

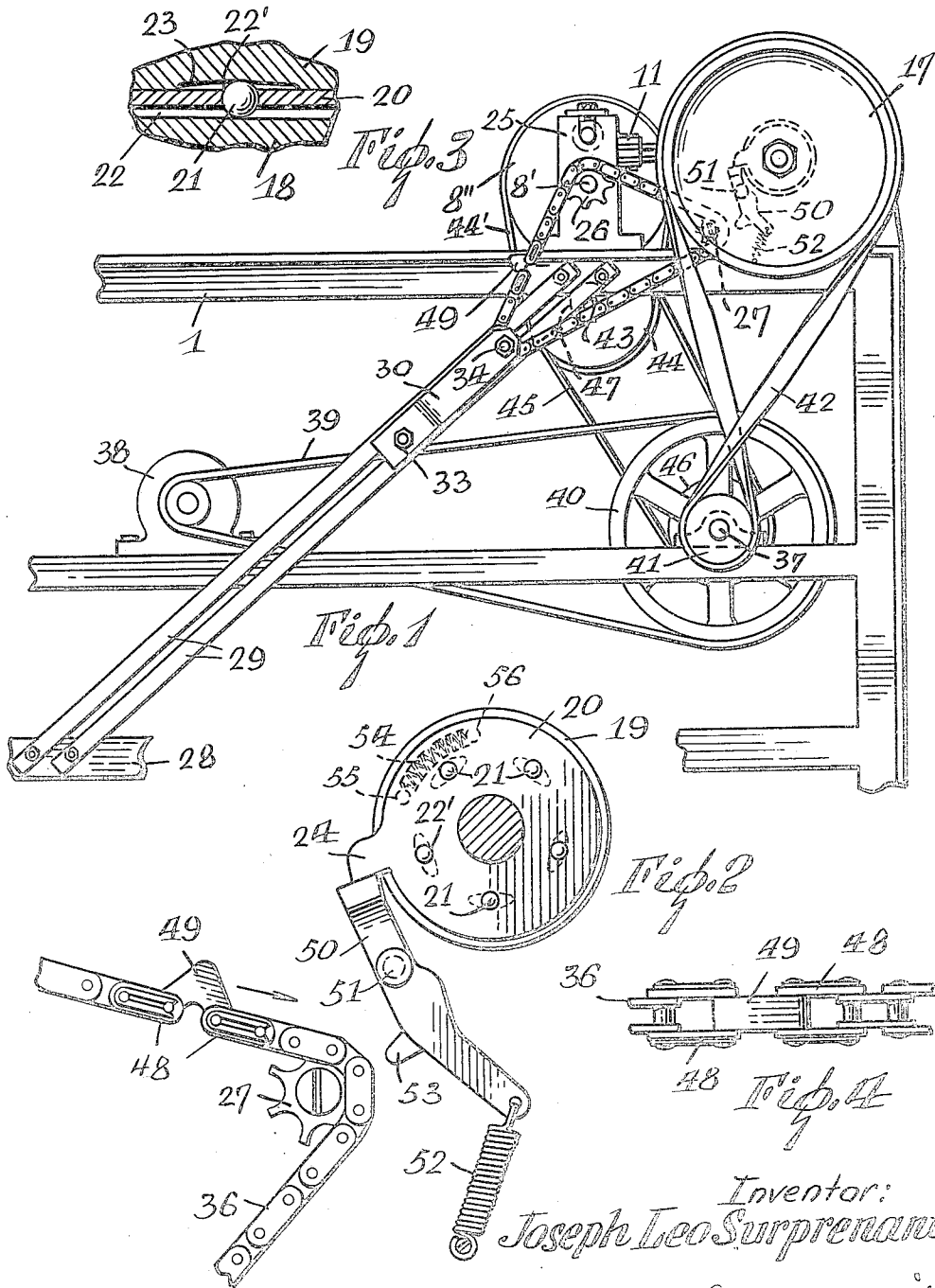
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J. L. SURPRENANT  
PAPER CUTTING MACHINE

