(No Model.) 2 Sheets—Sheet 1.

M. J. DOLPHIN.

LETTER FEEDING AND SEPARATING MACHINE.

No. 408,405. Patented Aug. 6, 1889.

Fig. 1.

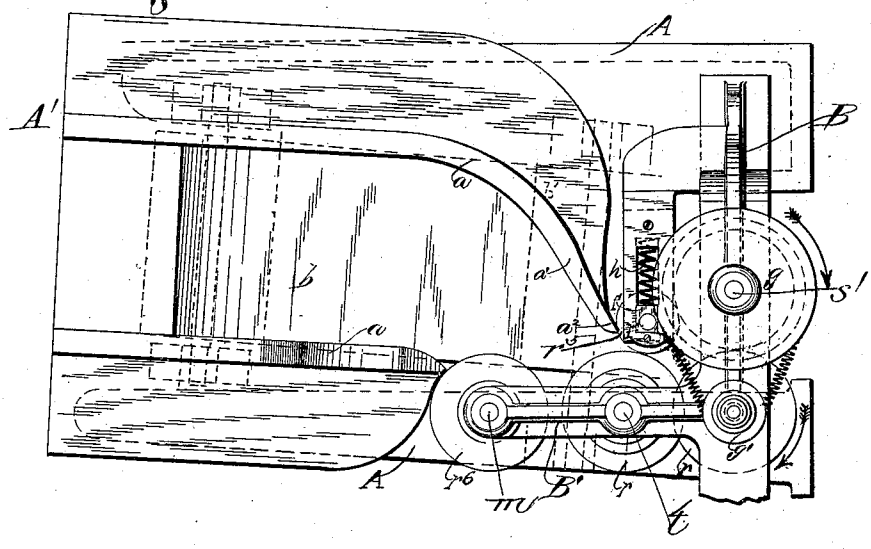
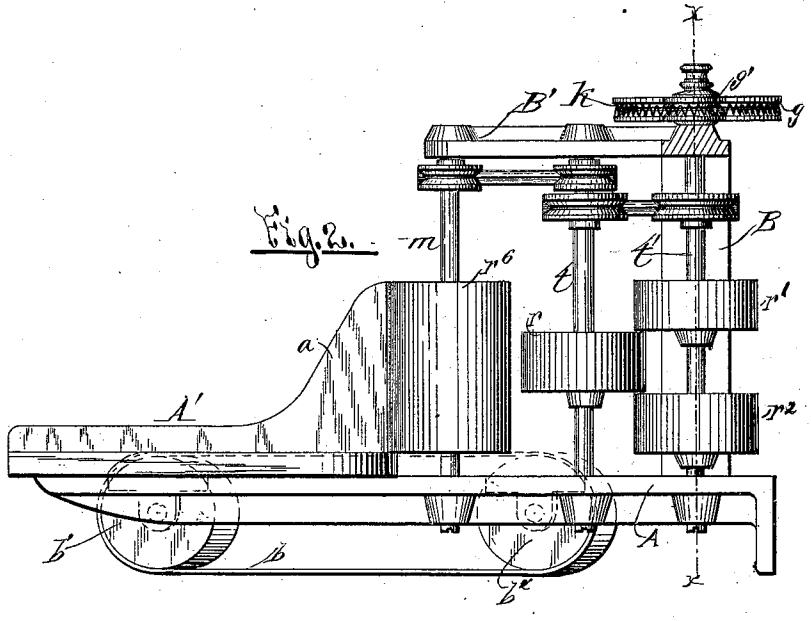


Fig. 2.



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Fig. 3.

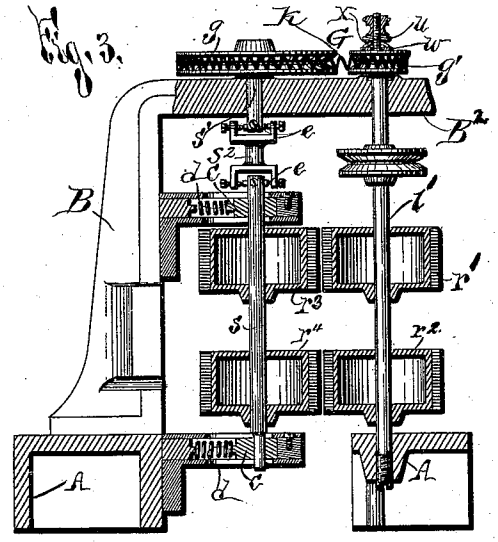


Fig. 5.

