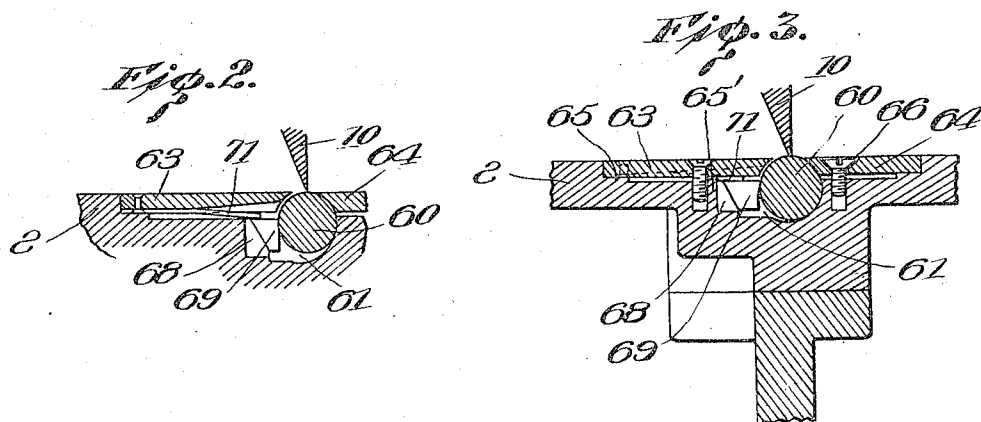


1,236,508.



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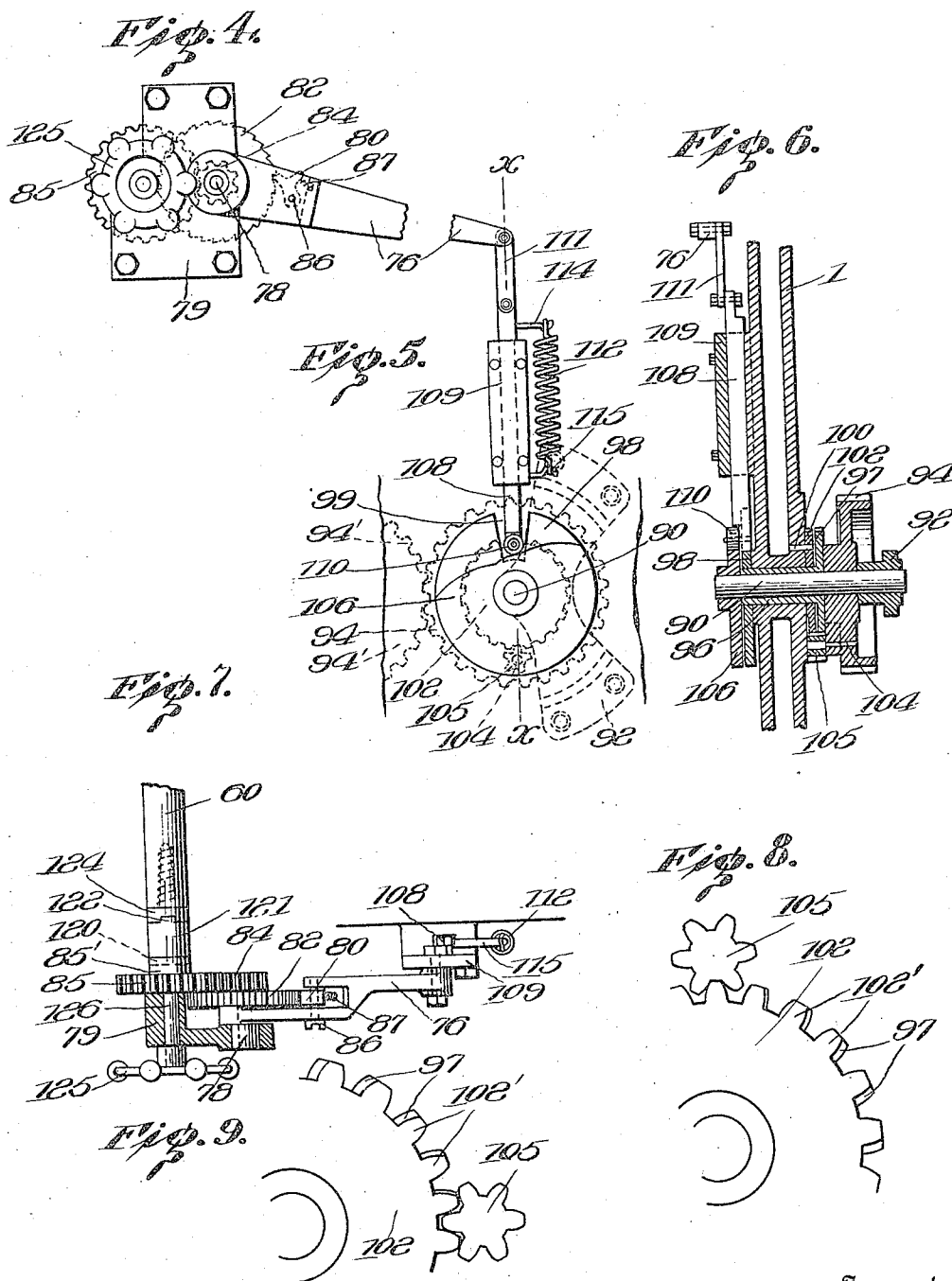
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PAPER CUTTING MACHINE.
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Patented Aug. 14, 1917.
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

