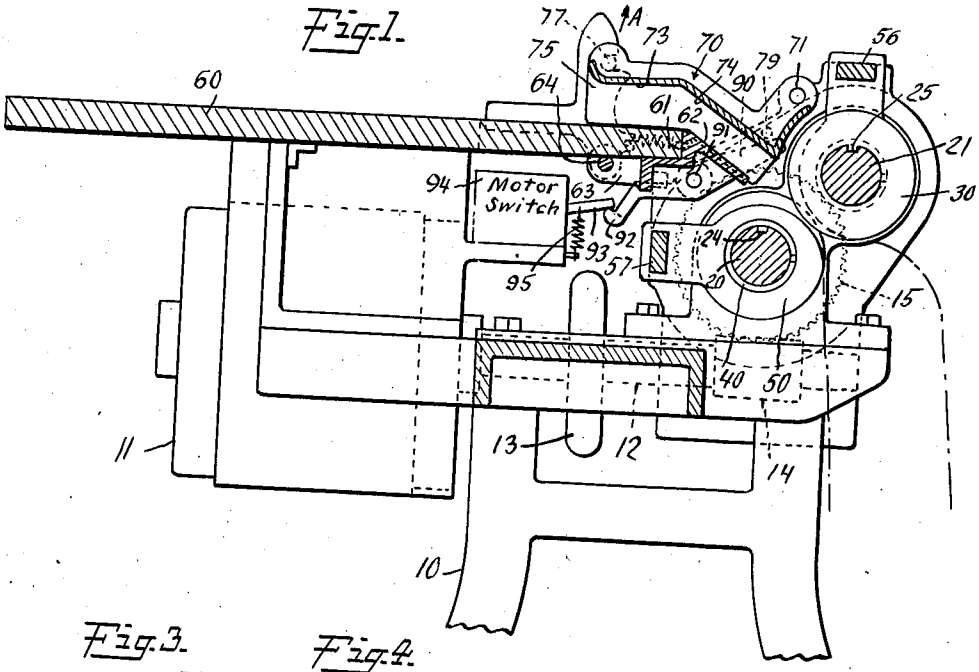


Fig. 3.

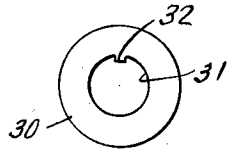


Fig. 4.

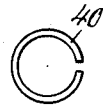


Fig. 9.

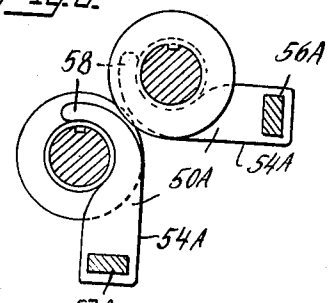


Fig. 5.

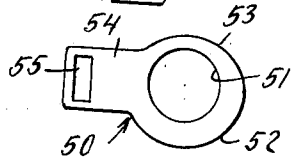


Fig. 10.

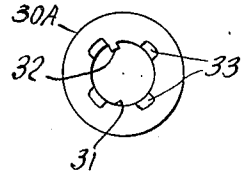


Fig. 11.

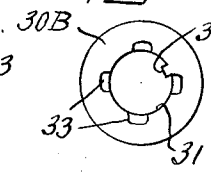


Fig. 12.

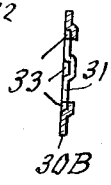
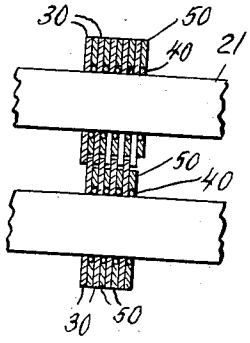


Fig. 6.



INVENTOR
Bruce V. Edwards
BY
Marshall & Hanley
ATTORNEYS

June 4, 1940.

B. V. EDWARDS

2,202,843

SHREDDING MACHINE

Filed April 6, 1937

2 Sheets-Sheet 2

Fig. 2.