2,506,750

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2 Sheets-Sheet 1



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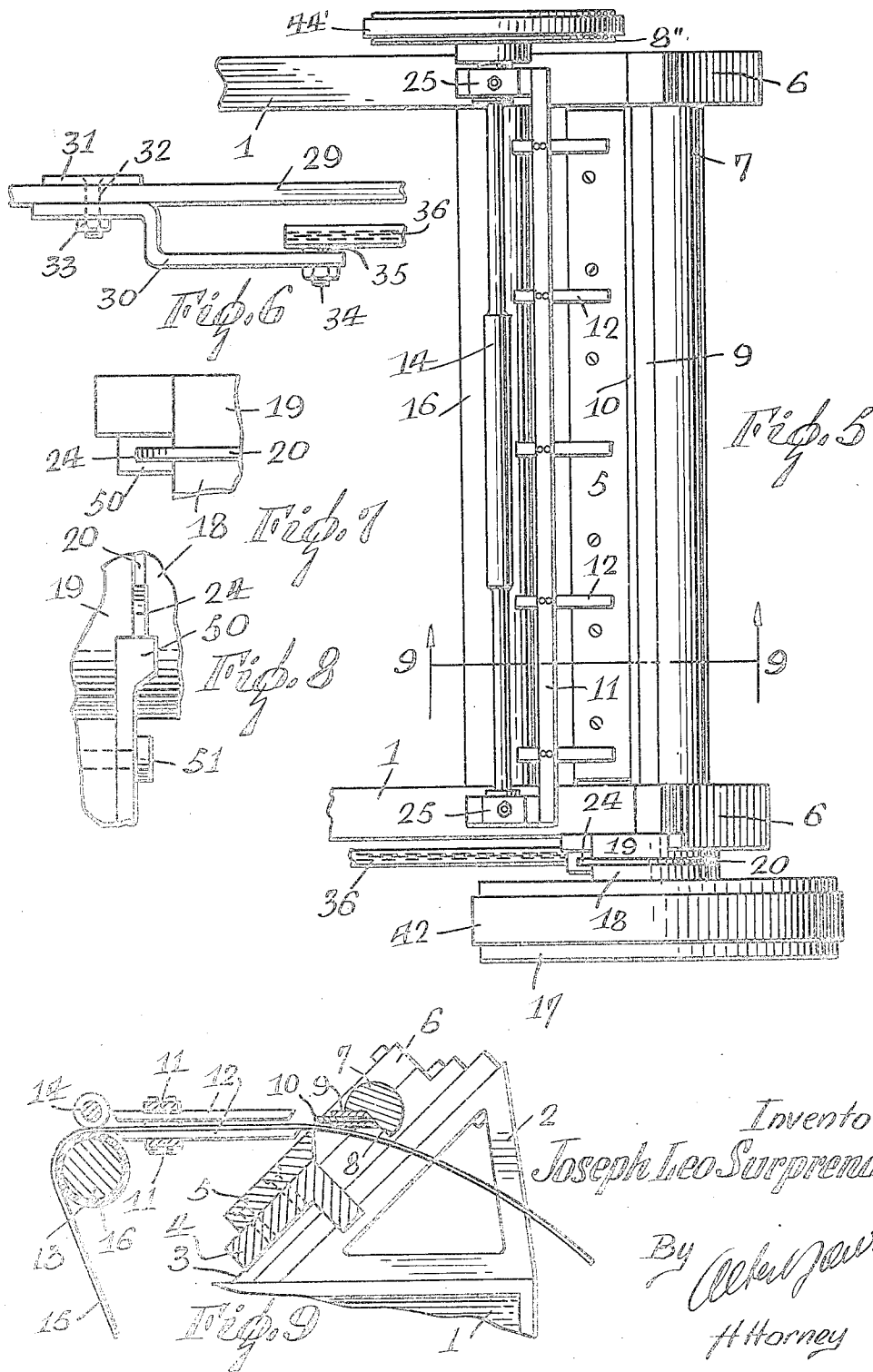
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# UNITED STATES PATENT OFFICE

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## PAPER-CUTTING MACHINE

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7 Claims. (Cl. 164--68)

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The present invention pertains to a novel machine for cutting predetermined lengths of paper or cardboard. Throughout the specification and claims the word "paper" is to be understood as also including cardboard.

One of the objects of the invention is to provide a comparatively inexpensive machine for accomplishing the stated operation. The machine as described herein can be sold for about one-fifth the price of conventional paper cutting machines. Another object, in the same connection, is to provide such a machine that can be operated from a small 110 volt motor.

