Dec. 12, 1933. L. J. ANTONSEN 1,939,246

PAPER SHREDDING MACHINE

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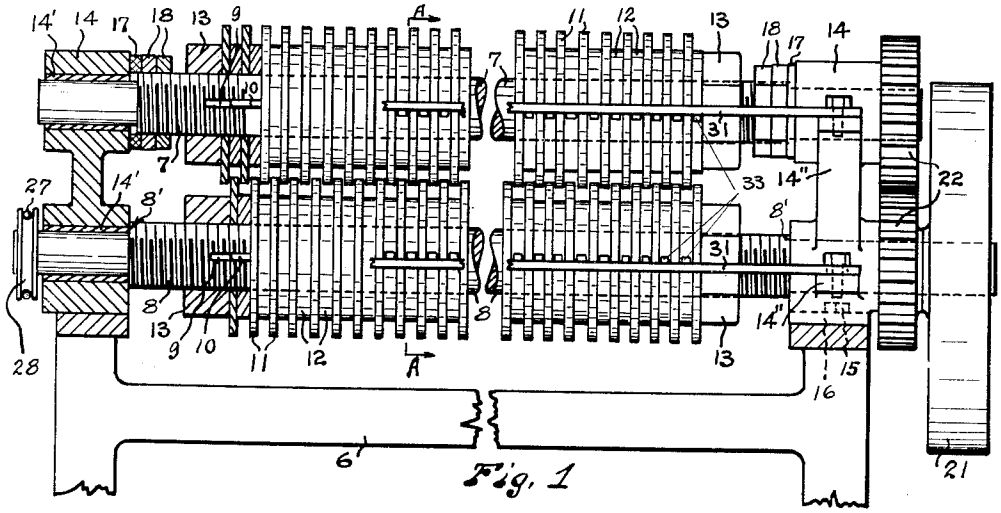


Fig. 1

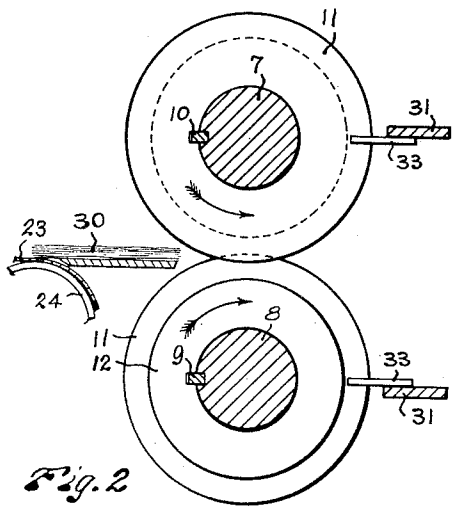


Fig. 2

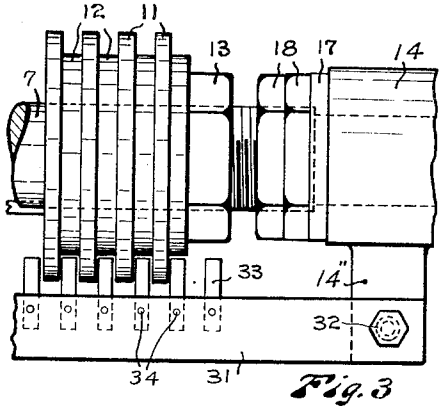


Fig. 3

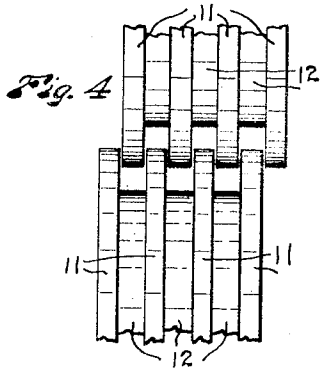


Fig. 4

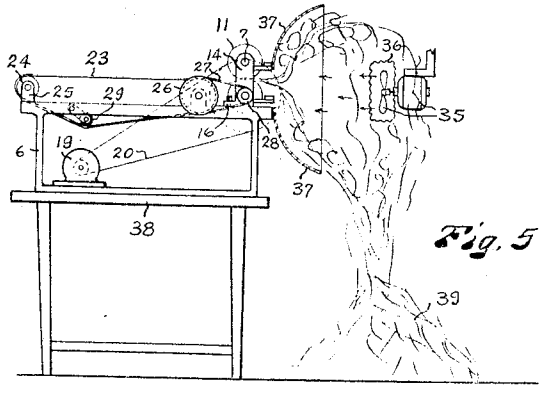


Fig. 5

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PAPER SHREDDING MACHINE

Louie J. Antonsen, Seattle, Wash.

