C. J. BRYANT.

MAIL OPENING MACHINE.

APPLICATION FILED NOV. 29, 1912.

1,109,958. **Patented Sept. 8, 1914.**

3 SHEETS—SHEET 1.

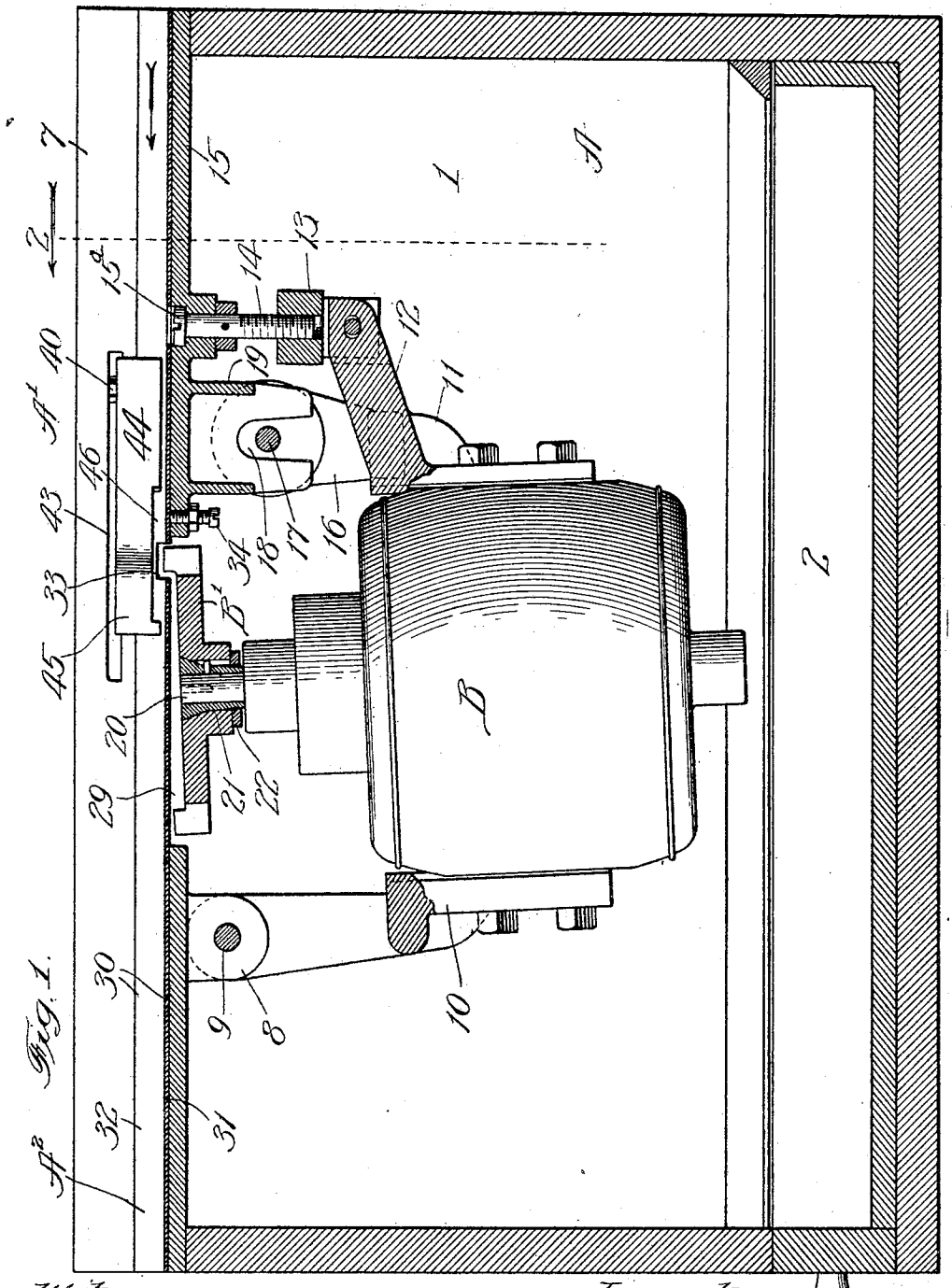


Fig. 1.

