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N. E. BOOTH

CUTTING MACHINE

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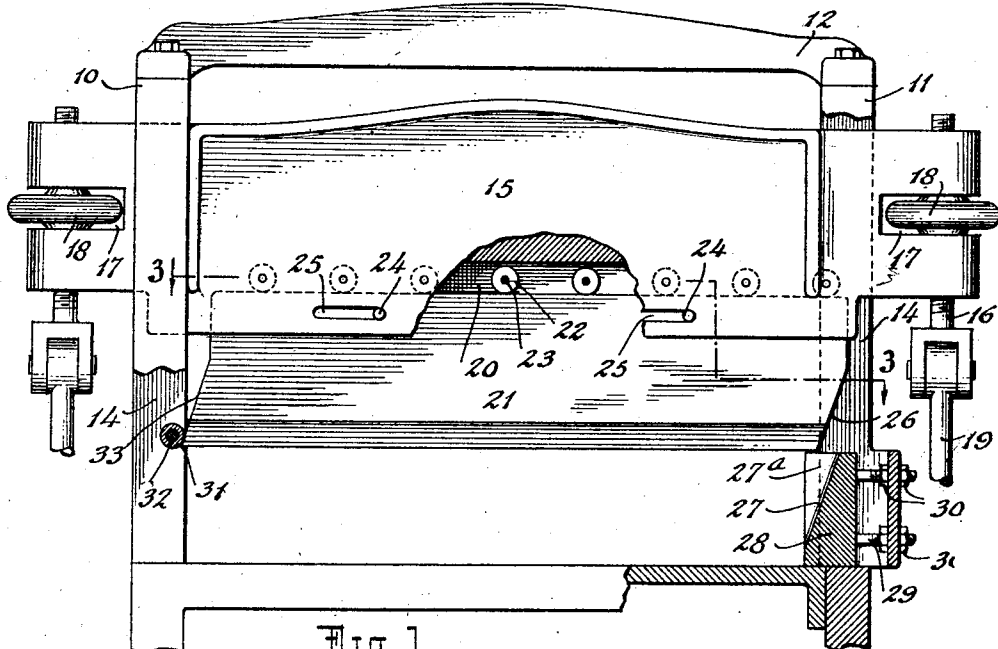


Fig. 1.

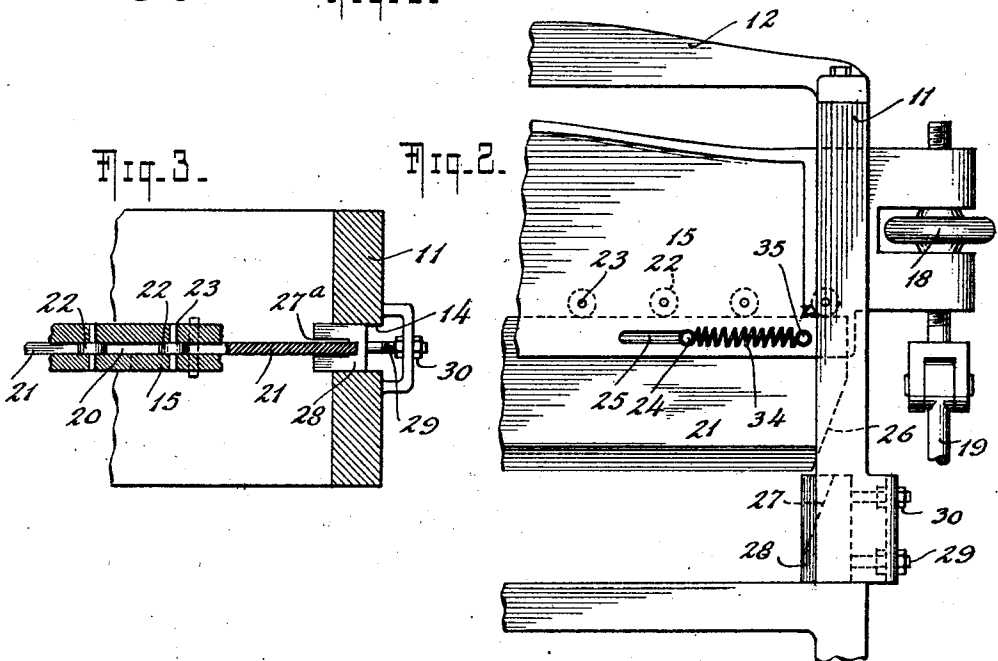


Fig. 2.

