(No Model.)

W. C. EDWARDS.

PAPER SLITTING MACHINE.

No. 392,262. Patented Nov. 6, 1888.

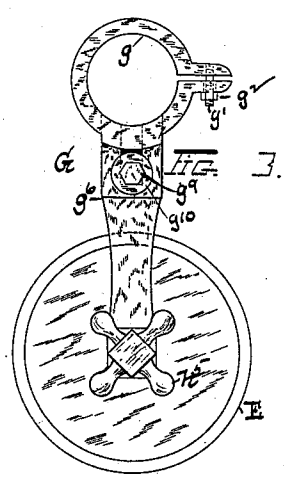


Fig. 3.

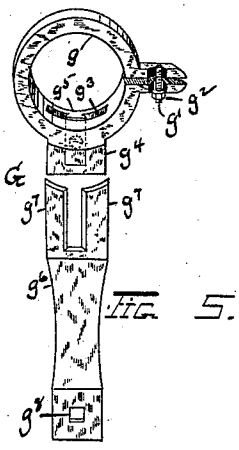


Fig. 5.

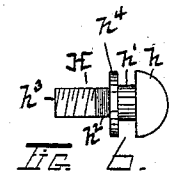


Fig. 6.

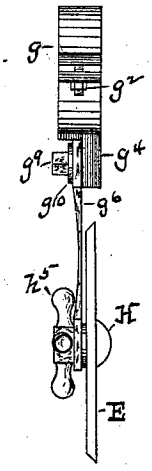


Fig. 4.

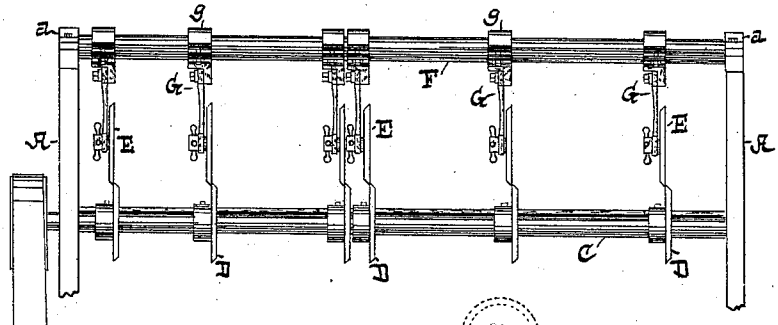


Fig. 1.

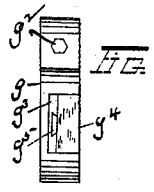


Fig. 7.

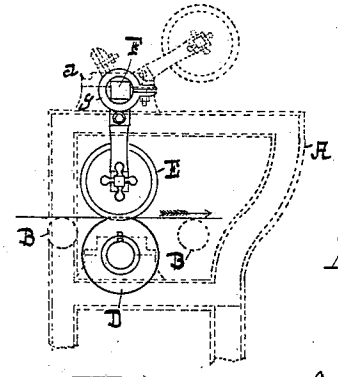


Fig. 2.

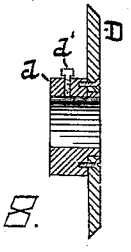


Fig. 8.

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UNITED STATES PATENT OFFICE.

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PAPER-SLITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 392,262, dated November 6, 1888.

Application filed December 27, 1887. Serial No. 259,126. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. EDWARDS, of Holyoke, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Improvement in Paper-Slitting Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to machines in which a series of upper rotary cutters is combined with a series of lower rotary cutters and with devices for guiding a web of paper between said cutters for the purpose of cutting or slitting said web into strips of any desired width; and it has for its object to provide novel means for supporting and adjusting the cutters of the upper series in such manner that said cutters can be quickly and easily thrown into and out of operative engagement with the cutters of the lower series, and can be adjusted relatively thereto to compensate for wear of their cutting-edges with great accuracy.

A further object of the invention is to provide means whereby the distance between the several pairs of upper and lower cutters can be reduced for the purpose of slitting the paper into very narrow strips.

To these ends my invention consists in the construction and combination of parts hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a front elevation of so much of a paper-slitting machine as is necessary to be shown in order to illustrate the application of my invention thereto. Fig. 2 is a side elevation thereof, the frame and guide-rolls being shown by broken lines. Fig. 3 is a similar view of one of the upper cutters and its hanger. Fig. 4 is a front view of the same parts. Fig. 5 is a view in perspective of the two members composing said hanger. Fig. 6 is a front view of the bearing-hub upon which the upper cutter revolves and by which it is secured to the hanger. Fig. 7 is an inverted plan view of the upper member of the hanger. Fig. 8 is a central vertical sectional view of one of the lower cutters and its hub.