DARIUS T. WADHAMS, OF OSWEGO, NEW YORK, ASSIGNOR TO NIEL GRAY, JR., OF OSWEGO, NEW YORK.

PAPER-CUTTING MACHINE.

1,236,508.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Original application filed July 28, 1913, Serial No. 781,606. Divided and this application filed March 8, 1915, Serial No. 12,875.

To all whom it may concern:

Be it known that I, DARIUS T. WADHAMS, a citizen of the United States, residing at Oswego, in the county of Oswego and State of New York, have invented new and useful Improvements in Paper-Cutting Machines, of which the following is a specification.

This invention relates to improvements in paper cutting machines which are designed to contribute to accuracy and effectiveness in the cutting operation and it consists particularly in an improved cutting stick to coact with the knife in producing a clean and uniform cut and in means to control the cutting stick from which movement is transmitted to the stick for changing of its position from time to time so as to present a new cutting surface to be engaged by the knife. It also includes novel features of construction and mode of operation as hereinafter more fully described.

This application is a division of my application Ser. No. 781,606 filed July 28, 1913.

My present invention is shown in the accompanying drawings wherein one of the possible embodiments thereof is illustrated and wherein the reference characters of this description are applied to the corresponding parts in the several views.

In the drawings Figure 1 is a side elevation of a machine embodying the various features of the present invention. Fig. 2 is an enlarged vertical cross-sectional view through the cutting stick and retaining plate. Fig. 3 is a similar view, but on a different plane. Figs. 4 and 5 taken together, illustrate in side elevation the mechanism for automatically rotating the cutting stick, the ratchet mechanism of Fig. 4 being enlarged. Fig. 6 is a vertical cross-sectional view of the timing mechanism, the section being taken on line $x-x$ of Fig. 5. Fig. 7 is a plan view of the mechanism of Fig. 4 also illustrating the connection to the cutting stick and Figs. 8 and 9 are illustrative views showing the operation of the timing plate rotating devices, the parts being shown in different positions.

In the figures 1 indicates the usual supporting standard for the table 2. The standard is provided with uprights 3 having finished front surfaces 5 to coact with guide-bars 6 in forming guide-way bearings

for the usual knife-stock 8 carrying the knife-blades 10. The guide-bars 6 are bolted to the front of the standards by securing bolts 7. The parts so far referred to are of usual construction and are shown in Fig. 1 at one side of the machine only but it will be understood that the guide-way for the knife-stock is duplicated at the opposite side of the machine and that the knife is operated therein in the customary manner to descend upon the work to be cut.

An important feature of this invention consists in the provision of an improved adjustable cutting stick 60 of circular section. The knife is arranged to cut directly over the center of the stick which is here shown positioned in a groove 61 formed in the table directly beneath the knife and extending the full width of the table. Front and rear retaining plates 63—64 as best shown in Fig. 3 are arranged in counter part grooves formed in the table surface to retain the stick in place and properly to extend the table surface to the cutting plane. For the latter purpose the plates are desirably formed to fit around the stick as shown. The front plate is screwed solidly to the table against ledges 65—65' and does not quite touch the stick. The back plate is not rigidly secured in position but is arranged as shown resting at its front edge upon the cutting stick and at its rear edge within its groove on the table. Retaining screws 66 for the rear plate are provided with their heads countersunk within the plate but not in contact therewith so that the plate is free to raise or lower within certain limits.