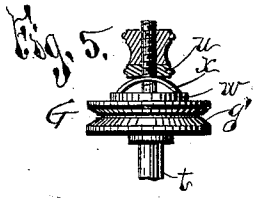


Fig. 4.

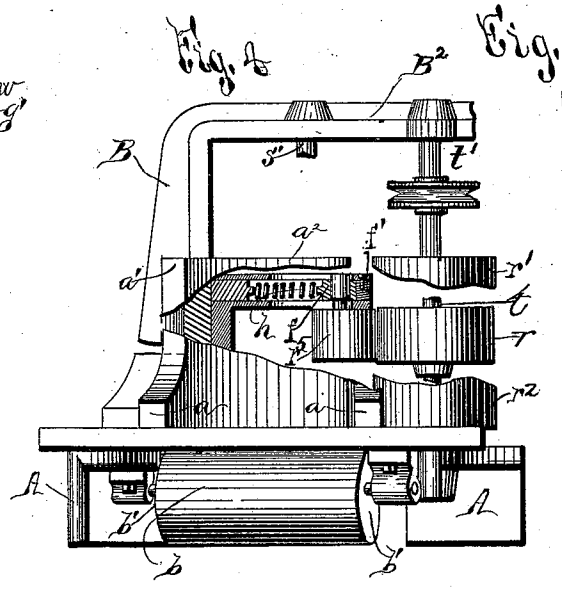
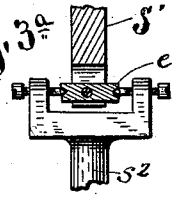


Fig. 3a.



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UNITED STATES PATENT OFFICE.

MATTHEW J. DOLPHIN, OF BROOKLYN, NEW YORK.

LETTER FEEDING AND SEPARATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,405, dated August 6, 1889.

Application filed June 3, 1887. Renewed February 25, 1889. Serial No. 301,163. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW J. DOLPHIN, of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Machines for Separating and Feeding Letters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to certain new and useful improvements in automatic feeding and separating mechanism for letter-marking machines, in which letters in quantities are placed into a feeding-receptacle and fed forward to the marking mechanism; and the objects of my invention are, first, to automatically feed forward the letters to a separating mechanism, and, second, to automatically separate and feed forward but one letter only at a time to the marker, as will be more fully hereinafter described in the specification and specifically pointed out in the claims. These objects are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a top plan view of my improved feeding and separating mechanism, showing the general arrangement and construction of the various parts. Fig. 2 is a side elevation showing the arrangement of feeding-rollers. Fig. 3 is a transverse vertical section on line $x\ x$ of Fig. 2, showing the arrangement of the separating-rollers and their peculiar connections, whereby said rollers are caused to yield for the purpose of permitting letters of varying thicknesses to pass freely through between the separating-rollers. Fig. 3^a is a detail view of the universal-joint connection. Fig. 4 is an end view, partly in section, taken back of the letter-feeding receptacle, showing the arrangement of the yieldingly-journaled check and pressure roller and feed-rollers. Fig. 5 is an enlarged detached view of the frictional device for operating the separating-rollers with varying speed.

In the drawings, the letter A indicates the support or frame upon which is mounted an automatic letter-feeding receptacle A′ for feeding letters placed in quantities therein. This receptacle consists of two parallel side walls $a\ a$ and a horizontal feed-belt b, running on drums $b'\ b'$, journaled in suitable bearings in the support or frame, said belt constituting the bottom of the receptacle. The side walls $a\ a$ serve as guides and supports for the letters, and one of said walls terminates in a curved extension a', with the extending point a^2 in close proximity to the entrance of the feed. The belt b is driven in a slightly-oblique direction, as shown in dotted lines in Fig. 1, the purpose of which will be hereinafter explained. For convenience, I will hereinafter designate these parts the "letter-feeding receptacle."

The positive feeding mechanism consists of three rollers $r\ r'\ r^2$, the former being mounted on the vertical shaft t and the two latter on the vertical shaft t'. The lower ends of these shafts are journaled in suitable bearings made in the support or frame and the upper ends in an arm B′ of a rectangular yoke B.