Application September 9, 1930. Serial No. 480,652

8 Claims. (Cl. 92—20)

My invention relates to improvements in paper shredding machines intended for high production capacity and is in the nature of an improvement on Patent No. 1,731,967 issued to Louie J. Antonsen on October 15, 1929.

The object of my invention is to provide a simple, compact and efficient machine for the shredding of old news papers, and the like, to make paper excelsior.

A further object is to provide a machine of the type described whereby the shredding operation is accomplished by simultaneously tearing a plurality of thicknesses of old news sheets lengthwise of the grain of the paper into a multiplicity of narrow strips.

A final object is to provide a method and means whereby the multiplicity of narrow strips may be effectively separated and piled to produce paper excelsior.

Other objects of the invention will be apparent from the following description and the accompanying drawing, and will be particularly pointed out in the appended claims.

The drawing clearly illustrates a preferred embodiment of my invention in which;

Figure 1 is a contracted end elevation of the operating head and upper portion of the frame of the machine, with some of the parts in section.

Fig. 2 is a transverse section through the shafts of the operating head on broken line A—A of Fig. 1 to a larger scale.

Fig. 3 is a partial plan view at one end of the operating head to the same scale to show the mounting of the strippers.

Fig. 4 is an enlarged fragmentary view to more clearly illustrate the mesh of the shredder discs, and the side clearance between them.

Fig. 5 is a side elevation, on a smaller scale, of the machine as installed for the manufacture of paper excelsior.

Like reference numerals are used to indicate like parts throughout the drawing, in which, 6 is a cast iron frame upon which the mechanism of the machine is mounted. The operating head consists of two shafts 7 and 8 each having threads and journals of reduced diameter at each end, and provided with longitudinal key ways 9 adapted to receive feather keys 10 that fit into keyways in dual-edged shredder discs 11 which are assembled on the shafts alternately with spacer discs 12 and secured in proper axial position by means of nuts 13. The spacer discs are slightly thicker than the shredder discs, and all discs of both kinds are ground accurately to the desired thicknesses. The journal ends of shafts 7 and 8 are mounted on dual bearing blocks 14 which are removably secured to frame 6 by means of bolts 15 passing through lugs 16. Bearing blocks 14 are provided with bronze bearing bushings 14' in which the journals rotate.

Shaft 8 is definitely positioned between the bearings by shoulders 8' formed by the journals of reduced diameter. Shaft 7 is positioned axially in the bearings with its shredder discs intermeshing with, but spaced uniformly from, those on shaft 8 by means of thrust washers 17 and adjustment nuts 18. As indicated by the arrows in Fig. 2 the shredder shafts are driven in opposite directions by means of an electric motor 19 through the intermediacy of belt 20, pulley 21 and a pair of spur gears having equal pitch diameters 22, said pulley and said gears being keyed to their respective shafts.

An endless conveyor belt 23 is mounted on two cylindrical pulleys 24 journalled in bearings 25 carried by frame 6, and is driven by a small grooved pulley 26 on the protruding end of shaft 8 through belt 27 and pulley 28 on the front conveyor pulley shaft as shown in Fig. 5. A cylindrical tightener pulley 29 of standard construction bears downwardly on the slack side of the conveyor belt, and maintains the upper side thereof in proper tension for the purpose intended.

The stock to be shredded 30 is preferably old newspapers which have been printed in modern rotary cylinder presses on wood-pulp, news-print paper. This stock is readily obtainable in large quantities at attractive prices, and has a decided grain, the direction of which may be determined by the direction of the printing for a given publication. I find that this stock tears readily lengthwise of the grain, and I take advantage of this fact in the operation of the machine by placing the unfolded papers on the belt conveyor so they will be fed between the oppositely rotating shredder discs so the grain of the paper will be lengthwise of the strips.