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Chas. H. Buell.

Inventor:
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By Dyer, Ayer, Lee, Cratton, and Wiles,
Attys.

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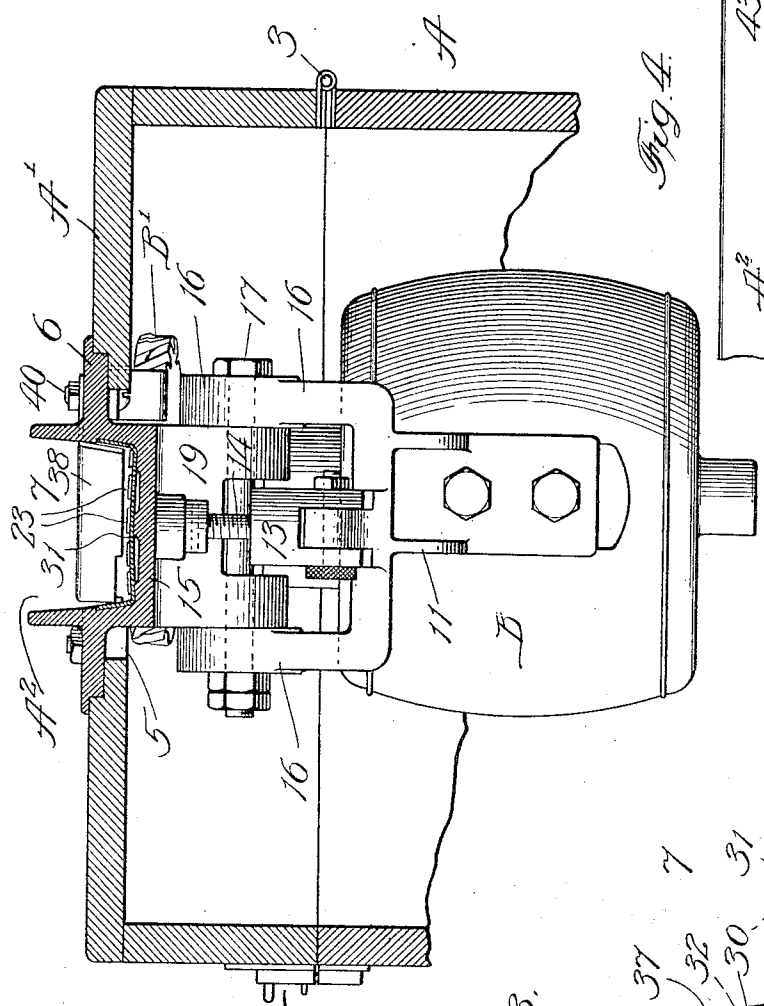


Fig. 2.

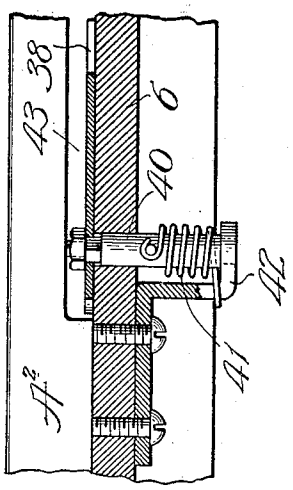


Fig. 4.

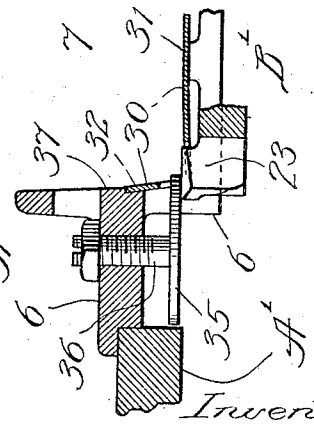


Fig. 3.

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3 SHEETS—SHEET 3.