The separator consists of two rollers $r^3\ r^4$, mounted on a vertical shaft s, journaled in yielding bearings $c\ c$. By reference to Fig. 3 of the drawings it will be seen that the separating-rollers are located opposite the positive feeding-rollers mounted on the shaft t'. It will be noticed that these rollers are arranged in the same horizontal plane and that their inner peripheries are slightly separated. The purpose of the separating-rollers is twofold, serving as pressure-rollers to press a passing letter up to the positive feed-rollers and as a means to separate the letters, so that but one letter at a time can pass through between the two sets of rollers, as will be more fully hereinafter explained.

In the arrangement of the feeding-rollers it will be seen that the rollers $r'\ r^2$ are separated on their shaft by a small space. This is for the purpose of having the roller r, which is mounted on its shaft near the center, project or interlap a short distance between the rollers $r'\ r^2$, the object being to afford a bearing or support for the rear and forward ends of a passing letter of the shortest length used, as hereinafter explained.

The feeding and separating rollers are covered with rubber or other suitable material, in order to secure a frictional hold upon the letters to feed them positively and rapidly.

The shaft s is connected to a short shaft s' by means of a shaft-section s^2 and the uni-

versal joints *e e*. The shaft *s'* is journaled in a bearing made in the arm B^2 of the yoke B, and carries a driving-pulley *g*, which is driven by a belt *k*, running from a grooved pulley *g'* on the shaft *t'*. By means of the yielding bearings and universal-joint connections the separating-rollers are permitted to yield freely in a horizontal plane to allow a free and uninterrupted passage to a letter of varying and uniform thickness, or in an inclined vertical direction to allow letters of uneven thicknesses to be fed through, or to yield in both directions at the same time, so that letters of both varying and uneven thicknesses may be fed through, the said rollers always presenting an even peripheral surface to the letter and constantly exerting a pressure by means of the spirals *d d* sufficient to press the same up to or against the positive feed-rollers located opposite to insure a rapid and positive feed for the letter.

Located substantially opposite to the centrally-mounted feed-roller *r* is a check or hinderance roller r^5, yieldingly journaled in bearings *f f*, made in horizontal brackets *f' f'* of the frame, only one of each being shown, as in Figs. 1 and 4. The function of this roller is to hinder or check the entrance of more than two or three letters at a time to the separator. It also serves as a pressure-roller, by means of the spiral *h*, to press the passing letters up against the feed-roller *r*.

A roller r^6, mounted on a vertical shaft *m*, journaled in rigid bearings, is located opposite the curved extension *a'* and between the end of wall *a* and feed-roller *r*, and serves both as a support and a feed-roller for the letters, it being driven by a belt running from a pulley on the shaft *t*, which in turn is driven by a belt running from a pulley on the shaft *t'*.

The separating-rollers are driven with a variable power and speed by means of a peculiar friction device, (shown in Figs. 3 and 5,) which secures by friction the grooved pulley *g'* to the shaft *t'*. This friction device consists of a leather washer *w*, a steel spring *x*, formed with a collar, and a binding-screw *u*. The pulley *g'* is fitted loosely on the shaft, resting upon a collar formed on said shaft, the washer resting upon the pulley, and the binding-screw serving to bind the whole together by compressing the spring upon the washer, which in turn binds, frictionally, the grooved pulley sufficiently tight on the shaft to drive the rollers r^3 r^4 through the medium of the spring-belt *k* or other connection with the pulley *g* on the shaft *s*. When a very thick letter is being fed through, the resistance of the separating-rollers is increased, which causes an increased strain on the driving-belt *k*. This increased strain overcoming the resistance of the friction device, the pulley *g'* turns on its shaft for an instant without operating the pulley *g* and the separating-rollers.

It will be observed that the shafts carrying the feed-rollers are journaled in stationary bearings, and that it is only the separating-rollers and check-roller that are journaled in yielding bearings.

It is well known that letters are not uniform in width and thickness, owing to the different ways of folding, and frequently unevenness occurs, and it is because of these varying conditions that I arrange the separating and feeding rollers in the manner above described—that is, so that both the separating and feeding rollers might have a frictional hold upon the letters at different points thereon—thereby securing a positive feed for the letters.

It will be evident that the yielding feature and the universal-joint connections of the separator allow the rollers to conform to the varying conditions of the letters.