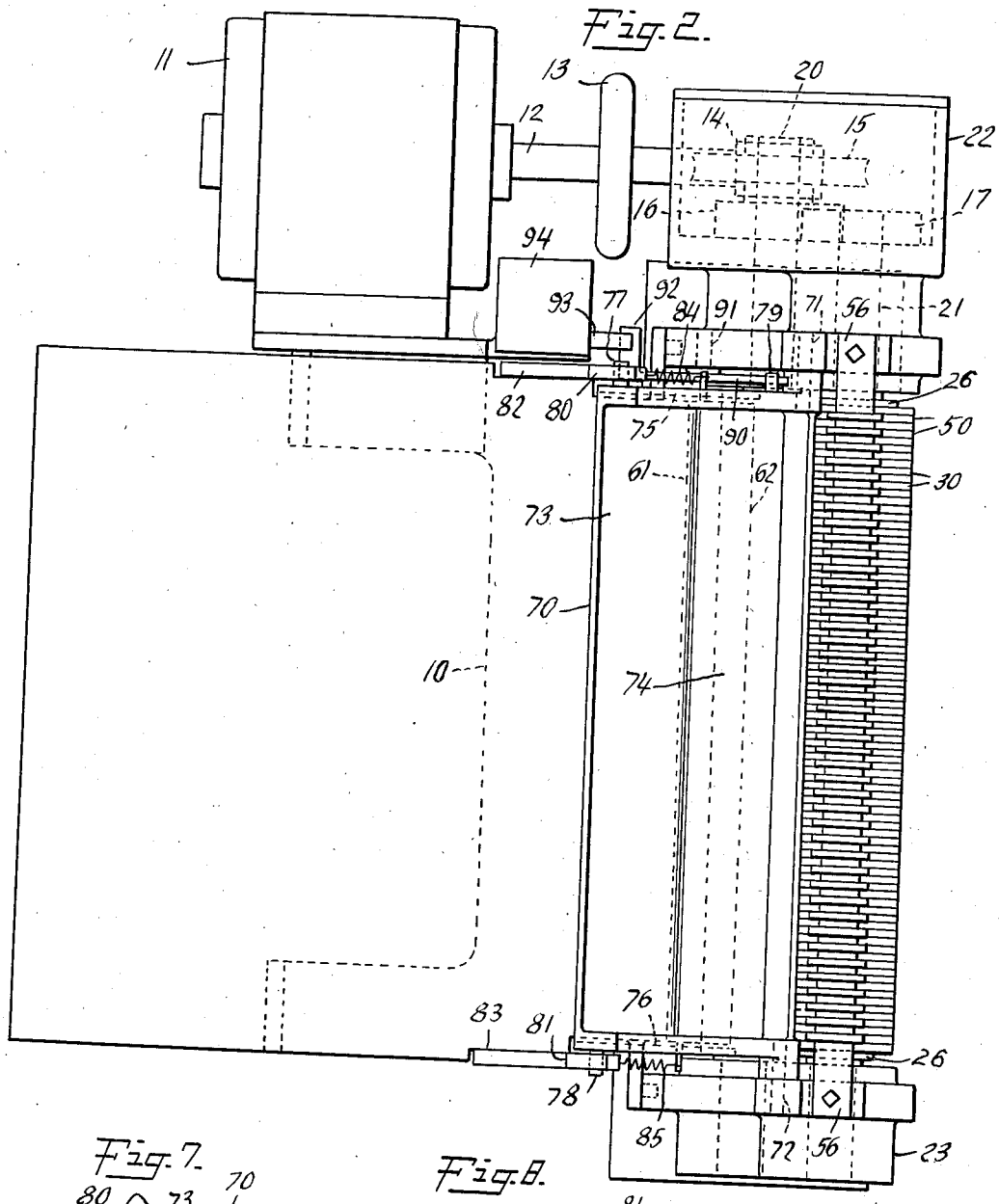


Fig. 7.

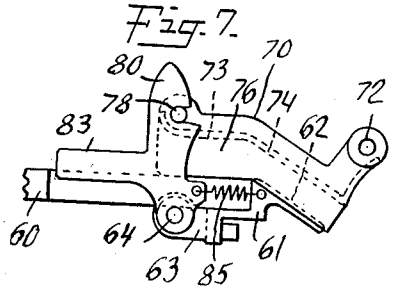
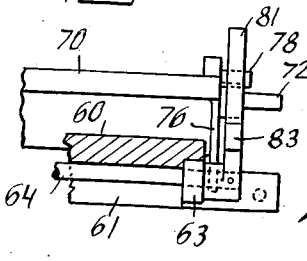


Fig. 8.



INVENTOR

Bruce V. Edwards

BY

Marshall & Stanley

ATTORNEYS

Patented June 4, 1940 2,202,843

UNITED STATES PATENT OFFICE

2,202,843

SHREDDING MACHINE

Bruce V. Edwards, East Orange, N. J.

Application April 6, 1937, Serial No. 135,220

10 Claims. (Cl. 164—60)

This invention relates to improvements in shredding machines of the type employing two overlapping series of overlapping cutters which is adapted to cut paper or other material into narrow strips.

Its object is to provide a simple efficient machine of novel construction which has features of advantage over such devices as have been available heretofore. To this end I have provided a novel manner of mounting the cutters to eliminate "weaving", have provided a form of strippers which are not subjected to wear, have made a feed chute which will prevent the insertion of stiff material, and have provided safety features which protect the operator.