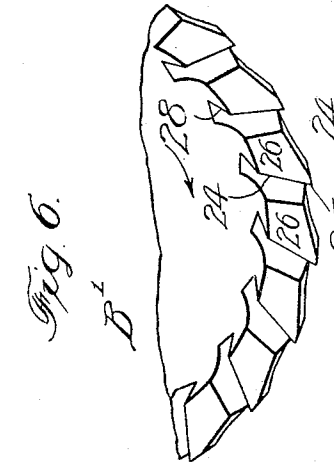


Fig. 6.

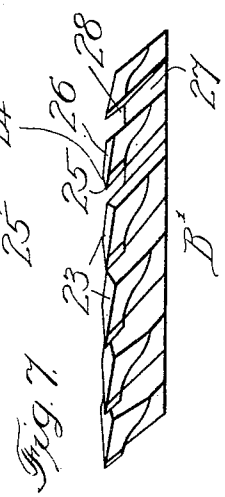


Fig. 7.

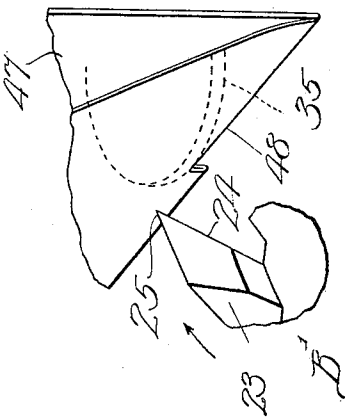


Fig. 8.

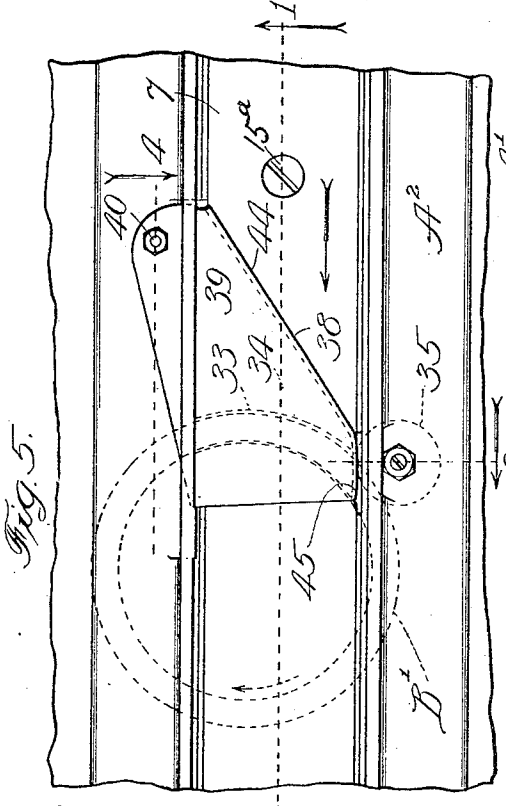


Fig. 5.

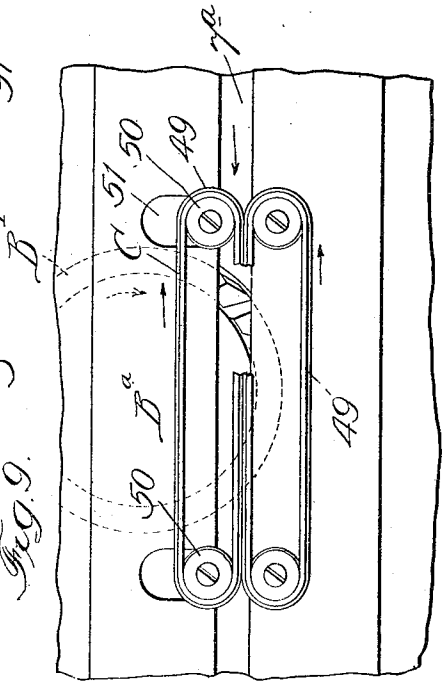


Fig. 9.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CLYDE J. BRYANT, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JOHN P. WALLIS, OF CHICAGO, ILLINOIS.

MAIL-OPENING MACHINE.

1,109,958. Specification of Letters Patent. Patented Sept. 8, 1914.

