June 12, 1928. 1,673,336

O. E. LEHMICKE

MACHINE FOR SHREDDING MATERIALS

Filed May 9, 1927

Fig. 1.

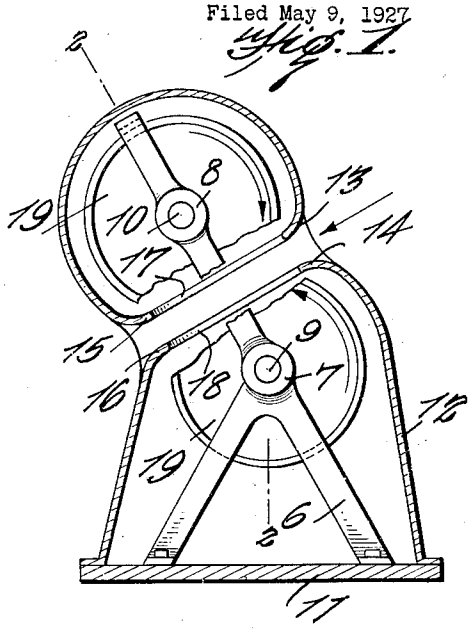


Fig. 5.

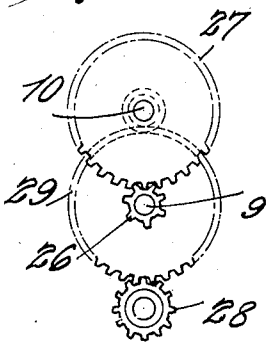


Fig. 2.

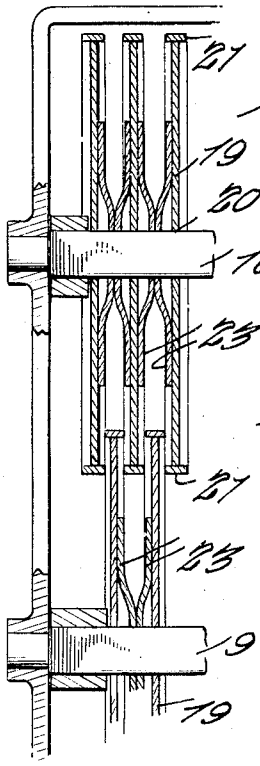


Fig. 3.

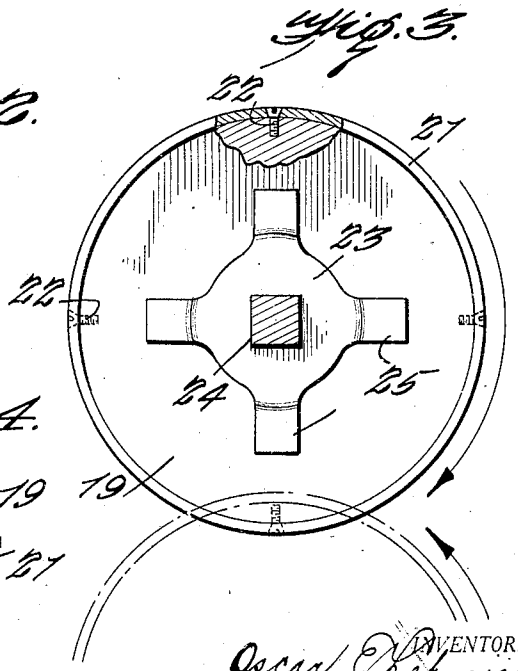
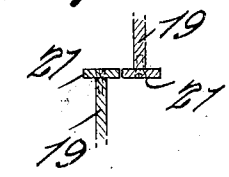


Fig. 4.



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UNITED STATES PATENT OFFICE.

OSCAR E. LEHMICKE, OF BIGFORK, MONTANA.

MACHINE FOR SHREDDING MATERIALS.

Application filed May 9, 1927. Serial No. 189,966.

This invention relates to machines for shredding materials, and has especial reference to a machine which will shred layers of paper such as are present in bound magazines.

It is the purpose of the inventor to produce a machine which will shred paper into fine or relatively narrow widths which can be used as packing and substituted for excelsior or other agencies now commonly used as cushioning devices in boxing and crating or otherwise packing frangible commodities.

It is an object of this invention to produce means operative to efficiently cut layers of paper, as aforesaid, in which the blades or cutting elements are removably mounted on their carriers in order that they may be expeditiously secured in place or removed for the purpose of sharpening, repair or substitution, a condition which will result in numerous advantages, as those skilled in the art will appreciate.

It is a further object of this invention to provide novel means for maintaining a shearing action between the rims or blades of the shredder, and furthermore, to provide novel means whereby the coacting cutters are driven in unison, but at slightly different R. P. M.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates an end view of a machine embodying the invention, the same being sectioned in part;

Figure 2 illustrates an enlarged longitudinal sectional view of a fragment of the machine;

Figure 3 illustrates a sectional view of one of the shredding units;

Figure 4 illustrates a sectional view through fragments of two of the coacting units taken at right angles to the section of Fig. 3; and

Figure 5 illustrates a detail view of the driving gearing for the shredding units.

