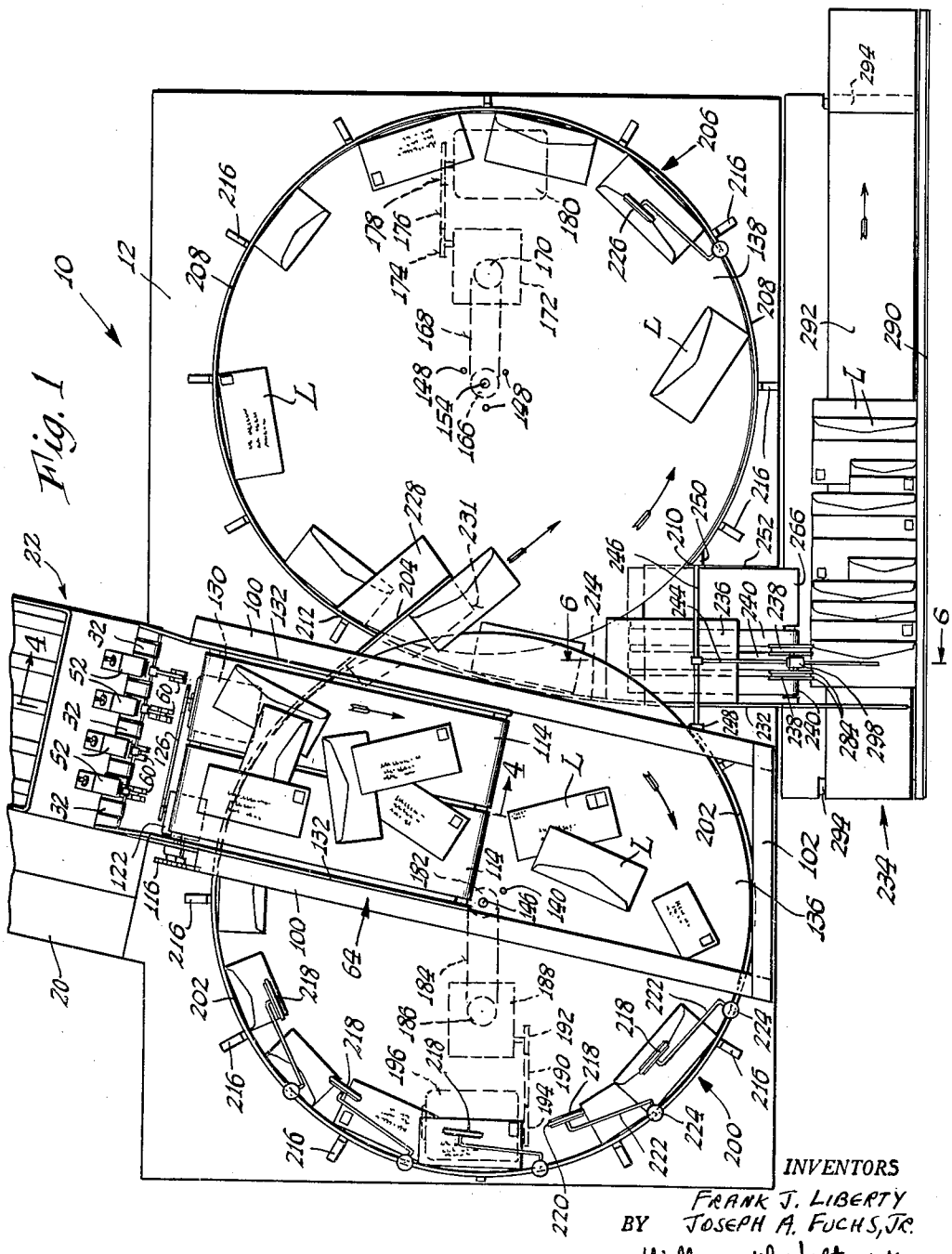
Oct. 30, 1962 F. J. LIBERTY ET AL 3,061,067