Application filed November 29, 1912. Serial No. 734,029.

To all whom it may concern:

Be it known that I, CLYDE J. BRYANT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Mail-Opening Machines, of which the following is a specification.

This invention relates particularly to machines adapted for cutting or opening envelops; and the primary object is to provide a machine which will operate to rapidly and effectively open mail matter.

It may be stated preliminarily that in the preferred form of the invention a rotary cutter and motor therefor are suspended from the hinged top of a box or cabinet, the top being equipped with a guide through which the envelops may be fed on edge to be operated on by the cutter. The blades of the cutter are preferably so arranged as to not only produce a shearing action on the envelops, but also to create a suction into the cabinet at the cutting point, so that the fine particles of paper, as they are sheared off, will be drawn or struck downwardly into the cabinet rather than thrown as dust into the room.

The present invention constitutes an improvement on the machine set forth in my application No. 621609, filed in the United States Patent Office April 17, 1911.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a central longitudinal section of an envelop opener constructed in accordance with my invention, the section being taken as indicated at line 1 of Fig. 5; Fig. 2, a broken transverse section taken as indicated at line 2 of Fig. 1; Fig. 3, an enlarged broken section taken as indicated at line 3 of Fig. 5, the view showing the relation of an adjustably-secured stationary shearing-member to the rotary cutter employed; Fig. 4, a broken sectional view taken as indicated at line 4 of Fig. 5; Fig. 5, a broken plan view; Fig. 6, a broken plan view of the rotary cutter; Fig. 7, a fragmentary edge elevational view of the same; Fig. 8, a perspective view, diagrammatic in its nature, illustrating the manner in which shearing operations are performed on an envelop; and Fig. 9, a broken plan view illustrating a modification of the machine.

In the form of the invention illustrated in Figs. 1 to 8, inclusive, it comprises a box or casing A having a top A^1 provided with an envelop channel or guide A^2; and a motor B located in the casing A and having a slightly-inclined (from the vertical) shaft on which is mounted a cutter-wheel B^1 having blades adapted to work through a transverse or segmental slot with which the guide A^2 is provided in its base-portion.

The casing A may be of any suitable form and construction. Preferably it comprises a box form body 1 provided in its base with a withdrawable drawer 2 and having a lid connected by hinges 3 and secured by a catch or lock 4. The top A^1 of the casing thus constitutes the upper member of the hinged lid, and the closure afforded by the lid may be opened to give access to the cabinet and to lift the cutting device and motor out of the cabinet.

The motor B is preferably suspended from the top of the casing, and the top of the casing is preferably provided throughout its length with a longitudinal channel through which the letters may be fed. Thus, it is preferred to provide the top-member A^1, which may be of wood, with a slot 5 which extends throughout the length of said member and which accommodates a metal guide-plate 6 having a longitudinal recess 7 which extends the whole length of the plate and may be of any desired width, two or three inches in width ordinarily being ample. The member 6 is equipped near one end with depending lugs 8 which support removable pivots 9, from which depends the hanger 10, which is secured to one side of the frame of the electric motor B. The other side of the motor is fitted with a bracket-member 11, which has a central arm 12, pivotally joined at its free extremity to a coupling-member 13 supported by an adjusting-screw 14 which has swivel connection with the bottom wall 15 of the channel 7. The screw 14 has a head 15^a which is slotted to receive a screw-driver and is accessible from the outer side of the casing-top. The bracket-member 11 also has arms 16 which flank the arm 12 and are connected by a bolt 17 movable in a slot 18 of a bearing or guide 19 which depends from a bottom-wall 15 and is embraced by the arms 16. Thus, the motor may be adjusted to vary the relation of the cutter-wheel to the guide-plate 6, according

to the depth of cut which it is desired the wheel shall effect. The shaft of the motor is inclined slightly and its upper end 20 is fitted with the cutter-wheel B^1, which is removably mounted. The securing-device employed comprises a bushing 21 which extends through an opening in the hub of the wheel; and a nut 22 applied to the threaded lower end of the bushing 21. The sleeve 21 has the outer surface of its upper end made conical and received within an annular conical surface which constitutes the upper portion of the bore in the wheel-hub. The upper portion of the member 21 is slotted or split, so that as the nut 22 is turned on the wheel will be securely clamped to the shaft.