Fig. 3.

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NELSON E. BOOTH, OF BROOKLYN, NEW YORK.

CUTTING MACHINE.

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To all whom it may concern:

Be it known that I, NELSON E. BOOTH, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Cutting Machines, of which the following is a specification.

The principal object of this invention is to provide a new and improved construction in a cutting machine by means of which a longitudinal motion of the cutting knife is produced simultaneously with the downward motion of the knife to thereby effect a shearing cut.

Another object is to simplify the construction of the means for producing the longitudinal motion of the knife and thereby decrease the manufacturing as well as maintenance costs of a device of this type.

A further object is to provide a means for adjusting the longitudinal motion producing means so as to vary the extent of the longitudinal motion according to the thickness of the material being operated upon.

While I am aware that numerous cutting machines have been designed in which means have been provided for producing a longitudinal or shearing cut of the knife, all such machines with which I am familiar produce the shearing cut by moving the knife carrier longitudinally and as the knife carrier must be so constructed as to withstand the strain of the heavy pressures necessary to force the cutting blade through stiff and compact masses of material, it is necessary in these machines to make the carrier of large and heavy castings, thereby entailing the expenditure of large amounts of power to operate the machine. Again, because of the great weight of the parts, the machines must be geared to run slowly, otherwise they would not stand up because of the jars and shocks which would be produced by the starting and reversal of the heavy knife carrier.

A further object of this invention is therefore to overcome the objections and difficulties enumerated above by confining the motion of the knife carrier to an up and down reciprocation and by mounting the knife within the carrier for longitudinal reciprocation to produce a comparatively light machine which can be run at greater speeds than the machines of the type referred to, and as a result thereof obtain a greater output or capacity from the machine.

For the accomplishment of these and such further objects as will hereinafter be apparent to those skilled in the art to which this appertains, the invention consists in the construction, combination and arrangement of parts herein specifically described and illustrated in the accompanying drawings, wherein is shown a preferred embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the claims hereunto appended.

In the drawings forming a portion of this specification

Fig. 1 is a front elevation partly in section of a machine embodying my invention.

Fig. 2 is a similar partial view of a modification.

Fig. 3 is a section on the line 3—3 of Fig. 1.

As shown in the drawings, the numerals 10 and 11 indicate the side frames of the machine which are held together at their tops by the usual cross head 12. The side frames are provided with suitable slotted guide ways 14 in which is slidably mounted the knife carrier 15 which extends outwardly beyond the side frames to provide a means for attaching the combined actuating and adjusting rods 16. The rods 16 pass through suitable apertures in the knife carrier which is provided with slots 17 in which is received an adjusting wheel 18 having a central threaded bore to engage cooperating screw threads upon the rod 16, so that the turning of the wheel 18 will vary the path of reciprocation of the carrier. The lower end of the rod 16 is pivotally connected to the upper end connecting link 19, the lower end of which is connected to an eccentric or crank arm by means of which the desired vertical reciprocation of the knife is obtained. As the particular means for securing the vertical reciprocation of the knife forms no part of the present invention, it has not been thought necessary to illustrate this part of the machine, it being understood that any desirable means may be resorted to and that means to adjust or regulate the extent of the vertical stroke will be incorporated therein.

The under face of the knife carrier is preferably slotted as indicated by the numeral 20 to provide a guideway for the knife blade 21, a series of antifriction rollers 22 being mounted upon pins 23 between the

upper edge of the knife and the lower face of the slot 20. The knife is retained within the carrier by means of a pin 24, which is held in snug engagement within a suitable aperture provided adjacent the upper part of the knife and which extends from opposite sides of the knife and freely through longitudinal slots 25 adjacent the lower edge of the carrier.

The means for causing the longitudinal motion of the knife consists in providing the edge of the knife adjacent the side frame 11 with an inclined surface 26 which is adapted to engage against a cooperating inclined cam surface 27 at the base of a slot 27^a provided in the cam block 28 which is adjustably mounted as by the bolts 29 to the side frame 11, suitable means such as the lock nuts 30 being provided to hold the cam block in adjusted position.

Means are provided to return the knife to the right hand side of the machine as it travels upwardly and may comprise a roller 31 rotatably mounted upon the pin 32 in the guide way of the side frame 10 and which roller engages in inclined surface 33 provided upon the left hand side of the knife.

