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H. W. WILSON

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PAPER SHREDDING AND CRIMPING MACHINE

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2 Sheets-Sheet 1

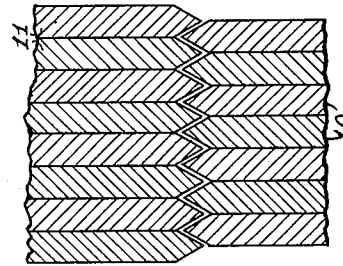
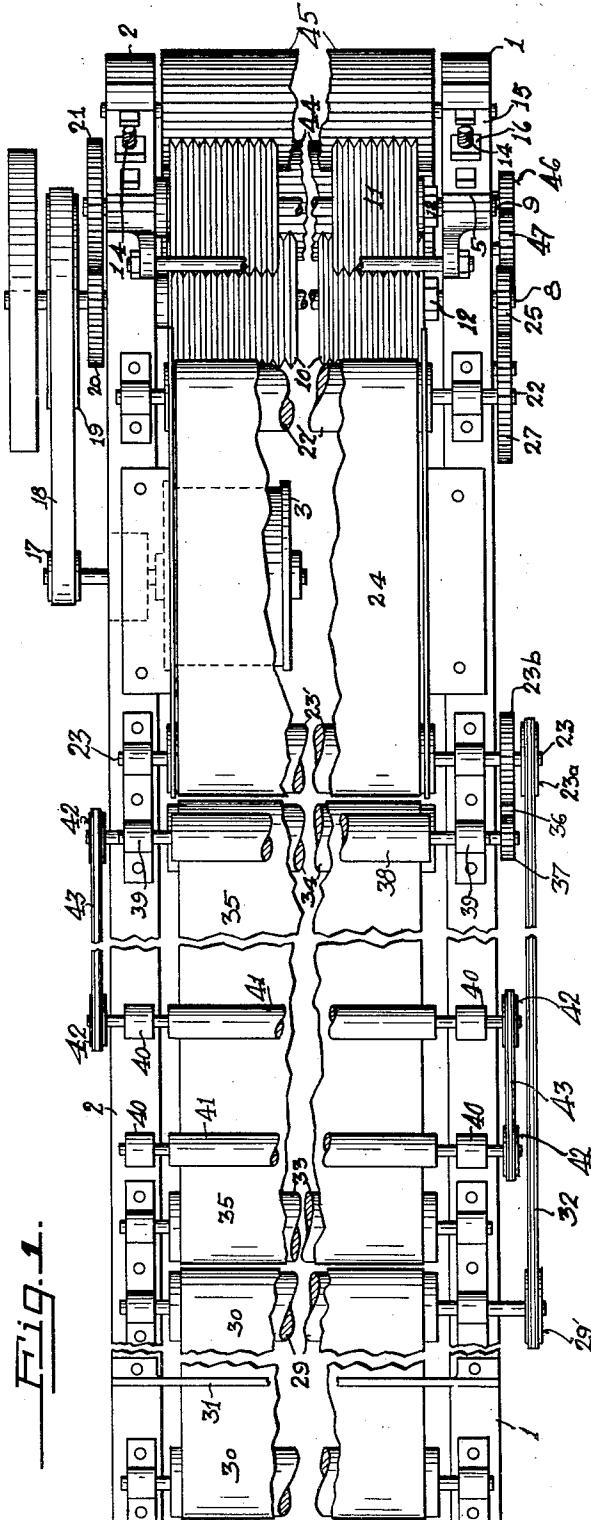


Fig. 2.

INVENTOR,  
*Harry W. Wilson*  
BY  
*J. E. Trabucco*  
ATTORNEY.