As will be understood from Figs. 6 and 7, it is preferred to form the blades of the cutter-wheel integrally with the wheel. Each cutter-tooth 23 projects laterally from the peripheral portion of the wheel, being presented upwardly. Each tooth has a shearing-edge 24 which is disposed obliquely, that is, forms an acute angle with a radius of the wheel, thus presenting an advance point 25 at the outer upper corner of the tooth. The upper surface 26 of the tooth is slightly inclined with relation to the axis of the wheel, so that the upper surface will be presented in a substantially horizontal plane at the point where the shearing operation is performed. The teeth are separated by slots 27 which are inclined forwardly and set obliquely, or at an angle to a radius of the wheel. Thus, each tooth presents an undercut front surface 28 and, as appears from Fig. 7, the slots 27 extend wholly through the wheel, thus affording inclined channels through which the sheared bits of the envelop pass in the cutting operation, it being observed that the undercut surface 28 tends to strike the sheared bit downwardly and also to create a suction into the cabinet at the cutting point.

To accommodate the cutter-wheel the bottom-wall 15 of the channel 7 is cut away as indicated at 29. Inasmuch as the cutter-wheel lies in a plane which is inclined slightly with reference to the horizontal, the teeth at the high edge of the wheel will describe an up-bowed curve, as viewed from the edge of the wheel. Accordingly it is preferred to provide the base-portion of the channel 7 with a sheet-metal lining 30 which has a bottom-wall 31 and side flanges 32, the bottom-wall 31 being bowed up slightly, in cross-sectoin, as will be understood from Figs. 2 and 3. The lining-member 30 is provided with a segmental slot 33 (Figs. 1 and 5) adapted to accommodate the teeth at the high edge of the cutter-wheel. Adjacent the slot 33 the bottom-wall 15 of the channel 7 is fitted with a set-screw 34 which is disposed centrally with relation to the channel 7 and adapted to vary the upward bow of the bottom-wall 31 of the lining 30.

Letters are fed through the channel 7 in the direction indicated by the arrow in Fig. 5, and the cutter-wheel rotates in the direction indicated by the dotted arrow in Fig. 5. The blades 23 co-act with an adjustably mounted stationary shear-member 35 which preferably comprises a hardened steel disk carried by a threaded stem 36 which passes through and has screw-connection with the plate 6, as shown in Fig. 3. The disk 35 projects through a lateral wall 37 of the feed-channel 7, and extends slightly into the feed-channel. The teeth 23 pass just beneath the inner edge-portion of the disk 35 as the cutter-wheel rotates, and the shear-edge 24 of each tooth co-acts with the lower edge-portion of the disk 35 in the shearing operation. The disk 35 may be turned, both to vary the edge-portion which co-acts with the cutter-teeth, and also to bring the shearing-shoulder of the disk to the desired degree of closeness to the plane of the tooth.

It is preferred to employ a spring-pressed guide-member 38 which operates to press the envelops against the lateral wall 37 of the envelop-channel 7. The member 38 preferably comprises a sheet-metal plate 39 which is secured (Figs. 4 and 5) to the upper end of a rock-shaft or stud 40, which is pivoted in the plate 6 and connected by a spring 41 to a bracket 42 with which the plate 6 is equipped on its lower side. The plate 39 works through a slot 43 in the corresponding lateral wall of the guide-channel 7; and said plate is provided within the channel 7 with a down-turned flange affording an oblique or diagonal surface 44 and a surface 45 which bears against the lateral wall 37 of the chute 7 and is substantially parallel therewith. The flange is cut away, as indicated at 46 (Fig. 1), to accommodate the cutter-teeth, regardless of the position of the member 38, as the envelops are fed through the channel 7.