The letter A designates a portion of the frame, B B the guide-rolls, and C the shaft, carrying the lower series of cutters of what is or may be the ordinary form of paper-slitting machine, which, being well known to those skilled in the art, need not be particularly described herein. The shaft C has adjustably mounted thereon by means of their hubs *d* and set-screws *d'* a series of disk-cutters, D, and revolution is imparted to said shaft by belt or other connection with a suitable source of power. A series of upper cutters, E, co-operates with said series of lower cutters to slit the web of paper guided between them, and many forms of devices for supporting and adjusting said upper cutters have been devised, all of which have been, so far as I am aware, more or less cumbersome and expensive and have been open to various objections. It is for the purpose of providing a simple and inexpensive but effective means for supporting and adjusting said cutters E that I have devised the construction which I will now proceed to describe.

The letter F designates a cylindrical bar supported at each end in the frame A above shaft C. I prefer to make the ends of said bar rectangular in cross-section, as shown in Fig. 2, and to seat said ends in rectangular depressions in the top bars of the frame or in blocks secured upon said top bars, and to retain said ends in said depressions by means of cap-plates *a*, so that while said bar is thus securely held in the frame and prevented from having a revolving movement it can be readily removed from its bearings by removing said cap-plates for the purpose of applying the hangers G to and withdrawing them from said bar.

In existing machines, in which the upper series of cutters is mounted upon a revolving shaft similar to shaft C, such upper shaft can be utilized to form the bar F by mounting it at the top of the frame in such manner as to prevent rotation thereof.

The function of bar F is to support the upper series of cutters, E, through the medium of a series of hangers, G, upon each of which is mounted one of said cutters. The hangers G are each composed of two members, the upper one of which consists of a strap, *g*, adapted to encircle bar F when placed thereon, and having bolt *g'* and nut *g²*, by means of which it can be tightened about said bar. Within

said strap is located a radial slot, g^3, and at one side of said slot the strap is extended to form the stem g^4, having upon its inner face the rib g^5, the edges of which rib are undercut, as shown. (See Figs. 5 and 7.) The inner face of the stem g^4 is also preferably inclined slightly toward its front side, as shown in Fig. 7, for a purpose presently to be described. The lower member of the hanger consists of a spring-plate, g^6, having at its upper end the projecting arms g^7, adapted to receive between them the rib g^5 on the upper member, the inner faces of said arms being beveled to cause them to closely fit the undercut sides of said rib. At their upper ends said arms g^7 are of a proper size to closely fit within slot g^3 in the strap upon either side of rib g^5, and said ends are beveled transversely to conform to the curve of the inner surface of the strap, as shown. The central portion of the plate g^6 is preferably reduced in thickness to increase its elasticity, and at its lower end said plate is provided with an angular orifice, g^8, to receive the hub H, upon which the cutter E is mounted. The two members of the hanger are adapted by the construction just described to be adjusted one upon the other by moving the arms g^7 of the lower member longitudinally upon stem g^4 and rib g^5 of the upper member, and are securely held from accidental movement when so adjusted by a bolt, g^9, entering a screw-threaded orifice in rib g^5, and a washer, g^{10}, located between the head of said bolt and the outer surface of arms g^7, as shown.

The hub H is provided with a head, h, a cylindrical bearing-surface, h', adjoining said head, a portion, h^2, angular in cross-section to conform to the shape of orifice g^8 in plate g^6, and terminates in a threaded end, h^3. A washer, h^4, is fitted to the angular portion of said hub, and the upper cutter, E, which is of the usual disk form, is mounted upon said hub between said washer and head h, whereby it is permitted to revolve freely upon the bearing-surface h', but is prevented from lateral movement thereon. The hub, with the cutter thus mounted thereon, is inserted in orifice g^8 in plate g^6, with its angular portion h^2 resting in said orifice, whereby the hub is prevented from rotating, and a nut, h^5, is turned upon the threaded end of the hub, thus securely locking the latter to the plate g^6. The hangers, with the cutters E thus mounted thereon, are applied to bar F by raising said bar from its bearings and sliding the straps g thereon, the normal diameter of said straps permitting them to be moved freely upon said bar. The upper and lower cutters are then adjusted laterally of the machine to the proper position for slitting the paper into strips of the desired width, and the straps g are tightened upon bar F by means of bolts g' and nuts g^2 in such position that the cutting-edges of cutters E will bear against the cutting-edges of cutters D. Said upper cutters will be held against the lower cutters by spring-pressure, owing to the elasticity of plates g^6, and the degree of such pressure can be very accurately regulated by lateral adjustment of the straps g. I am thus enabled to avoid the use of spiral springs to press the cutters together, which springs soon lose their elasticity and have to be renewed. Moreover, the inclination of the inner face of stems g^4, previously described, causes the cutting-edges of cutters E to stand at an acute angle to the cutting-edges of cutters D, and I thus secure a shear-cutting action between said cutting-edges, which insures a clean even cut along both edges of the strips of paper. Whenever it is desired to utilize only a portion of the upper cutters—as, for instance, when the edges of the web of paper are to be trimmed without slitting said web into strips—the intermediate cutters can be elevated to the position shown by dotted lines in Fig. 2 by loosening nuts g^2 of their straps, and can be retained in such position by tightening said nuts again, whereby said idle cutters are entirely removed from the proximity of the path of the web of paper, as indicated by the arrow in said figure. The introduction of the web of paper to the machine can also be much facilitated by thus elevating all of the upper cutters, placing the front end of the web upon the lower cutters, and then lowering such of the upper cutters only as it is desired to use.

