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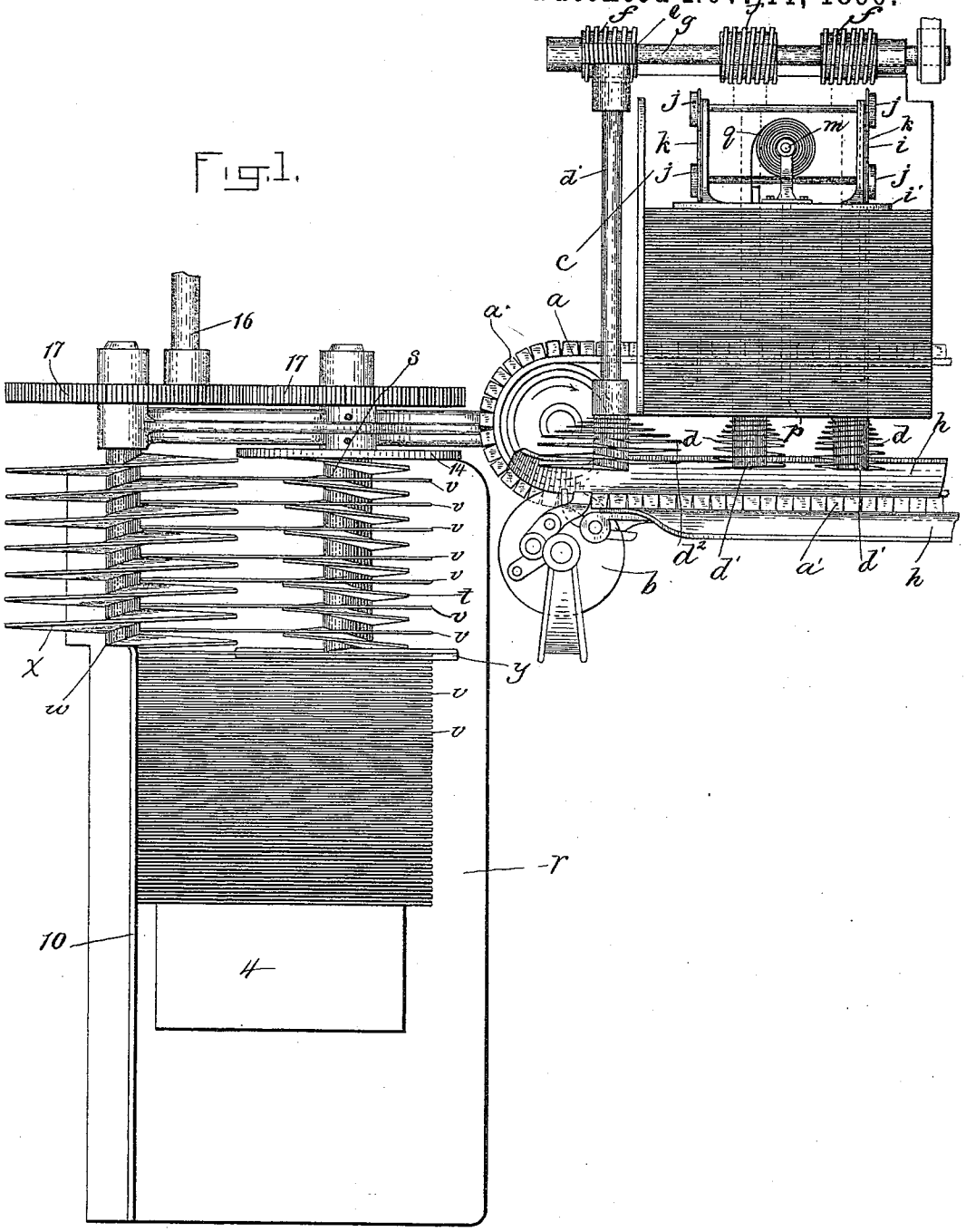
4 Sheets—Sheet 1.