In the operation of the machine, a pack of envelops is placed edgewise in the channel 7 and moved by the operator across the cutter-wheel, the pressure-member 38 yielding as the envelops are fed through, but serving to press the envelops firmly against the wall 37 of the channel. As the envelops are moved the teeth of the cutter wheel successively shear off small rectangular bits at the lower edges of the envelops. In Fig. 8, the operation is illustrated and it will be noted that the advance-point 25 of the tooth is adapted to pierce the envelop at the beginning of the shearing operation, and the oblique shearing-edge 24 of the tooth then coöperates with the shearing-shoulder at the lower portion of the edge of the stationary shear-member or disk 35. The numeral 47 indicates an envelop, a portion of whose

lower edge has been cut away, as indicated at 48, by successive shearing operations of the cutter-teeth.

A machine of the character described is of comparatively simple construction; and such a machine having a capacity of approximately 15,000 letters per hour may be manufactured at a comparatively low cost. It will be noted, therefore, that it is entirely feasible and very satisfactory to feed the envelops by hand. If desired, however, power-actuated means for feeding the envelops may be provided. Thus, in Fig. 9 the numeral 7^a represents a modified form of feed-channel; B^a represents the rotary cutter; and C represents means for feeding the envelops through the channel 7^a, so that their lower edges will be presented to the cutter. In the illustration given, the means C comprises a pair of co-acting feed-belts 49, which may be operatively connected with the motor in any suitable manner (not shown). The rollers 50 of one feed-belt are preferably mounted so as to be capable of yielding, the slots 51 permitting such action. It will be understood that, in practice, suitable means will be provided for feeding the envelops between the belts 49.

It is noteworthy that in the construction illustrated in Fig. 1, it is possible to adjust the rotary shear-member B^1 with relation to the stationary shear-member 35 while the machine is in operation, the adjusting screw 15^a being accessible through the channel 7 of the envelop-guide.

The foregoing detailed description has been given for clearness of understanding only and no undue limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a mail-opening machine, the combination of an envelop-guide adapted to permit envelops to be passed therethrough on edge, and a rotary cutter-wheel having laterally-projecting teeth adapted to remove successive sections from the lower edge-portion of envelops passed through said guide, said teeth separated by slots extending through the cutter-wheel.

2. In a machine of the character set forth, the combination of an envelop-guide adapted to permit envelops to be passed therethrough on edge, and a coacting rotary cutter-wheel having an inclined axis and having its peripheral portion equipped with inclined teeth separated by inclined slots extending through the wheel.

3. In a machine of the character set forth, the combination of an envelop-guide adapted to permit envelops to be passed therethrough on edge, and a co-acting rotary cutter-wheel having an inclined axis and equipped with laterally-projecting inclined teeth separated by slots extending through the wheel, said teeth having oblique shearing-edges presenting an advance-point at the upper outer corners of the teeth.

4. In a machine of the character set forth, the combination with an envelop-guide having its base-portion provided with a transverse slot, of a rotary cutter-wheel having an inclined axis and provided at its peripheral portion with laterally-projecting shearing-blades formed integrally with the wheel and separated from each other by slots, said slots being inclined to the plane of the wheel and obliquely disposed with relation to the radii of the wheel.

5. In a machine of the character set forth, the combination with an envelop-guide, of a rotary cutter-wheel equipped with laterally-projecting shearing-blades, and an adjustably-secured, stationarily-mounted shear-member associated with said envelop-guide and disposed near one lateral wall thereof.

6. In a machine of the character set forth, the combination of an envelop-guide, a stationary shear-member at one side of said guide and projecting through a lateral wall thereof, and a rotary cutter-wheel having lateral shearing-blades co-acting with said shear-member.

7. In a machine of the character set forth, the combination of an envelop-guide, a disk-form shear-member adjustably mounted at one side of said guide and projecting through a lateral wall of said guide, and a rotary cutter-wheel having lateral shearing-blades co-acting with said shear-member.

8. In a machine of the character set forth, the combination of an envelop-guide, a shear-member mounted near one lateral wall of said guide, and a rotary cutter-wheel having upwardly-presented lateral shear-blades adapted to pass beneath said shear-member.