In conventional machines the cutting knife or blade is continuously rotated, and the adjustment of the blade for different thicknesses of material requires the loosening and tightening of numerous bolts that hold the blade. Another object of the present invention is to simplify the blade structure by providing an intermittently rotating blade and varying the frequency thereof for desired lengths of material to be cut. A clutch-engaging means is operated by a sprocket chain geared to other moving parts of the machine. Consequently the frequency of clutch actuation, or the frequency of the rotary cutting blade, is determined by the length of the chain. The chain is mounted in such a manner that its length may be altered as desired.

In the accomplishment of these objects, as already indicated, a rotary cutting blade cooperates with a fixed blade and is intermittently driven through a clutch. The clutch tends to become engaged but is held disengaged by a stop lever. The aforementioned adjustable chain carries a trip for the stop lever to effect the intermittent driving of the rotary blade.

The chain has a number of supporting sprockets, one of which is driven by the motor that drives the clutch. Another of the chain sprockets is adjustably mounted on a suitable guide carried by the frame of the machine. The chain may be lengthened or shortened by addition or removal of links, and the adjustable sprocket is positioned accordingly to hold the chain taut. The linear speed of the chain is constant in its relation to the rate of feeding paper through the machine. The frequency of the cutting action is determined by the length of the sprocket chain, and this in turn determines the length of material cut off on each operation of the rotary cutting blade.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings in which:

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Figure 1 is a side elevation of the device;

Figure 2 is a longitudinal section in a plane parallel to that in Figure 1;

Figure 3 is a detail cross section;

Figure 4 is a detail plan view of the timing chain;

Figure 5 is a plan view of the machine;

Figure 6 is a plan view of a detail;

Figure 7 is another detail plan view;

Figure 8 is a detail end view; and

Figure 9 is a section on the line 9--9 of Figure 5.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figures 1, 5 and 9 is shown an elongated machine frame 1 having transverse supports 2 mounted at one end. Each support presents sloping surface 3 carrying a block 4 on which is mounted a blade 5 as shown more clearly in Figure 9. Bearings 6 also mounted on the members 2 support a transverse shaft 7 which is notched at 8 to carry a pair of clamping plates 9. Between the plates is held a blade 10 adapted to cooperate with the blade 5 as the shaft is rotated, as will presently be described.

Adjacent to the blade 5, a pair of horizontal plates 11 are secured across the frame 1, one over the other, and carry guide fingers 12 also mounted one above the other and extending toward the edge of the blade 5. Rollers 13 and 14 are mounted adjacent to the ends of the fingers 12 remote from the blades 5 and are adapted to feed a length of paper 15 between the fingers 12 and across the edge of the blade 5. The lower roller 13 is preferably rubber covered at 16, and the roller 14 bears thereon to move the paper.

On one end of the shaft 7 is loosely mounted a drive pulley 17 carrying on its inner surface a clutch plate 18. This plate faces a complementary clutch plate 19 on the shaft 7, and between the plates 18, 19 is inserted a drive disk 20 as shown more clearly in Figure 3. The shaft 7 is to be driven only when there is driving engagement between the plates 18, 19. The clutch includes a series of balls 21 mounted in the disk 20 and extending to both sides thereof. The balls are received in a circular groove 22 in a plate 18 and in recesses 23 in the plate 19, the recesses being tapered or reducing in thickness toward both ends, as also shown in Figure 3.

A lug 24 extends outwardly from the edge of the disk 20 (Figure 2) and permits the disk to be held stationary by means that will presently be described. When the disk is held stationary, the rotating pulley 18 merely rolls the balls 21 in groove

22' of the stationary disk 20 without transmitting motion to the plate 19 and shaft 7. When, however, the lug 24 is released, the disk 20 is displaced and rolls the balls into the shallower ends of the recesses 23, whereby the plate 19 and shaft 7 are driven. The shallowing of the recesses 23 at both ends permits the plate 19 to be driven in either direction.