Rigidly to hold the cutting stick 60 in proper position during cutting I have provided two holding wedges, lower 68 and upper 69, fitted within the groove 61 in front of the cutting stick 60. The upper wedge, as shown, is arranged to be under the action of springs 71, secured to the under surface of front plate 63, whereby it is constantly pressed downwardly whereby the wedges coact to clamp the stick between them and the rear concave surface of the groove. The clamping arrangement is such, however, that the stick can be rotated clockwise, raising the upper wedge against the action of the springs 71. As soon as the

stick stops turning the wedges will again be effective under the influence of the springs firmly to clamp the cutting stick in position.

The stick will be still further clamped in position during the cutting operation by the action of the clamping pressure exerted by the usual clamp 73 operating vertically immediately to the rear of the knife; the pressure thereof bearing down on the rear plate which as aforesaid rests upon the stick along its front edge.

As will readily be understood, after a number of cuts have been made in one place on the stick it opens a cleft in which the knife wedges and, moreover, is liable to leave ragged edges on the bottom sheets of the material being cut as the cleft removes their coacting support afforded by the surface of the cutting stick adjacent to the knife cutting edge. I therefore have provided means for both automatically and manually rotating the cutting stick to present a fresh cutting surface when required to obtain the best results.

The former means, whereby the cutting stick is rotated automatically, consists in the provision of ratchet and pawl connections to the stick and actuating mechanism therefor adapted to time the operation of the connections as desired. These connections to the cutting stick whereby it is rotated continuously in one direction with an intermittent movement are as follows: A ratchet lever 76 is fulcrumed on pin 78 in a bracket 79 bolted to the machine frame. Pivotaly carried on the lever 76 is the pawl 80 in engagement with the teeth of ratchet wheel 82 loosely mounted on pin 78 and having attached thereto the pinion 84 meshing with a pinion 85 secured to the cutting stick. Thus a reciprocal movement of the lever 76 will rotate the pinion 85 progressively in a clockwise direction, this rotative movement being transmitted to the cutting stick by connections to be described. The pawl 80 is pivoted on a pin 86 and is engaged by a yieldable spring 87 bearing in a suitable socket in the arm 76.

The actuating and timing mechanism here employed to reciprocate the ratchet feed mechanism consists in the arrangement of the counter shaft 90 having bearings in the frame 1 and in a suitable bracket 92 secured on the frame. Secured on this shaft 90, desirably within the frame, is a gear 94, in mesh with a similar gear 94' fixed on the crank-shaft 95 from which the knife is operated in the usual manner. The counter-shaft 90, as shown, has its frame bearing within a sleeve 96 journaled directly in the frame and having integral therewith at its inner end the timing gear 97 and at its outer end having affixed thereto the timing plate 98 formed with a notch 99. Secured to the frame by pin 100 is the stationary toothed

controlling plate or gear 102 arranged adjacent to the timing gear and of the same diameter as the gear. Loosely journaled on pin 104 projecting from the side of gear 94 is the small pinion 105 in engagement with the teeth of the stationary controlling plate 102 and also with the teeth of the timing gear 97. As will be best seen by reference to Figs. 8 and 9 the controlling plate 102 and the timing gear 97 are provided with a different number of teeth and as the engagement of the pinion 105 with the teeth of the stationary plate controls the pinion to engage a like number of teeth on the timing gear during one revolution it therefore effects a movement of the timing gear, at each revolution of the large gear, a distance proportionate to the difference in teeth aforesaid.

On the outer end of counter-shaft 90 there is a cam affixed which will be rotated with said shaft in unison with the crank shaft. A square slide 108 is arranged as shown to operate in a vertical bearing of bracket 109 secured on the frame and this slide carries on its lower end an anti-friction roller 110 to be engaged by the cam 106 when the time plate 98 is in the position shown permitting the slide to enter into the slot 99. A link 111 is pivotally connected to the slide and to the arm 76 whereby on the rotation of the cam 106 the roller 110 will ride up the incline of the cam, communicating the movement imparted thereto to the ratchet lever 76 and to the cutting stick.

Thereafter, while the roller is engaged by the outer concentric peripheral portion of the cam, the unslotted portion of the timing plate will advance into peripheral engagement with the lower end of the slide whereby the slide will be withheld from return movement into engaging position which is effected under the influence of the retractile spring 112 on the succeeding registration of the slide and slot 99. The spring 112 is attached to the hooked projections 114—115 arranged on the slide and on the bracket respectively.

The manner of rotating the timing plate 98 to permit the cam to act on the slide will be understood more readily by reference to Figs. 8 and 9 wherein the coaction of the teeth 102' of the controlling plate 102 and the teeth of the pinion 105 in effecting rotation of the timing gear is clearly illustrated by showing the parts in different positions. As therein shown the timing gear is rotated by the wedging cam action of the pinion teeth entering the spaces between the teeth of the timing gear and the stationary controlling plate. A complete revolution of the timing plate and consequent feed movement of the cutting stick may desirably be effected for every twenty-five cutting strokes. To obtain this effect the controlling plate 102

might have twenty-five teeth and the timing gear twenty-four, the latter being advanced one tooth at each revolution of gear 94 and the crank-shaft.