F. N. ETHRIDGE.

MACHINE FOR MARKING MAIL MATTER.

No. 440,401. Patented Nov. 11, 1890.

Fig. 1.



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C. F. Bartlett

INVENTOR:
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by Wright Brown Quinby & Woodley
Attys.

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

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F. N. ETHRIDGE.

MACHINE FOR MARKING MAIL MATTER.

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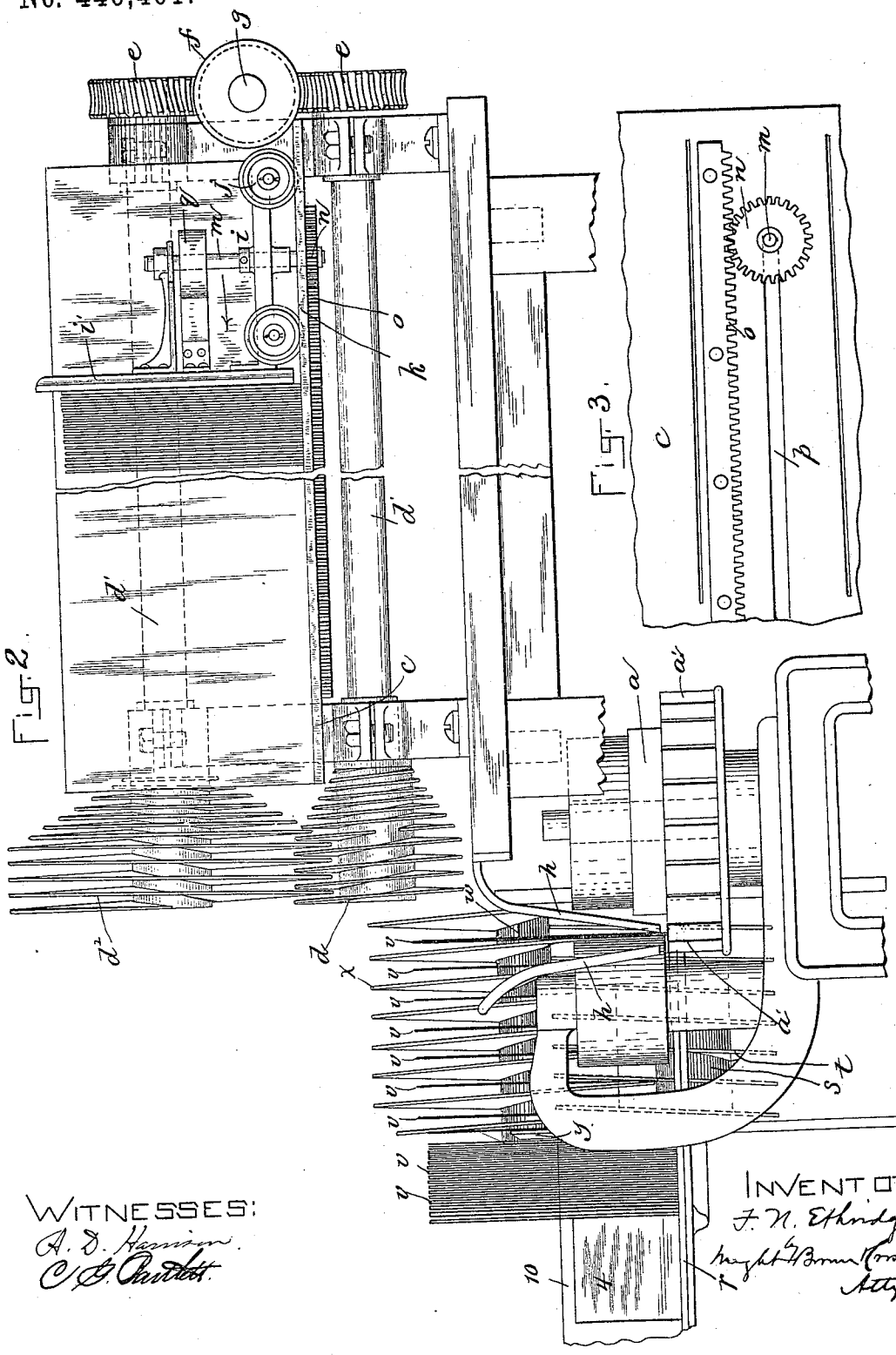


Fig. 2.