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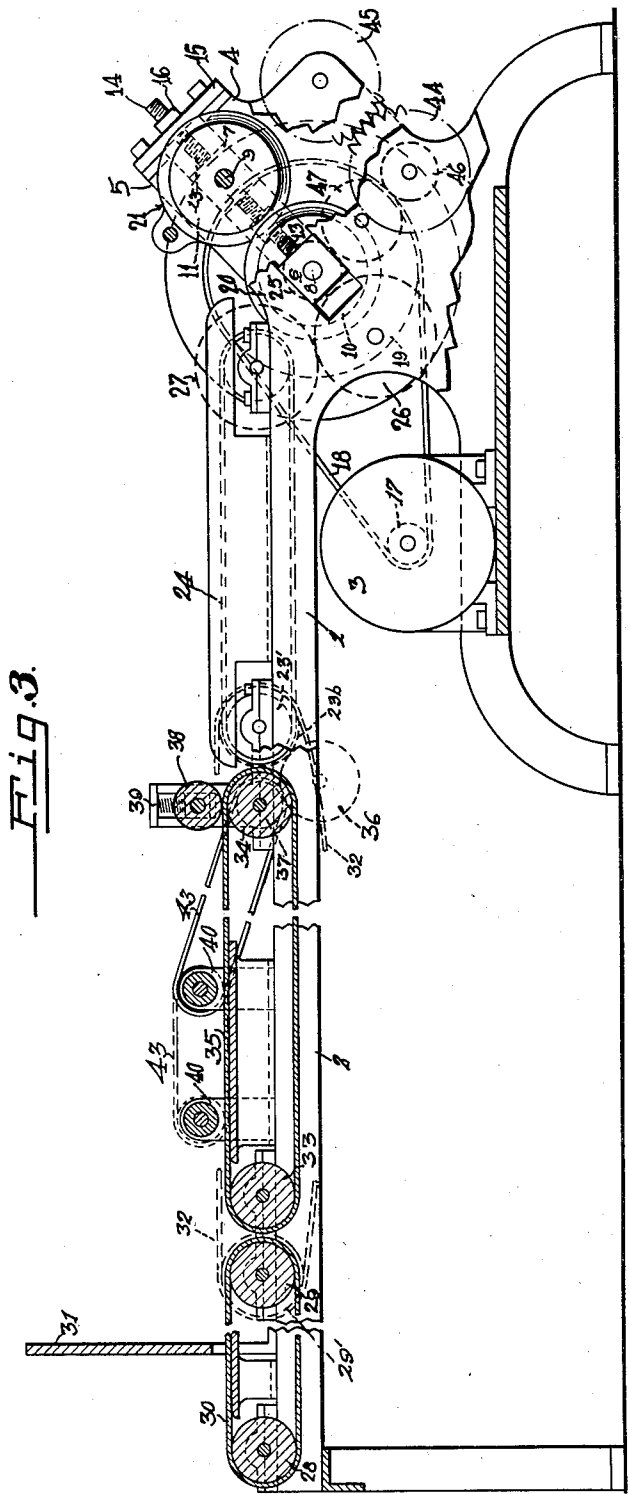
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INVENTOR,  
*Harry W. Wilson*  
BY  
*J. E. Trabucco*  
ATTORNEY.

## UNITED STATES PATENT OFFICE

HARRY W. WILSON, OF SAN FRANCISCO, CALIFORNIA

## PAPER SHREDDING AND CRIMPING MACHINE

Application filed May 18, 1931. Serial No. 538,167.

This invention relates to improvements in paper shredding machines of the kind adapted to manufacture paper excelsior from newspapers or the like.

5 An object of my invention is to provide an improved paper shredding or cutting machine embodying means for tearing sheets of paper into a plurality of narrow strips and also means for crimping the said strips.

10 Another object of my invention is to provide an improved paper shredding machine embodying novel paper feeding mechanism which operates automatically to cause only such amounts of paper to be fed to the cutting or shredding mechanism of the machine as

15 can be satisfactorily accommodated thereby. A still further object of my invention is to provide an improved paper cutting or shredding machine embodying novel means for manufacturing crimped paper excelsior from waste paper such as newspapers.

20 Other objects more or less apparent will present themselves or will be specifically pointed out in the description to follow.

25 In the accompanying drawings:

Fig. 1 is a top plan view of a machine constructed in accordance with my invention;

Fig. 2 is a sectional view of the cutting discs, showing their positions with respect to each other; and

30 Fig. 3 is a side elevation of the machine, showing parts thereof in section.

Referring to the drawings, the numerals 1 and 2 represent the spaced sides of a suitable supporting frame having a motor 3 mounted thereon. The sides of the frame are substantially of the same form and shape, and each is provided with two upwardly extending inclined projecting parts 4 and 5 which are separated one from the other by an intervening space. The inner adjacent sides of the projecting parts 4 and 5 are provided with suitable slots or grooves within which projections located on blocks 6 and 7 are slidably positioned.