5 To facilitate the insertion of the cutting stick 60 and to accommodate for its proper positioning within the groove 61 I have connected it to its rotating pinion 85 by forming a cross-slot in the hub 85' of said pinion to which is fitted a complementary tongue or key 120 of a coupling member 121. The coupling member 121 has a similar tongue 122 at its outer end at right angles to the tongue 120 and this tongue 122 enters into a cross-slot in the head of the screw 124 which is screwed into the end of the cutting stick 60 and acts as a driver therefor. The Oldham's coupling, consisting of the tongues and cross-slots arranged at right angles, provides for any slight lateral movements of the cutting stick and rotatively connects it to the pinion 85. A hand wheel 125 desirably is fastened to the bearing shaft 126 of the gear 85 thereby providing for turning the cutting stick and the coupling parts by hand to assist in removing or inserting the stick or to move the stick to give a new surface to be cut upon.

It will be understood that the mechanism as here described, whereby the stick automatically is turned a trifle at predetermined intervals, is timed to operate at a time other than during the cutting half of the stroke.

Having described my invention I claim:

35 1. A machine of the character described having a supporting frame and a table for the work thereon, a cutting knife and a clamp to cooperate with the knife, a cutting stick to cooperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a renewed cutting surface, a plate arranged beneath the clamp to overlie the cutting stick to extend the table surface immediately adjacent to the cutting plane and above the stick and said plate being arranged to bear upon the stick under the clamping pressure rigidly to hold the stick, substantially as described.

50 2. A machine of the character described having a supporting frame and a table for the work thereon, a cutting knife and a clamp to cooperate with the knife, a cutting stick to coact with the knife, fitted to a table recess, said cutting stick being adapted to be turned with reference to the knife to present a renewed cutting surface, oppositely arranged plates arranged to overlie the cutting stick to extend the table surface adjacent the cutting plane and above the stick, one of said plates being arranged to bear upon the stick under the clamping pressure and resilient means normally to retain the stick from rotation, substantially as described.

3. A machine of the character described having a supporting frame and a table thereon for the work to be cut, a cutting knife and a cutting stick to cooperate with the knife in the cutting operation, said cutting stick being arranged in a recess in the table and adapted to be turned with reference to the knife to present a new cutting surface, holding wedges within the table recess and adapted to secure the stick in position and springs in engagement with the wedges normally to cause the effective holding action of the wedges.

4. A machine of the character described having a supporting frame and a table thereon for the work to be cut, a cutting knife and a cutting stick to cooperate with the knife in the cutting operation, said stick being of circular cross-section and arranged within a recess in the table, means to turn the cutting stick with reference to the knife to present a new cutting surface, retaining plates arranged on the table surface forwardly and rearwardly of the knife and formed to extend the table surface immediately adjacent to the cutting plane, one of the retaining plates being supported to rest against the cutting stick whereby the latter is clamped during the cutting, springs attached to the other of said plates and holding wedges engaged by said springs and actuated thereby to secure the stick in adjusted position.

5. A machine of the character described having a cutting knife and a cutting stick to cooperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new cutting surface, a ratchet wheel connected to the cutting stick, an actuating pawl therefor, means intermittently to move the pawl to advance the ratchet, a crank shaft for operating the knife, said intermittently operating means being operated from said crank shaft and controlling means operative to withhold said intermittently operating means from operation during a predetermined plural number of cutting operations substantially as described.

6. A machine of the character described having a cutting knife and a cutting stick to cooperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new surface to be cut upon, a shaft suitably journaled, an operating cam thereon, a timing plate journaled adjacent to the cam, a timing gear connected with the timing plate, a controlling plate arranged adjacent to the timing gear and having teeth thereon, a pinion rotatively connected to the cam shaft and engaging the teeth of both the timing gear and the controlling plate, and means to rotate the cam shaft and connections arranged to be engaged by the cam

and timing plate intermittently to rotate the cutting stick, the controlling plate and timing gear being provided with an unequal number of teeth.