Fig. 3.

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(No Model.) 4 Sheets—Sheet 3.

F. N. ETHRIDGE.

MACHINE FOR MARKING MAIL MATTER.

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Fig 4.

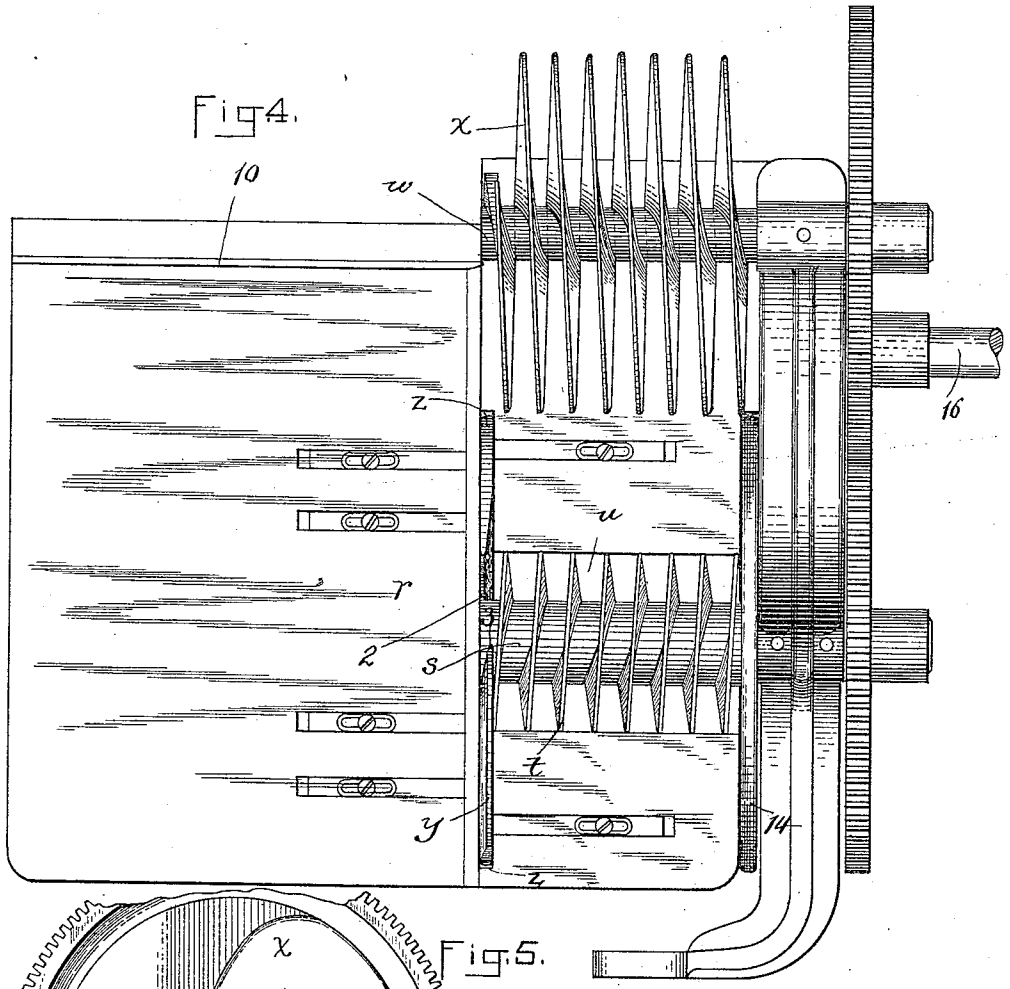
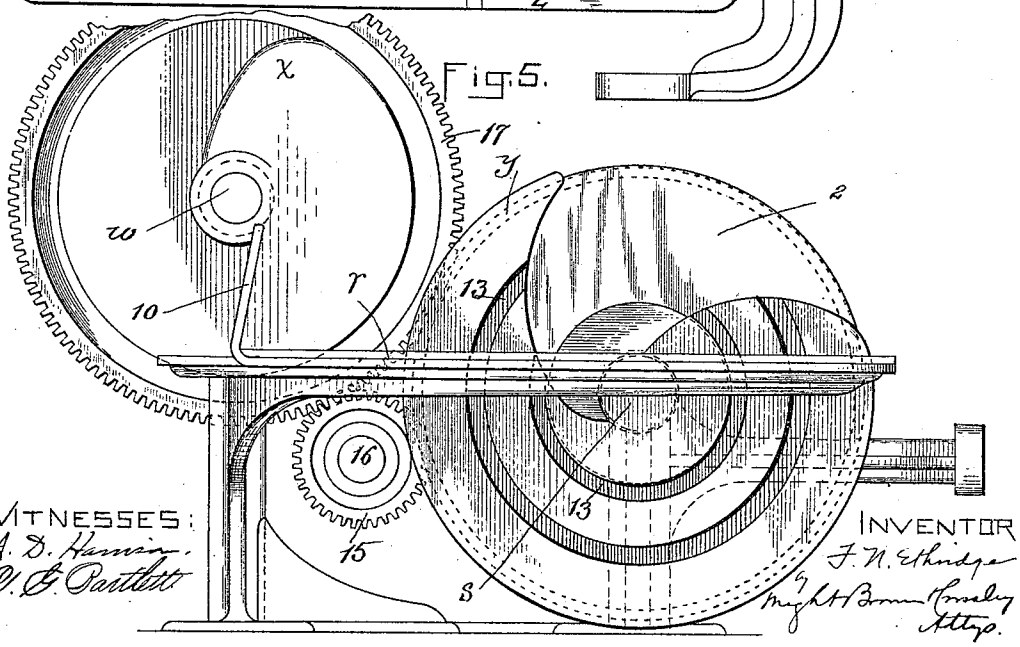