45 Rotatably mounted within the blocks 6 and 7, respectively, are the ends of shafts 8 and 9, and each of said shafts have, respectively, a series of discs 10 and 11 secured thereon. The discs are of circular shape and are pro-

vided with sharp cutting edges at their peripheries. The discs of each series rotate with the shaft on which they are mounted, and by means, such as nuts 12, they are held in firm contact with one another. The discs 11 are so arranged with respect to the discs 10, that the cutting edges of the former are positioned between the cutting edges of the latter, with a slight clearance between. In order to adjust the clearance, so that different thicknesses of paper may be properly accommodated by the discs, a screw 13 having right and left hand threads is rotatably mounted between each pair of blocks 6 and 7, with the ends of the same extending into the said blocks. By turning the screws 13 in one direction the blocks 6 and 7 may be separated so as to separate the cutting edges of the two sets of discs, and when turned in the opposite direction the two sets of discs may be moved so their cutting edges are brought toward each other. So as to adjust the positions of the two sets of discs on the projecting parts 4 and 5 of the frame and without changing their relative positions, a screw 14 is rotatably attached at one end to each of the blocks 7, with its opposite end extending through and beyond a bar 15 secured to the ends of the said projecting parts 4 and 5. A nut 16 on each of the screws 14, serves as means for permitting the movement of the blocks 7 and 6, as a unit, either toward or away from the bar 15, thereby affording means for adjusting the positions of the discs 10 and 11.

The motor shaft is provided with a pulley 17 over which extends an endless belt 18, the said belt also extending over a large pulley 19 securely mounted on the shaft 8. The shaft 8 carries a gear 20 which meshes with a gear 21 carried by the shaft 9, and thus upon the rotation of the motor shaft, the two sets of discs 10 and 11 may be rotated in opposite directions.

Rotatably mounted on the frame and within suitable bearings provided thereon, are shafts 22 and 23 which carry, respectively, rollers 22' and 23'. An endless conveyor belt 24, extending over the rollers 22' and 23' is of sufficient width to accommodate sheets of paper to be cut or torn into strips.

The roller 22' extends over and above the rear parts of the discs 10, thereby causing the sheets of paper delivered by the belt 24 to fall upon the said discs. An end of the shaft 8 is provided with a gear 25 which meshes with an idler gear 26 mounted on the side 1 of the frame. The idler gear 26 is in mesh with a gear 27 secured to an end of the shaft 22. Upon the shaft 8 being rotated as previously described, the roller 22' is rotated in a clockwise direction, thereby causing the endless conveyor belt 24 to be actuated in a direction to cause paper mounted thereon to be carried toward the discs.

Rotatably mounted on the rear end of the frame are a pair of spaced rollers 28 and 29 each having an axis which is mounted in suitable bearings on the frame. An endless conveyor belt 30 extends over the rollers 28 and 29 and serves to convey such quantities of the waste paper sheets as are deposited thereon toward the cutting or tearing discs 10 and 11. Suitably mounted on the frame is an upright plate 31 which extends above the belt 30 and is provided with a lower edge that is spaced from the upper surface of the said belt for a certain distance. The space located between the lower edge of the plate 31 and the conveyor belt 30 is of suitable size to permit a quantity of waste paper sheets of certain thickness to be carried forwardly and pass beneath the said plate. The space ordinarily present between the cutting edges of the two sets of discs 10 and 11 enables a certain number of sheets of certain thickness to be properly accommodated and cut. The purpose of having the plate 31 above the belt 30 is to enable only a certain number of sheets of paper to be carried toward the cutting discs, the number being slightly greater than the capacity of the machine. The axis of the forward roller 29 is provided with a pulley 29', while the shaft 23 is provided with a pulley 23a of approximately the same size. An endless belt or chain 32 extends over pulleys 29' and 23a thereby enabling the belt 30 to be actuated from power exerted through shaft 23'.

Rotatably mounted on the frame at points adjacent the roller 29, is a roller 33 having its axis located in suitable bearings provided on said frame. Also located on the frame at points adjacent the roller 23' is a roller 34 which has its axis also rotatably mounted in suitable bearings provided on the said frame. An endless belt conveyor 35 extends over rollers 33 and 34 and serves to receive quantities of paper sheets from the conveyor belt 30 and carry them to the conveyor belt 24. The shaft 23' is provided with a large gear 23b which meshes with an idler gear 36 mounted on the frame, the said idler gear being in mesh with a small gear 37 secured to the axis of roller 34. Thus when the belt 24 is actuated at a certain speed the belt 35 is also actu-

ated in the same direction at a considerably greater speed.

Located directly above the roller 34 is a spring pressed roller 38, the axis of which is rotatably mounted in blocks movably located in upwardly extending supporting members 39 secured to the sides 1 and 2 of the frame. Suitable springs interposed between the tops of the supporting members 39 and the blocks within which the axis of the roller 38 is mounted, serve to press the said roller downwardly so it normally and yieldably presses against the conveyor belt 35.