The rollers 14 and 13 are supported in a bearing 25 on the frame 1, as shown in Figure 1, and the shaft 8' of the roller 13 carries a small sprocket wheel 26. A similar sprocket wheel 27 (Figure 2) is mounted adjacent to the pulley 17. To the base 28 of the machine is attached a pair of spaced guide rails 29 that extend upwardly in the general direction of the sprockets 26, 27 as shown in Figure 1. Along the guide rails is adjustably mounted a bearing arm 30 fitted at one end with a clamp plate 31 (Figure 5), a bolt 32 passed between the rails and a nut 33 on the bolt at the other side of the rails whereby the bearing may be clamped in the desired position along the rails. The bearing 30 carries a stub shaft 34 on which is rotatably mounted a sprocket wheel 35, and a sprocket chain 36 is passed over the wheels 26, 27 and 35.

Below the shaft 7, the frame of the machine supports a transverse rotatable shaft 37. Adjacent to the shaft 37, there is mounted an electric motor 38 belted at 39 to a wheel 40 on the shaft 37. A smaller wheel 41 on the shaft 37 is belted at 42 to the pulley 17.

Another shaft 43 (Figure 1) is journaled across the frame below the shaft 8' and carries a wheel 44 which is belted at 45 to still another wheel 46 on the shaft 37. The shaft 43 carries a feed roll 47 over which the paper passes and by which it is delivered to the free rollers 13, 14. Shaft 8' also carries a wheel 8'' driven by belt 44' joining wheels 8' and 44. The rotation of the roller 8' causes rotation of the sprocket 26 which in turn drives the chain 36.

The chain 36 has a pair of consecutive slotted links 48 (Figure 2) between which is mounted a trip cam 49 for the lug 24. A lever 50 retaining the lug 24 is pivotally mounted between its ends on a pin 51 carried by the frame. The opposite end of the lever is pulled by a spring 52 which normally holds the lever in locking relation to the lug 24, in which no motion is transmitted to the clutch plate 19 and shaft 7. A lug 53 extends from the lever 50 and is engageable by the traveling cam 49 to withdraw the lever 50 from the lug 24 and permit a complete rotation of the shaft 7 in the manner already described. The blade 10 thus sweeps across the edge of the blade 5 to sever the paper. The prompt engagement of the clutch is facilitated by a coil spring 54 joining pins 55 and 56 carried respectively by the plate 19 and disk 20.

The length of paper that is cut off on each rotation of the blade 10 is determined by the tripping interval of the cam 49 which in turn is determined by the length of the chain 36. For this purpose the length of the chain may be adjusted by inserting additional links between the links 48, or by removing links if the chain is to be made shorter. After the length of the chain has been adjusted, the chain is made tight by proper adjustment of the bearing arm 30 along the rails 29, followed by tightening the clamp 31-33.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without de-

parting from the scope of the invention as indicated by the appended claims.

What I claim as my invention is:

1. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a movable chain adjacent to said stop means, and a lug on said chain adapted to withdraw said stop means.

2. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a plurality of chain supports on said frame, one of said supports being adjustable to accommodate varying chain lengths, a chain mounted on said supports, and a lug on said chain adapted to withdraw said stop means.

3. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, a stop lever holding said clutch disengaged, a plurality of chain supports on said frame, one of said supports being adjustable to accommodate varying chain lengths, a chain mounted on said supports, and a lug on said chain adapted to withdraw said stop lever.

4. A paper cutting machine comprising a frame, a fixed blade thereon, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a movable chain adjacent to said stop means, and a lug on said chain adapted to withdraw said stop means, a feed roll for paper passing through the machine, and a sprocket wheel for said chain driven by said roll.

5. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a movable chain adjacent to said stop means, and a lug on said chain adapted to withdraw said stop means, a feed roll adapted to be driven by paper passing through the machine, and a sprocket wheel for said chain driven by said roll.

6. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a plurality of chain supports on said frame, a guide fixed to said frame, one of said supports being adjustable on said guide to accommodate varying chain lengths, a chain mounted on said supports, and a lug on said chain adapted to withdraw said stop means.

7. A paper cutting machine comprising a frame, a fixed blade thereon, means for passing paper over said blade, a rotary blade on said

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frame and cooperating with said fixed blade, a driver for said rotary blade, a normally engaged clutch between said driver and rotary blade, stop means holding said clutch disengaged, a plurality of chain supports on said frame, a guide fixed to said frame, one of said supports being adjustable on said guide to accommodate varying chain lengths, a chain mounted on said supports, and a lug on said chain adapted to withdraw said stop means, a feed roll for paper passing through the machine, and a sprocket wheel for said chain driven by said roll.

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