Fig 5.



WITNESSES:
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(No Model.)

4 Sheets—Sheet 4.

F. N. ETHRIDGE.

MACHINE FOR MARKING MAIL MATTER.

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Fig. 6.

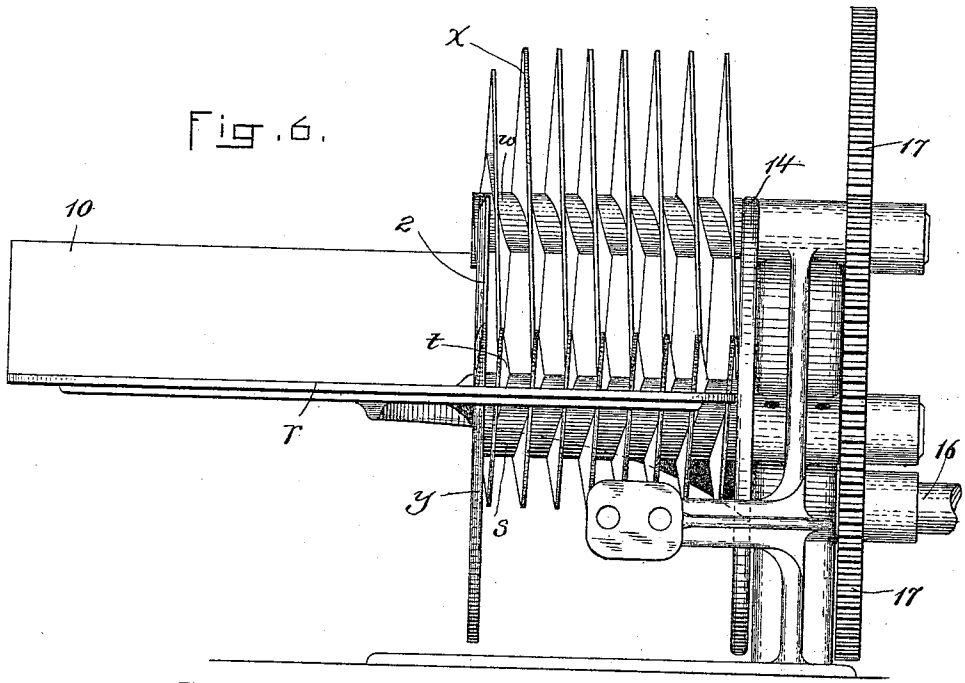


Fig. 7.

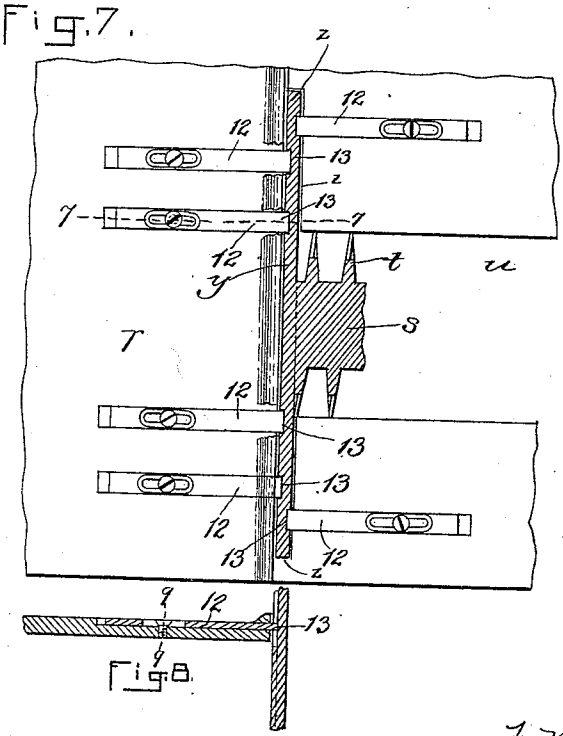


Fig. 9.

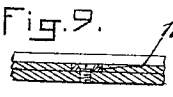


Fig. 8.

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A. D. Harman.
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UNITED STATES PATENT OFFICE.

FRANK N. ETHRIDGE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN POSTAL MACHINES COMPANY, OF MAINE.

MACHINE FOR MARKING MAIL-MATTER.

SPECIFICATION forming part of Letters Patent No. 440,401, dated November 11, 1890.

Application filed May 9, 1890. Serial No. 351,110. (No model.)

To all whom it may concern:

Be it known that I, FRANK N. ETHRIDGE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Marking Mail-Matter, of which the following is a specification.

This invention relates to postmarking-machines in which letters, cards, and other mail-matter are fed endwise through the machine by a suitable feeding device, such as an endless belt, and delivered by said belt to a packing device, whereby the letters are arrested and moved laterally or sidewise and accumulated on a suitable table or support, each piece of mail-matter being marked by a suitable printing device while it is being moved forward endwise by the feeding device.

The present invention relates to the means for supplying or delivering the letters, cards, &c., to the feeding-belt, by which they are moved forward endwise and presented to the printing-wheel and for arresting the endwise forward motion imparted by said belt to the letters, &c., and packing them upon a bed or table by a lateral or sidewise movement.

The object of the invention is, first, to provide suitable means for separating the letters or pieces from a pack and delivering said pieces singly or one at a time to the feed-belt, so that the pieces will not overlap each other on the belt, but will form a procession in which each shall be uncovered or unobstructed along its entire face, and, secondly, to provide a simple and effective packing device or attachment to pack the pieces of mail-matter after they have been marked.