Other objects of the invention will appear from the following specification in which I will describe the invention, the novel features of which will be pointed out in appended claims.

Referring to the drawings,

Fig. 1 is a side elevation partly in section of a machine which embodies my invention;

Fig. 2 is a plan view of the machine;

Figs. 3, 4 and 5 show detailed elevations of a cutter, a spacer and a stripper, respectively;

Fig. 6 is an end elevation partly in section of some of the parts shown in Figs. 3, 4 and 5, assembled on their supporting shafts;

Fig. 7 is a side elevation of some of the parts shown in Fig. 2, showing a latching mechanism somewhat in detail;

Fig. 8 is a rear elevation partly in section showing a portion of the feed chute;

Fig. 9 is a side elevation showing a modification of the stripper mechanism; and

Figs. 10 and 11 are elevations of a modified form of cutter and Fig. 12 is a sectional edge view of the cutter shown in Fig. 11.

10 designates a frame upon which the various parts of the machine are supported. A motor 11 is affixed to one side of this frame. On its shaft 12 is affixed a hand wheel 13 by means of which the cutter shafts may be turned manually. 14 is a worm on shaft 12. This meshes with a worm gear 15 on a transverse cutter shaft 20. 16 is another gear on the shaft 20 in mesh with a gear 17 of the same diameter on another transverse cutter shaft 21 above and ahead of the shaft 20. The shafts are supported in bearings on the frame 10 and the gears enclosed in suitable housings 22 and 23.

Keyways 24 and 25 are cut in the shafts 20 and 21. The cutters 30 are flat and circular. They are apertured, as at 31 (Fig. 3), to fit the shafts 20, 21 and provided with lugs 32 to engage the keyways therein. These are assembled on the shafts 20, 21 with spacers 40 between them. The cutters on shaft 20 are positioned opposite those on shaft 21, and their diameters are such that they overlap. The cutters and spacers are held together by disks 26 between the outer cutters and the shaft bearings.

The spacers 40 are split rings of resilient metal preferably of circular cross section having an internal diameter slightly less than the diameters of the shafts 20, 21, so that when assembled they hub the shafts. When the machine is to be used for shredding paper, the use for which it is primarily designed, the thickness of the spacers is slightly greater than that of the cutters. For cutting certain other materials, such as Cellophane, a sharp shearing cut is necessary and in such cases the spacers are no thicker than the cutters. This construction results in the cutters being held rigidly on the shafts near the surfaces of the shafts, but less rigidly away from the shafts so that the cutters on one shaft accommodate themselves more readily to the spaces between the cutters on the other shaft.

In Figs. 10, 11 and 12 the cutters 30A and 30B are shown with angularly spaced portions 33 pressed outwardly near their apertures 31 to form integral spacers. The lugs 32 on cutters 30A and 30B are spaced in different angular positions, so that when these cutters are alternately assembled on a common shaft, the spacers on one cutter will be positioned between those on the adjacent cutters.

50 designates stationary strippers which are placed between the cutters. These are provided with circular holes 51 of sufficiently large diameter to clear the outer diameter of the spacers. The part 52 of the strippers is of the same diameter as that of the cutters, so that together with the cutters they form substantially unbroken cylindrical surfaces. The part 53 is cut back so that when assembled they form a tapered throat, as shown in Fig. 1, through which material may be fed to the cutters. 54 is an arm which extends radially from the part of the spacer which is to be placed between the cutters. In this arm is a rectangular opening 55. Transverse rods 56, 57, the ends of which are secured to the housings 22, 23, pass through these openings and support and position the strippers.

60 is a feed table supported on the frame 10. A transverse member 61 which forms a downwardly inclined lip 62 is affixed to its forward end. Bore lugs 63 extend rearwardly from this member and a rod 64 which is supported by the

frame passes through them and thereby supports the forward end of the feed table.

70 is a safety guard. It extends transversely across the machine and is pivoted to the housings 22, 23, at 71, 72. It completely covers the forward end portion of the feed table and the lip 62. Its rear part 73 is substantially parallel with but spaced from the feed table and its forward part 74 is substantially parallel with but spaced from the lip 62. This safety guard has sides 75, 76 which, when it is down in the position shown in Figs. 1 and 8, reach to the top of the feed table and its lip.

The safety guard is held in this closed position by latches 80 and 81 which are affixed to the transverse rod 64 and engage lugs 77, 78 which extend outwardly from the sides 75, 76. Arms 82, 83 extend rearwardly from the latches 80, 81, respectively. Depressing either of these arms imparts rotation to the rod 64 and releases both of the latches against the action of springs 84, 85. This permits the guard to swing upwardly in the direction indicated by the arrow A, Fig. 1.