In carrying the invention into practice, the end frame members 6 may be duplicated, or they may be of any appropriate structure that will prove effective as possessing bearings such as 7 and 8, in which shafts 9 and 10, respectively, may be rotatable. It is shown in this illustration that a base 11 is provided and the end frames may be supported on the base, or obviously they may be applied to any foundation or support, and the inventor does not wish to be limited with respect to these features. The shearing elements are mounted on the shafts 9 and 10 and they coact for cutting paper as it is delivered to the machine.

As shown in Fig. 1, a casing 12 may be provided applied to the base or foundation and this casing may enclose the shredding elements, except where the shredding elements of one shaft coact with the shredding elements of the other shaft. Preferably, at the location just indicated, the casing has inturned upper and lower walls 13 and 14 which form a guide or mouth into which the material to be shredded is introduced between the coacting cutters, which will presently be described. The casing is also provided at the side opposite that occupied by the inturned portions 13 and 14 with inturned sides 15 and 16, forming exit guides and an opening through which the shredded material is discharged to any appropriate receptacle which may be located at the discharge opening. Stripping bars 17 extend from the inturned portion 13 to the inturned portion 15 of the casing, and one of these bars is interposed between each two of the shredding elements on the shaft 10, whereas another stripping bar 18 extends from the inturned part 14 of the casing to the inturned part 16 thereof, and a bar of this type is interposed between each two of the adjacent shredding elements on the shaft 9. These stripping elements may be of any appropriate type and may be anchored in place in any appropriate manner.

The shredding elements, in the present embodiment of the invention, are duplicated on the shafts 9 and 10, and therefore, a description of one set of elements will suffice for an understanding of their structure. Those portions of the shafts between their trunnions are preferably angular in cross section and each shaft is provided with a plurality of disks such as 19 having apertures such as 20 of the shape of the cross sectional configuration of the shafts on which they are mounted, and by the em-

ployment of this construction, keys or other means for insuring the rotation of the shaft and disk in unison may be dispensed with.

The blades or cutting elements 21 are secured to the disks by fastenings 22 such as studs, screws or the like, although they should preferably be of a type which will permit the ready attachment and release of the rims or blades. In the further description of the device, the elements 21 will be referred to as "blades", since they act as shearing blades during the operation of the machine. The disks of one shaft are in stepped relation to the disks of the other shaft so that the disk of one shaft projects between two coacting disks, except at the ends, of course. One set of disks projects beyond the other set of disks to a very limited degree, but slightly greater than the thickness of the blades.

In order to maintain a shearing action between the blades, resilient elements are interposed between the disks and, in the present embodiment of the invention, each resilient element comprises a hub portion 23 with an aperture 24 of the configuration of the shaft to which it is applied in order that it will rotate with the shaft, and the resilient element has fingers 25 which extend radially and bear against the surface of the disk. It is shown in the drawing that two resilient elements are interposed between each pair of disks, one element bearing against a side of one disk and the other element bearing against the side of the next succeeding disk and they maintain pressure on the disks, so that when the blades of one shaft travel between the blades of the other shaft, an efficient shearing action will result.

The blades are provided with a squared flat face and smooth edges and the blades are very sharp at the junction of the faces and sides, a condition which aids in the shearing action and the efficiency of the device.

The shaft 10 is driven through a pinion 26 on the shaft 9 that engages a gear wheel 27 on the shaft 10, whereas the shaft 9 is driven by a pinion 28 that engages a gear wheel 29 on the shaft 9. The pinion 28 may be driven from any suitable source of power which need not be disclosed. Preferably the pinions 26 and 28 have an unequal number of teeth, as it is desirable that one set of blades shall be rotated faster than another set, for the purpose of developing a draw cut or action of one set of blades with respect to the other set.

The terms "shredding elements," "blades or cutting elements" and "shearing elements" as employed in the specification are used synonymously, as is apparent from a reading of the disclosure.

I claim:

1. In a machine for shredding materials, a frame having rotatably mounted shafts in spaced relation to each other, disks on the said shafts, the disks of one shaft being stepped with relation to the disks of the other shaft, shearing rims on the disks, the rims of one set of disks coacting with the rims of the other set of disks, and means for rotating the disks.

2. In a machine for shredding materials, a frame having rotatably mounted shafts in spaced relation to each other, disks on the said shafts, the disks of one shaft being stepped with relation to the disks of the other shaft, shearing rims on the disks, the rims of one set of disks coacting with the rims of the other set of disks, and means for rotating the disks at different R. P. M.

3. In a machine for shredding materials, a frame having shafts rotatably supported thereby, the said shafts being angular in cross section, disks having apertures conforming in contour to that of the shafts to which they are applied, cutting rims removably secured to the disks, means for rotating the shafts, and resilient elements on each shaft engaging respective disks for exerting pressure thereon axially of the shafts.

4. In a machine for shredding materials, a frame having shafts rotatably supported thereby, the said shafts being angular in cross section, disks having apertures conforming in contour to that of the shafts to which they are applied, cutting rims removably secured to the disks, means for rotating the shafts, resilient elements on each shaft engaging respective disks for exerting pressure thereon axially of the shafts, a casing having openings at the edges of the disks, and stripper bars extending from one side of the casing to the other between the said disks.

OSCAR E. LEHMICKE.