To these ends the invention consists in the improvements which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a top view of a portion of a machine for marking mail-matter, showing my improved letter supplying or delivering and letter-packing devices in their operative relation to the feed-belt and printing-wheel of the machine. Fig. 2 represents an end elevation of the same. Fig. 3 represents an inverted plan view of a portion of the letter-delivering mechanism. Fig. 4 represents a top view of the packing device detached from the postmarking-machine. Fig. 5 represents an end elevation of the packing device. Fig. 6 represents a front elevation. Fig. 7 represents a top view of a portion of the table, showing a part of the packing device in section. Fig. 8 represents a section on line 7 7, Fig. 7. Fig. 9 represents a section on line 9 9, Fig. 8.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a* represents the feeding-belt, which runs on suitable supporting-pulleys, so that its sides are substantially vertical, the lower edge of the belt having a substantially horizontal flange *a'*, which supports the lower edges of the letters and other pieces of mail-matter, said pieces being dropped edgewise upon the belt by my improved delivering mechanism and moved forward endwise to the packing mechanism. During the forward movement imparted to the letters by the feeding-belt they are presented to the rotary printing-wheel *b*, Fig. 1, which prints the desired marks on each letter as it is carried forward by the belt.

The construction and arrangement of the feeding-belt and of the printing devices form no part of my invention, and my improvements, hereinafter described, may be used with any suitable means for feeding the letters forward in an endwise direction and printing or marking them while they are being thus carried forward.

My improved means for separating the letters from a pack and delivering them one at a time to the feeding-belt comprise a table *c*, on which the letters are placed by hand in a pack or series, each letter standing vertically on edge, two or more screw conveyers *d d*, arranged at one end of the table above the feeding-belt, said conveyers being formed to separate the outermost letter in the pack from the body of the pack and feed it laterally and drop it by itself on the feeding-belt, as presently described, and a pushing device for pushing the pack of letters toward the screw conveyers. The screw conveyers are composed of spiral blades on horizontal shafts *d'*, the convolutions of the blades being separated by spaces of suitable width to receive letters standing edgewise. I prefer to employ three

conveyers, two of which $d\,d$ are on shafts $d'\,d'$, located below the table c, their spiral blades being of tapering form and arranged to project at their highest portions above the table, the inner ends of said blades being below said table, as shown in Fig. 2, so that as the letters are pushed sidewise from the table their lower edges will readily enter the spaces between the convolutions of the spiral blades. The other conveyer d^2 is on a shaft d', which is located above the table c, so that it will engage the ends of the letters which are engaged with the conveyers $d\,d$ and prevent said letters from tipping over, the elevated location of the conveyer d^2 enabling it to accomplish this result in a way which will be readily understood. The conveyers are rotated simultaneously by the engagement of worm-wheels e on their shafts with worms f on a driving-shaft g, the pitch of the spiral blades and the direction of their rotation being such as to convey the letters outwardly from the table c in a sidewise direction until the letters reach the outer ends of the conveyers and drop therefrom onto the feeding-belt. The spaces between the convolutions of the blades at the inner ends of the conveyers are so narrow that but one letter or piece can be engaged with either conveyer at a time, so that one letter is detached from the pack at a time and conveyed outwardly, each letter being separated by a convolution of a blade from the one preceding it, so that when a letter has been conveyed to the outer ends of the conveyers and dropped therefrom onto the feeding-belt the next letter cannot drop until the conveyers have made another rotation. Time is therefore afforded for the feeding-belt to move each letter forward before the next letter is dropped upon it. The letters as they drop from the conveyers are guided to the flange a' of the feeding-belt by fixed inclined plates $h\,h$, arranged over said flange and constituting a hopper, which causes each letter to drop edgewise onto the flange a'.