Rotatably mounted on suitable brackets 40 which are secured to the sides 1 and 2 of the frame, are the axes of a plurality of rollers 41, the said rollers being spaced above the upper surface of the conveyor belt 35 and separated from each other by an intervening space. The space located between the rollers 41 are connected by a series of pulleys 42 and to permit the passage of paper sheets of a thickness corresponding to the capacity of the machine. The axes of the rollers 34 and 41 are connected by a series of pulleys 42 and belts 43, thereby enabling the said rollers 41 to be rotated through the power delivered to the gear 37 of roller 34. The rollers 41 are rotated in a clockwise direction while the conveyor belts are being rotated in the same direction. If there is too much paper delivered to the conveyor belt 35 by the first conveyor belt 30, the rollers 41 hold back the excess quantity thereby enabling the conveyor belt 35 to only deliver a sufficient thickness of paper sheets to conveyor belt 24 as can be properly accommodated by the space between the cutting edges of discs 10 and 11.

In order to cause the strips of paper passing from the cutting discs 10 and 11 to be crimped, I have rotatably mounted a pair of longitudinally corrugated drums 44 and 45 on the forward part of the frame in positions whereby they intercept the said strips of paper falling from the said discs. The axes of the drums are rotatably mounted in the sides 1 and 2 of the frame, with the corrugations of one drum meshing with the corrugations of the other. The axis of drum 44 is provided with a gear 46 which meshes with an idler gear 47 supported at the side 1 of the frame, the said idler gear being in mesh with the gear 25 secured to shaft 8. Thus when the shaft 8 is rotated by the motor 3, the drums 44 and 45 are rotated in opposite directions. The strips of paper passing from the cutting discs 10 and 11 fall onto the corrugations of drum 44 and are carried forwardly between the two drums, after which they are crimped and fall downwardly. The drum 45 is rotated by the drum 44, the corrugations being in mesh and acting in the same manner as intermeshing gears.

A number of sheets of waste paper is ordinarily placed by the operator on the conveyor

belt 30 which carries a certain portion thereof to the conveyor belt 35. The conveyor belt 35 finally delivers a certain amount of the paper to conveyor belt 24, which in turn carries the paper to the set of discs 10, after which it passes between the cutting edges of discs 10 and 11 and is cut or torn into a plurality of strips. The strips fall onto the corrugations of drum 44 and thereafter are carried between the two drums 44 and 45, finally emerging therefrom with transversely disposed crimps located therein. The crimping of the strips, enables air to enter between the contact strips, thereby causing the individual strips to separate one from the other as they fall from the drums.

Having described my invention what I claim is:

1. In a machine of the class described, a pair of oppositely rotated parallel shafts mounted on the frame, each shaft mounting a plurality of intermeshing bevel-edged discs, a pair of oppositely rotated intermeshing parallel corrugated drums mounted on the frame and positioned to intercept material passing between the pairs of discs, and means for rotating the shafts and drums.
2. In a machine of the class described, means for tearing sheets of material into a plurality of strips, and means synchronized with the first mentioned means for crimping the strips.
3. In a machine of the class described, a pair of sets of oppositely rotated bevel-edged intermeshing discs, conveying means synchronized with the discs for conveying material thereto, crimping means synchronized with the discs for crimping the material after it leaves the discs, and means for actuating the discs, conveying means and the crimping means.
4. In a machine of the class described, a frame, a plurality of separated conveying belts movably mounted in alignment on the frame, and means mounted on the frame for allowing only a certain quantity of material to pass from one belt conveyor to another, and means located adjacent one of the belt conveyors for cutting or tearing the material into a plurality of strips.
5. In a machine of the class described, a paper shredding mechanism, a plurality of endless belt conveyors for delivering sheets of paper to the shredding mechanism, the said belt conveyors being arranged so that the sheets of paper are delivered by one of the conveyors to a succeeding conveyor, and means mounted adjacent one of the belt conveyors for rejecting such excessive quantities of the said sheets as cannot be accommodated by the shredding mechanism.
6. In a machine of the class described, a paper shredding mechanism, a plurality of endless belt conveyors for delivering stacks of paper sheets to the shredding mechanism,

the said conveyors being arranged in alignment and synchronized with the shredding mechanism, and means synchronized with the conveyors and mounted adjacent one of the belt conveyors for rejecting sheets of said paper over and above a certain thickness whereby a stack of said sheets of paper of a certain thickness, may be delivered to the shredding mechanism at a given time.

In testimony whereof I have affixed my signature.

HARRY W. WILSON.

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