5 7. A machine of the character described having a cutting knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to
10 present a new surface to be cut upon, a cam shaft suitably journaled, an operating cam thereon, a timing plate having a notch therein and arranged adjacent to the cam, a timing gear connected to the timing plate, a
15 stationary controlling plate arranged adjacent to the timing gear and provided with teeth on its periphery, an operating gear on the cam shaft, a pinion carried by the operating gear in engagement with the teeth
20 of both the controlling plate and the timing gear, the number of teeth of said plate and gear being unequal, a reciprocal slide arranged to be engaged by both the cam and the timing plate and adapted to enter the
25 notch in said plate to be engaged by the cam, a spring normally to force the slide into engagement with the cam, connections from the slide to the cutting stick whereby the cutting stick will be rotated slightly on
30 the reciprocal movement of the slide and means to secure the cutting stick in its adjusted position.

8. A machine of the character described having a cutting knife and a cutting stick to
35 coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new surface to be cut upon, operating means for the cutting stick whereby it
40 is rotated and a coupling member interposed between the operating means and the cutting stick, said coupling member being keyed to the stick and operating means in right angular relation whereby the stick may be later-
45 ally displaced.

9. A machine of the character described having a supporting frame and a table for the work thereon, a cutting knife and a
50 clamp to coöperate with the knife, a cutting stick to coact with the knife, fitted to a table recess, said cutting stick being adapted to be turned with reference to the knife to present a renewed cutting surface, oppositely
55 arranged plates arranged to overlie the cutting stick to extend the table surface adjacent the cutting plane and above the stick, one of said plates being arranged to bear upon the stick under the clamping pressure, resilient means normally to retain the stick
60 from rotation, an operating member and coupling means interposed between the operating member and the stick and adapted to permit lateral displacement of the latter substantially as described.

65 10. A machine of the character described

having a knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new
cutting surface and automatically operating
70 means associated therewith and operative periodically to shift the position of the stick to renew the cutting surface after a predetermined plural number of cuts have been made, substantially as described.

11. A machine of the character described having a knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new
80 cutting surface, automatically operating means associated therewith and operative periodically to shift the position of the stick to renew the cutting surface after a predetermined plural number of cuts have been
85 made and coupling means between the stick and the operating means and adapted to permit lateral displacement of the stick substantially as described.

12. A machine of the character described having a knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new cutting surface, automatically
90 operating means associated therewith and operative periodically to shift the position of the stick to renew the cutting surface after a predetermined plural number of cuts have been made and retaining means to en-
95 gage the stick substantially as described.

13. A machine of the character described having a cutting knife and a cutting stick to coöperate in the cutting operation, said stick being adapted to be turned with reference to the knife to present a new surface
100 to be cut upon, operating connections for the cutting stick adapted to transmit a rotary movement thereto and timing means associated therewith and operative to control the operation of the operating connections to shift the cutting stick periodically after a plural number of cuts have been made in each position, substantially as described.

14. A machine of the character described having a knife and a cutting stick to coöperate with the knife in the cutting operation said cutting stick being adapted to be turned with reference to the knife to present a new surface to be cut into and automatically operating means associated therewith and operative periodically to shift the position of the stick to renew the cutting surface after a predetermined plural number of cuts have been made, said operating means being adapted to permit of the stick being manually turned independently thereof, substantially as described.

15. A machine of the character described 130

having a knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new surface to be cut into, an operating member connected to the stick, automatically operated actuating means connected to the operating member and operative periodically to shift the stick therethrough and said actuating means being adapted to permit of the stick being manually turned independently thereof.

16. A machine of the character described having a knife and a cutting stick to co-operate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a new surface to be cut into, an operating member, coupling means interposed between the operating member and the stick and adapted to permit lateral displacement of the stick, automatically operated connections to the operating member adapted to permit independent movement of said member, and timing means arranged to control the operation of the connections, substantially as described.

17. A machine of the character described having a supporting frame and a table thereon for the work to be cut, a cutting knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being arranged in a recess in the table

and adapted to be turned with reference to the knife to present a new cutting surface, holding wedges within the table recess and adapted to secure the stick in position, means resiliently to engage the wedges normally to cause the effective holding action of the wedges, an operating member and coupling means between the operating member and the stick substantially as described.

18. A machine of the character described having a cutting knife and a cutting stick to coöperate with the knife in the cutting operation, said cutting stick being adapted to be turned with reference to the knife to present a renewed cutting surface, a shaft suitably journaled, an actuating element thereon, operating connections actuated thereby to rotate the stick, resilient means tending to maintain operative engagement between said connections and the actuating element and controlling means adapted to withhold said engagement for predetermined intervals and to permit of the stick being rotated by said engagement only after a plurality of cuts have been made, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DARIUS T. WADHAMS.

Witnesses:

E. O. JOHNSON,

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."