As the multiple layers of stock pass between the shredder discs, they are gripped thereby and a tear through the several layers is made simultaneously at each point where the discs pass each other in rotating to the intermeshed position, thus producing as many multiple layer strips as there are discs actively engaged in shredding the paper. Since the intermeshing sides of the shredder discs do not touch, this is obviously a tearing and not a cutting operation. Furthermore I find that when the shredding is done in this way the machine may be speeded up and more sheets per stack of stock may be used, thus

greatly increasing the output of the machine as compared with its capacity when used to shred the stock by cutting, as is done when the adjacent intermeshing sides of the shredder discs are in contact.

Lugs 14'' projecting outwardly from bearing blocks 14 are adapted to support stripper bars 31 which are adjustably secured thereto by means of cap screws 32. Stripper teeth 33, preferably of spring steel, are removably mounted on bars 31 by means of screws 34 and serve to prevent the shredded strips from winding around the shafts. Obviously in case any of the stripper teeth are damaged they may be readily replaced.

The multiple layer strips are effectively separated by a current of air directed against their ends as they leave the shredder discs, said current of air being produced best by means of an electric fan 35 whose speed preferably may be controlled by the operator over a wide range of valves in the usual way in order to adapt the force of the air current to the various paper stocks that may be handled by the machine. In order to protect the fan from the flying paper strips, the fan is enclosed in a small-mesh, wire-screen guard 36. The shredding machine mechanism is likewise protected by means of an air stream reflector 37 which is effective in further using the air currents to separate the strips. The separation of the strips is also assisted by mounting the machine at a considerable elevation above the floor on a suitably supported operating platform 38 so they will fall through a considerable height onto the baling floor in all sorts of positions as indicated at 39.

I find that by means of the method and machine of my invention I can produce a superior paper excelsior product for which there is a ready market in competition with wood excelsior.

It is apparent to those skilled in the art that various modifications may be made in the details of the mechanism without departing from the intent of the invention which resides particularly in the arrangement of the intermeshing shredder discs and the method of handling the paper stock and shredded strips to produce the marketable product, paper excelsior. In determining the scope of the appended claims, it is understood that the term shredding appearing therein, unless otherwise stated, means tearing and/or cutting the paper stock into long narrow strips.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:—

1. The method of manufacturing paper excelsior which consists of simultaneously tearing a plurality of thicknesses of news print paper into a multiplicity of narrow strips lengthwise of the grain of said paper, separating said strips, thoroughly mixing the separated strips, and assembling the mixed strips in irregular positions.

2. The method of separating narrow, multiple-layer strips of paper to form the product paper excelsior, which consists of directing air currents of suitable force against the edges of said strips as the same are being produced by shredding a plurality of layers of paper stock.

3. The method of manufacturing paper excelsior which consists of shredding a plurality of thickness of paper stock into narrow, multiple-layer strips, directing air currents of suitable force against the edges of said strips as the same are being produced, and assembling the separated strips in irregular positions.

4. The method of manufacturing paper excelsior which consists of shredding a plurality of thicknesses of paper stock by tearing the same lengthwise of the grain of said stock into narrow multiple-layer strips, separating said multiple-layer strips by directing air currents of suitable force against the edges of said multiple layer strips and assembling the separated strips in irregular positions.

5. In a paper excelsior machine, the combination of a shredder head adapted to shred multiple layer paper stock into a plurality of narrow multiple layer strips, and mechanism means adapted to produce air currents, said air currents being directed against said multiple layer strips as they leave said shredder head to separate said multiple layer strips into unit strips.

6. In a paper excelsior machine, the combination of a shredder head adapted to shred multiple layer paper stock into a plurality of narrow multiple layer strips and fan means adapted to produce air currents, said air currents being directed against said multiple layer strips as they emerge from said shredder head for the purpose of separating said multiple layer strips into unit strips and thoroughly mixing said unit strips.

7. In a paper excelsior machine, the combination of a shredder head adapted to tear multiple layer paper stock into a plurality of narrow multiple layer strips, and fan means forcing air currents of adjustable force against the edges of said multiple layer strips as they emerge from said shredder head whereby said multiple layer strips are separated into unit strips and said unit strips are thoroughly mixed.

8. In a paper excelsior machine, the combination of a shredder head adapted to shred multiple layer paper stock into a plurality of narrow multiple layer strips, fan means forcing air currents against said multiple layer strips as they emerge from said shredder head whereby said multiple layer strips are separated into unit strips and said unit strips are thoroughly mixed, and guard means on the discharge side of said shredder head adapted to deflect said shredded strips away from the mechanism of said shredder head.

LOUIE J. ANTONSEN.