The pack of letters may be pushed toward the conveyers by any suitable means. I have here shown a carriage i, having wheels $j\,j$, mounted to run on tracks $k\,k$ on the table c, said carriage having a vertical face-plate i', which bears against the rear end of the pack of letters.

m represents a vertical shaft journaled in bearings on the carriage i, and having at its lower end a pinion n engaging a rack o on the under surface of the table c, the latter having a slot p for the accommodation of the shaft m. A coiled spring q, attached at one end to the carriage i and at the other end to the shaft m, rotates said shaft in the direction required to cause its pinion by its engagement with the rack o to move the carriage in the direction indicated by the arrow in Fig. 2, thus causing the face-plate i' to push the pack of letters forward. The spring uncoils and loses a portion of its force as the carriage approaches the conveyers, and is coiled or reset by pushing the carriage away from the conveyers by hand.

My improved letter-packing device or attachment comprises a bed or table r, which is preferably substantially horizontal, and may be attached in any suitable way to the frame of the machine. The table r is arranged to receive the letters that are fed forward endwise by the feeding-belt. Below the upper surface of the bed or table r is a shaft s, which extends crosswise of the path in which the letters are moved upon the table by the feeding-belt of the machine, the upper surface of said shaft being preferably flush with the upper surface of the table. On the shafts is formed a spiral blade t of such width that the highest portions of its convolutions project through an opening u in the table r above the upper surface thereof, the space between said convolutions being of sufficient width to receive a letter or other piece of mail-matter when the same stands edgewise or vertically on the table.

It will be seen that the shaft s and its spiral blade t constitute a screw conveyer, which when rotated convey pieces of mail-matter between the convolutions of the blade sidewise out of the path along which they are moved by the feeding device, and force said pieces laterally upon that portion of the table r which is located at one end of the screw conveyer.

A series of letters v are shown in Figs. 1 and 2 engaged with the convolutions of the conveyer, the right-hand letter of the series being shown in the position it occupies when delivered by the feeding-belt. The endwise forward movement of the letter or piece v is arrested by a stop w, located above the table and at the rear of the shaft. Said stop is here shown as a shaft provided with a spiral blade x, which is of the same general shape as the blade t, but is preferably considerably wider, so that the letter-receiving spaces or pockets between its convolutions are deeper than those of the spiral blade t. The pieces of mail-matter are fed forward by the feeding-belt with such force that they move across the shaft s and through the spaces between the convolutions of the blade thereof until they strike the shaft or stop w, which arrests their forward motion, each piece being then held in a vertical position or on edge by the two blades $t\,x$, one engaging its lower edge and the other its forward end.

The two screw conveyers are simultaneously rotated in the direction required to cause their convolutions to move the letter or piece engaged therewith sidewise in the manner already described, each letter being sustained on edge by the convolutions of the blades until it has passed to the ends of said blades. To afford a vertical support for each letter as it is ejected from the convolutions of the spiral blade and prevent the end of the blade from rubbing against and defacing the ejected letters, I provide the shaft s with

a circular flange y at the delivering end of blade t. Said flange projects through a slot z in the table r and is provided with a recess or opening 2, extending from its periphery inwardly to the shaft s. One edge of said opening is preferably convex and the other concave, as shown in Fig. 5, the convex edge being beveled from the outer side of the flange to the inner side, thus forming a comparatively sharp angle 3, Fig. 4, at the inner side of the flange y. When the shaft is rotating, the beveled edge or angle 3 engages the rear end of a letter or other piece when the same reaches the end of the blade t and deflects said end outwardly, thus causing the letter or piece to pass through the opening 2, while the latter is crossing the space above the table r. The flange y prevents the ejected letter from bearing against the end of the blade t, so that each letter is protected from injury after leaving the conveyer-blades. The said flange y also supports one end of the pack of letters formed on the table by the operation of the packing device, the said letters accumulating on the table in a pack, the outer one of which is supported by a sliding weight or block 4, resting loosely on the table, as shown in Figs. 1 and 2. The letters are guided as they move on the outer portion of the table by a flange or guide 10 at the forward edge thereof.