A modified means of securing the return movement of the knife is shown in Fig. 2, and consists of the provision of a pair of coil springs 34 (only one of which is shown) one end of each spring being secured to the adjacent projecting end of the pin 24 and the other end being suitably anchored to the carrier as by means of the pin 35.

The operation of the machine is as follows, the driving means for the machine being set in operation the knife carrier descends, the inclined face 26 of the knife contacting with the inclined surface 27 of the cam block 28 and causing the knife to move longitudinally from right to left, to produce a shearing cut. As the carrier ascends the knife is carried upwardly, the pin 24 preventing the knife from falling out of the carrier. In the form shown in Fig. 1 the inclined surface 33 is engaged by the roller 31, thus causing the knife to be pushed from left to right and returned to its original position.

During the downward cutting stroke the thrust of the knife is taken up by the rollers 22 and transmitted by the rollers to the carrier, the rollers permitting the free longitudinal motion of the knife, it being understood that the pin 24 is free enough in the slots 25 to offer no resistance to the longitudinal motion. During the upward stroke there is no strain upon the pin 24 except that due to the weight of the knife. Consequently the pin 24 is amply strong enough to support this weight.

In the form shown in Fig. 2, the return movement of the knife is produced by means of the springs 34.

The screws 29 and nuts 30 provide a means for adjusting the cam block 28, so as to regulate the longitudinal motion of the knife according to the thickness of the material to be cut. If the thickness of the material is substantially equal to the full stroke of the knife, the cam block will be set inwardly so that the inclined surfaces 26—27 will start to contact as soon as the cutting stroke of the knife commences. If thinner material is to be cut the cam block 28 is moved outwardly a suitable amount to cause contact of the cam surfaces 26—27 immediately before the cutting action begins.

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

1. In a cutting machine, a frame, a knife carrier mounted for reciprocation therein, means to reciprocate said carrier, a knife slidably mounted within said carrier, said knife provided with an inclined cam surface, a cam block adjustably carried by said frame and having a cooperating inclined cam surface adapted to engage the inclined surface of said knife upon the cutting stroke and move said knife longitudinally of said carrier and resilient means to move said knife longitudinally in the opposite direction upon its upward stroke.

2. In a cutting machine, a knife carrier, means to reciprocate said carrier, said carrier provided with a knife receiving groove, a knife slidably mounted in said groove, a plurality of antifriction rollers mounted between the inner edge of said groove and the inner edge of said knife and adapted to transmit the cutting thrust from said carrier to said knife and means to retain the knife within said groove.

3. In a cutting machine, a knife carrier, means to reciprocate said carrier, said carrier provided with a knife receiving groove, a knife slidably mounted in said groove, a plurality of antifriction rollers mounted between the inner edge of said groove and adjacent edge of said knife and adapted to transmit the cutting thrust from said carrier to said knife, means to retain the knife within said groove, and means to move said knife longitudinally.

4. In a cutting machine, a knife carrier mounted for reciprocation therein, means to reciprocate said carrier, a knife slidably mounted within said carrier, cam means to move said knife longitudinally of said carrier in one direction, means to move said knife in the opposite direction, said cam means being slidably and adjustably mounted to permit the longitudinal motion of said knife to be regulated according to the thickness of the material to be operated on and means to lock said cam means in adjusted position.

5. In a cutting machine, a knife carrier,

means to reciprocate said carrier, said carrier provided with a knife carrying guide, a knife slidably mounted in said guide, a plurality of antifriction rollers mounted
5 between said carrier and knife adapted to transmit the cutting thrust from said carrier to said knife, means to retain the knife within said groove, means to engage said knife during its cutting stroke, means to
10 move said knife longitudinally in one direction and resilient means to normally move said knife in the opposite direction.

6. In a cutting machine, a knife carrier, means to reciprocate said carrier, said carrier
15 provided with a knife carrying guide,

a knife slidably mounted in said guide, a plurality of antifriction rollers mounted between said carrier and knife adapted to transmit the cutting thrust from said carrier to said knife, means to retain the knife
20 within said groove, means to engage said knife during its cutting stroke, means to move said knife longitudinally in one direction and resilient means connected with said knife retaining means and said carrier.
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In testimony whereof I have affixed my signature.

NELSON E. BOOTH.