9. In a machine of the character set forth, the combination of an envelop-guide, a shear-member associated with one lateral wall thereof, a rotary cutter having shear-blades co-acting with said shear-member, and a spring-held guide-member projecting into said envelop-guide, for the purpose set forth.

10. In a machine of the character set forth, the combination of an envelop-guide, a shear-member associated with one lateral wall thereof, a rotary cutter-wheel having shear-blades co-acting with said shear-member, and a pivotally-mounted spring-held guide-member having a wall extending diagonally across said envelop-guide.

11. In a machine of the character set forth, the combination of an envelop-guide, a shear-member associated with one lateral wall thereof, a rotary cutter-wheel having shear-blades co-acting with said shear-member, and a pivotally-mounted spring-held guide-member having a wall extending

diagonally across said envelop-guide and having also a wall forming a continuation of said diagonal wall and extending substantially parallel with the guide.

12. In a machine of the character set forth, the combination of an envelop-guide, a shear-member associated with one lateral wall thereof, said envelop-guide having a transverse slot in its bottom-wall, a spring-held presser-member extending into said envelop-guide, and a rotary cutter-wheel having upwardly-presented lateral shear-blades working through said slot and co-acting with said shear-member.

13. In a machine of the character set forth, the combination of an envelop-guide having a bottom-wall which is bowed upwardly in cross-section and provided with a segmental slot, and a rotary cutter-wheel equipped with upwardly-presented lateral blades working through said slot.

14. In a machine of the character set forth, the combination of an envelop-guide having a bottom-wall which is bowed upwardly in cross-section and provided with a segmental slot, means for varying the convexity of the bottom-wall of said envelop-guide, and a rotary cutter-wheel equipped with upwardly-presented lateral blades working through said slot.

15. In a machine of the character set forth, the combination of a metal-plate provided with a channel affording an envelop-guide, the bottom-wall of said guide being cut away to accommodate a cutter-wheel, a lining-member in said envelop-guide having an upwardly bowed bottom-wall provided with a segmental slot, and a rotary cutter-wheel having an inclined axis and provided with upwardly-presented lateral blades working through said slot.

16. In a machine of the character set forth, the combination of a cabinet having its top equipped with an envelop-guide, a shear-member associated with the lower portion of said guide, a cutter-wheel having upwardly-presented lateral shear-blades co-acting with said shear-member, and adjusting means for varying the inclination of the cutter-wheel, said adjusting means extending through a wall of the cabinet.

17. In a machine of the character set forth, the combination of a cabinet having its top equipped with an envelop-guide, a motor suspended from said top and having an inclined shaft equipped at its upper end with a cutter-wheel provided with upwardly-presented lateral blades, and adjusting means for the motor and cutter-wheel, said adjusting means including an adjusting-screw extending through the top-wall of the cabinet.

18. In a machine of the character set forth, the combination of a cabinet having a top-wall equipped with an envelop-guide, a motor having one side of its frame pivotally suspended from the cabinet-top, an adjusting-screw accessible through the cabinet-top and connected with the other side of the motor-frame, whereby the inclination of the motor may be adjutsed while the machine is in operation, and a cutter-wheel mounted on the upper end of the inclined motor-shaft and having upwardly-presented lateral blades.

19. In a machine of the character set forth, the combination of a cabinet having its top equipped with an envelop-guide, a motor having at one side a bracket pivotally suspended from said guide and having at the other side a bracket having guide-connections with the lower portion of the envelop-guide, an adjusting-screw connected with the said last-named bracket accessible through the envelop-guide, and a cutter-wheel mounted on the upper end of the motor-shaft and having upwardly-presented lateral blades, for the purpose set forth.

20. A cutter-wheel for the purpose set forth, comprising a disk provided centrally with means for mounting it on a shaft and provided peripherally with integrally-formed laterally-projecting blades separated by slots extending through the disk.

21. A cutter-wheel for the purpose set forth, comprising a disk provided centrally with means for mounting it on a shaft and provided peripherally with integrally-formed laterally-projecting blades having undercut front surfaces and oblique shearing edges.

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