The vertical adjustment of the lower members of the hangers G upon the upper members thereof, as described, enables the cutters E to be adjusted toward the lower cutters to compensate for wear of their cutting-edges with perfect accuracy.

Another important feature of the construction shown and described is the fact that by suspending the hangers G from bar F by means of the straps g, I am enabled to bring said hangers very close to each other, as shown in Fig. 1, and thus slit the paper into very narrow strips, which for certain purposes is very desirable.

In addition to the advantages just enumerated, the means devised by me for supporting and adjusting the upper series of cutters is simple and inexpensive and can be applied to existing machines without necessitating material changes in the latter.

I do not wish to limit myself to the exact details of construction shown and described, as it is obvious that modifications therein can be made within the spirit of my invention.

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

1. In a machine for slitting paper, a revolving shaft having a series of rotary cutters adjustably mounted thereon, a cylindrical bar rigidly supported above said shaft, a series of hangers depending from said bar, each of said hangers being composed of an upper member consisting of a strap adjustably secured upon the bar and a lower member consisting of a spring-plate adjustably secured to said strap, and a series of rotary cutters journaled upon

the lower members of said hangers, combined and operating substantially as set forth.

2. In a machine for slitting paper, having upper and lower rotary cutters, as a means for supporting the upper cutters thereof, a cylindrical bar rigidly secured to the frame of the machine, a series of straps encircling said bar and capable of being rigidly secured thereto, each of said straps having a depending stem, one of the faces of which stands at an acute angle to the axis of said bar, and a series of depending plates adjustably secured to said stems upon said inclined face thereof, said plates being provided at their lower ends with means for journaling said upper cutters thereon, substantially as described.

3. In a machine for slitting paper, the combination, with shaft C, having cutters D adjustably mounted thereon, of bar F, rigidly supported above said shaft, straps g, adjustably secured to said bar by means of bolts g' and nuts g^2, said straps having downwardly-projecting stems g^4, provided with ribs g^5, plates g^6, having arms g^7, adapted to receive between them said rib g^5, means—such as bolts g^9 and washers g^{10}—for securing said plates upon the stems g^4, and cutters E, mounted upon said plates, substantially as described.

4. The combination, with hangers G, having near their lower ends angular orifices g^8, of hubs H, each of said hubs being composed of a head, h, bearing-surface h', angular portion h^2, and threaded end h^3, cutters E, mounted upon the bearing-surfaces h' of said hubs, washers h^4, fitted to the angular portion of said hubs, and nuts h^5, fitted to the threaded ends of said hubs, substantially as set forth.

5. In a machine for slitting paper, comprising upper and lower rotary cutters, as a means for supporting the upper cutters thereof, a series of hangers, G, depending from a rigidly-supported bar, each of said hangers consisting of a strap, g, having a slot, g^3, and having a projecting stem, g^4, at one side of said slot, said stem being provided with a rib, g^5, having undercut sides, a spring-plate, g^6, having at its upper end arms g^7, the inner faces of which are beveled to correspond with the inclination of the sides of said rib, said plate having at its lower end means for mounting one of the upper cutters thereon, and a bolt entering a threaded orifice in said rib g^5, adapted to clamp said arms g^7 to the stem g^4 upon either of said ribs, arranged and operating substantially as and for the purpose described.

6. In a machine for slitting paper, the combination, with shaft C, carrying the rotary cutters D, of bar F, straps g, mounted upon said bar and having the depending stems g^4, one of the faces of which stems is inclined at an acute angle to the plane of rotation of said cutters D, spring-plates g^6, secured to said stems upon the inclined faces thereof, and cutters E, journaled upon said plates, substantially as described, whereby a shear-cutting action between said cutters D E is secured.

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