The separation of the letters depends upon the resistance offered by the surfaces of the separating-rollers, and it will be observed that, although they are driven in the same direction as that of the feed-rollers, the peripheral surface of the separating-rollers at the point of contact with the letters travels in a direction opposite or contrary to the direction of travel of the feed-rollers at the same point, as indicated by the arrows in Fig. 1. This described action of the separating-rollers separates the letters, or, in other words, forces backward all letters but that one which is adjacent to the feeding-rollers and holds them until that letter has been fed through, when the next letter adjacent to the feed-rollers is separated and fed through, the operation continuing until all the letters are separated and fed through. It will be readily understood that this peculiar action is due to the following conditions, viz: As the letters approach the separator only two are permitted to enter between the separating and feeding rollers. The letter adjacent to the feeding-rollers is forced forward by the frictional contact of the rollers with the letter, while the letter adjacent to the separating-rollers is at the same time forced backward by a similar contact exerted by the separating-rollers, it being borne in mind that the inner periphery at the point of contact of the separating-rollers is traveling in a direction opposite to that of the feeding-rollers, this action causing a complete and perfect separation of the letters, made easy by the smoothness of the adjacent surfaces of the two letters.

From the above description the operation of my improved separating and feeding mechanism is readily understood. The letters are placed edgewise longitudinally in quantities in the feeding-receptacle, and, motion being communicated to the feed, the letters are carried forward by the bottom belt, and are guided, one letter slightly in advance of the next following, and so on, by the curved wall, the obliquely-moving belt at the same time deflecting them toward the rollers *r* r^6, so that the letter intended to be fed in first is brought into immediate contact with said rollers, which

support and feed the letters to the separator, the roller r^5 hindering or checking the entrance of all letters but the first two or three, at the same time pressing the letters up to the roller r, which feeds them to the separator, where but two can enter and only one be fed through, the separation being accomplished as hereinbefore described.

By arranging the roller r to interlap between the rollers r' and r^2 the distance between the point of contact of the rollers r^2 $r^\times$ and the point of contact of the rollers r r^5 is somewhat less than the length of the shortest envelope, so that the front and rear ends of the shortest letter used will be equally supported by the rollers r and r^2 until such letter is in firm frictional contact with the rollers r' and r^2.

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

1. An automatic letter-feeding receptacle consisting of a straight wall, a wall partially curved, and an obliquely-moving bottom feed-belt, whereby letters placed in the receptacle are guided, one slightly in advance of the other, and deflected toward feeding-rollers, substantially as specified.

2. The combination, with a letter-separator and feed-rollers, of an automatic letter-feeding receptacle consisting of a straight wall, a wall partially curved, and a moving bottom belt, whereby the moving letters are automatically arranged, one slightly in advance of the other, and are guided and deflected toward and into contact with the feed-rollers, substantially as specified.

3. The combination, with a letter-separator, of an automatic letter-feeding receptacle having a wall partially curved for guiding the letters, one a little in advance of the other, an obliquely-moving bottom feed-belt for deflecting the letters toward the feeding-rollers, and a supporting feed-roller, substantially as specified.

4. In an intermittent letter feeding and separating machine, the combination of the feed-roller r and rollers r' r^2, the roller r arranged to interlap between the rollers r' and r^2, all of said rollers rotating in the same direction, substantially as and for the purpose set forth.

5. In a letter-separating machine, the combination, with the feed-rollers r' r^2, mounted on a shaft journaled in stationary bearings, of the separating-rollers mounted on a shaft journaled in yielding bearings, said shaft connected by a universal joint to a shaft journaled in stationary bearings, substantially as specified.

6. The combination of the stationary journaled feed-rollers, the separating-rollers journaled in yielding bearings and connected by a universal joint to the driving-shaft s, the pulleys g g', and spring-belt k, substantially as specified.

7. The combination, with an automatic letter-feeding receptacle, of a yieldingly-journaled hinderance or check and pressure roller and interlapping feed-rollers, substantially as specified.

8. The combination, with an automatic letter-feeding receptacle, a check and pressure roller, and an interlapping feed-roller, of a letter-separator and feed-rollers, substantially as specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at New York, in the county of New York, in the State of New York.

MATTHEW J. DOLPHIN.

Witnesses:

HERVEY SHELDON,

D. W. C. BROWN.