The safety guard is hinged to swing upwardly. A lug 79 projects outwardly from its side 75. This engages the forward end of a rock-lever 90 which is pivoted at 91 to the frame. The other end of lever 90 terminates in a toe 92 which is engaged by the actuating lever 93 of a motor switch within a casing 94. A spring 95 is tensioned to pull the switch lever down and open the motor circuit.

By means of this arrangement it is impossible to run the cutter shafts when the safety guard is raised. The safety guard is of such length and the space between it and the feed table so restricted, that it is impossible for the fingers of the operator to reach the cutters when they are running.

The feed table and its inclined lip, together with the angularity of the safety guard, form an angular feed slot which is another feature of my invention. Because of this feature, stiff material which cannot bend around the angular path thus formed, cannot be fed to the cutters, but paper or like material can be fed through this feed slot and between the cutters through the tapered throat formed between the cut-back part of the strippers.

The cutting and stripping is done in the usual manner, but the mounting of the cutters which has been described, increases the efficiency of the operation. The circular parts of the strippers extending to the outer surfaces of the cutters forms a structure which will not injure the operator if he should touch it while in operation.

In the modification shown in Fig. 9, the strippers 59A do not surround the spacers, but terminate in horns 58 between which a tapered throat is formed for the reception of the material to be cut. The arms 54A extend tangentially from the edges of the cutters. The supporting bars 56A and 57A, when positioned as shown, hold the strippers in such a way that the proximate edges of the two sets of strippers are at right angles to one another and thus form a discharge opening of adequate size.

Other structural modifications may be made within the spirit and scope of the invention, and I intend no limitations other than those imposed by the appended claims.

What I claim is:

1. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, spacers between the cutters having line contacts therewith near the surfaces of the shafts, two series of stationary strippers also disposed between the cutters, and means on the shafts for holding the cutters and spacers together.

2. A shredding machine comprising a pair of parallel rotary shafts, a series of circular flat cutters assembled on said shafts in alternating and overlapping relations, spacers between the cutters on each shaft of greater thickness than that of the cutters contacting therewith only near the surfaces of the shafts, two series of stationary strippers of less thickness than that of the spacers also disposed between the cutters, and means on the shafts for holding the cutters and spacers together.

3. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, spacers between the cutters, means on the shafts for holding the cutters and spacers together, and two series of stationary strippers also disposed between the cutters, said strippers being out of contact with the spacers, having cut-back portions to form a flaring throat between the strippers of the two series and extending only to the outer diameter of the cutters.

4. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, spacers between the cutters, means on the shafts for holding the cutters and spacers together, two series of stationary strippers between the cutters having cut-back portions to form a tapered throat between the strippers of the two series and extending only to the outer diameter of the cutters, said strippers also having radially extending arms and cross bars engaging said arms to support the strippers.

5. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, a pair of rigid walls spaced from and substantially parallel to each other, each wall having relatively angular portions, thus, forming an angular feed slot to the overlapping portions of the cutters.

6. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, a feed table, an inclined lip at the edge thereof nearest the cutters, a cover spaced from said feed table and lip, having a portion substantially parallel with the table and another portion substantially parallel with the lip, said table, lip and cover forming an angular feed slot to the overlapping portions of the cutters.

7. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, means for driving the shafts, a feed table, a movable cover forming with the feed table in one of its positions a feed slot to the overlapping portions of the cutters, and means for rendering the shaft driving means inoperative when the cover is moved from its slot forming position.

8. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, means for driving the shafts, a feed table, a cover forming with the feed table

a feed slot to the overlapping portions of the cutters, a pivotal support for the cover, means tending to move the cover about its pivot away from its slot forming position, means for rendering the shaft driving means inoperative when the cover is moved from its slot forming position, and manually releasable means for holding the cover in its slot forming position.

9. A shredding machine comprising a pair of parallel rotary shafts, a series of circular cutters assembled on said shafts in alternating and overlapping relations, means for driving the shafts, a feed table, a cover forming with the feed table a feed slot to the overlapping portions of the cutters, a pivotal support for the cover, means tending to move the cover about its pivot away from its slot forming position, means for rendering the shaft driving means inoperative when the cover is moved from its slot forming position, a latch for holding the cover in its slot forming position, and means at the sides of the feed table for releasing the latch.

10. A shredding machine comprising a pair of rotary shafts and series of circular cutters assembled on said shafts in alternating and overlapping relations, portions of said cutters near the shafts being outwardly pressed to form angularly spaced bosses and differently spaced lugs arranged to engage a straight shaft keyway to cause said bosses to abut portions of the next adjacent cutters between the outwardly pressed portions thereof.

BRUCE V. EDWARDS.