To prevent postal-cards and other thin pieces from dropping into the slot z through which the flange y projects, I provide the table r with tongues or bridges 12, projecting into circular grooves 13 in the sides of the flange y, said tongues extending across the spaces between the sides of the flange and the sides of the slot z.

14 represents a continuous circular flange attached to the shaft s at the end of the blade t opposite the end where the recessed flange y is located. Said flange 14 is intended to prevent the letters from falling outwardly at that end of the screw conveyer.

The conveyers may be rotated by power applied in any suitable way—as, for example, by a gear 15 on a shaft 16, meshing with gears 17 on the conveyer-shafts; or said gears 17 may be arranged to intermesh, in which case power may be applied to one of the conveyer-shafts. The two shafts will then rotate in opposite directions, so that the blade of one will be a right-hand screw and the blade of the other a left-hand screw.

It will be seen that the blade t of the shaft s if made of sufficiently large diameter may be made to pack the letters without the aid of the second blade x, in which case any suitable stop to limit the forward movement of the letters may be substituted for the shaft w and blade x.

I claim—

1. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, with a letter feeder or carrier adapted to feed letters forward endwise, of a letter-pack-supporting table above said carrier, screw conveyers formed and arranged to engage the letters at the outer end of a pack pushed across said table, and means for rotating said conveyers.

2. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, with a letter feeder or carrier adapted to feed letters forward endwise, of a letter-pack-supporting table located above said carrier and screw conveyers of tapering form located partly below said table, the inner ends of the blades being at or below the surface of the table.

3. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, with a letter feeder or carrier adapted to feed letters forward endwise, of a letter-pack-supporting table located above said carrier, screw conveyers of tapering form located partly below said table, the inner ends of the blades being at or below the surface of the table, and another screw conveyer the shaft of which is located above said table, as set forth.

4. The combination, with the table and the screw conveyers arranged, as described, at one end of the table, of the pack-pushing carriage and a spring-impelled shaft on said carriage, having a pinion engaged with a fixed rack, as set forth.

5. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, with a letter feeder or carrier adapted to feed letters forward endwise, of a packing device comprising a bed or table arranged at one end of the letter-feeder, said table being adapted to support the letters delivered by the feeder and provided with an opening, a horizontal shaft located in said opening, its upper portion being substantially flush with the upper surface of the table, a spiral blade on said shaft extending across the opening in the table, said shaft and blade constituting a screw conveyer extending across the path in which the letters are fed, the shaft also supporting the lower edge of the letters at the center of the opening, a stop behind said conveyer to arrest the forward movement of the letters by the feed-belt, whereby the letters are left standing in engagement with the conveyer, and means for rotating the conveyer, whereby the letters engaged therewith are moved laterally toward one end of the table.

6. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, with a letter feeder or carrier adapted to give forward endwise motion to letters, &c., of a bed or table arranged at one end of the letter-feeder and adapted to support the letters delivered by the feeder and two screw conveyers extending across the path in which the letters are fed, one located in advance of the other, the forward conveyer being located partly below and partly above the table, while the rear conveyer is located at a

higher point and constitutes a stop to arrest the endwise movement imparted to the letters by the feeder, said higher conveyer also serving as a conveying support for the forward ends of the letters, as set forth.

7. In a letter-packer for postmarking-machines, the combination of a bed or table upon which the letters, &c., are delivered by the feeding device of the machine, a shaft below said bed, a spiral blade on said shaft, projecting upwardly through an opening in said bed, a flange attached to the shaft at the delivering end of the blade and projecting upwardly through a slot in the bed, said flange having an opening for the passage of letters through the flange, and tongues or bridges attached to the bed and projecting into circular grooves in the sides of said flange, whereby thin pieces of mail-matter are prevented from falling into the slot in the bed through which said flange projects, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of May, A. D. 1890.

FRANK N. ETHRIDGE.

Witnesses:
H. E. WAITE,
C. F. BROWN.