MAIL HANDLING DEVICE

Filed March 16, 1960 4 Sheets-Sheet 1

Fig. 1



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MAIL HANDLING DEVICE

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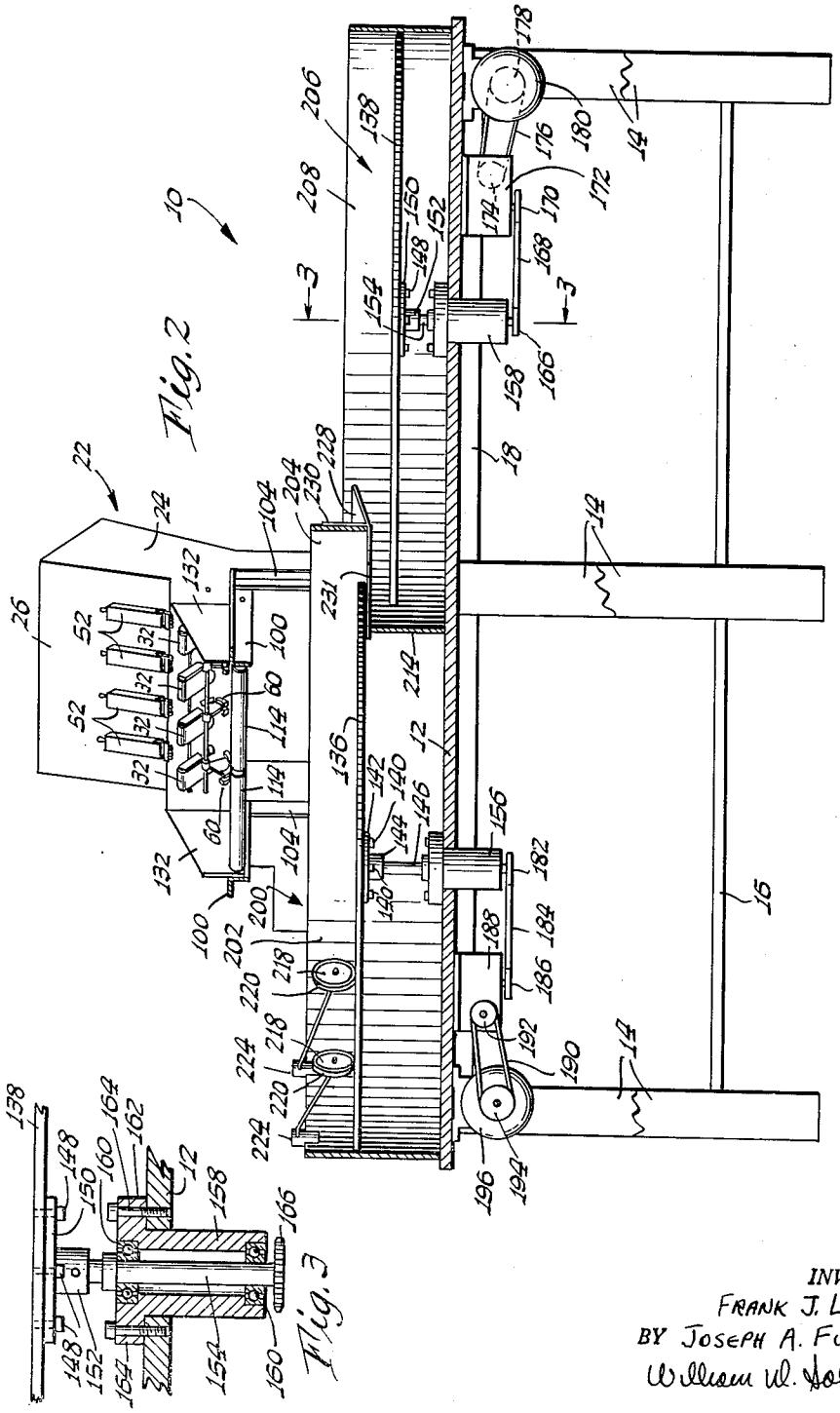


Fig. 2

Fig. 3

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MAIL HANDLING DEVICE

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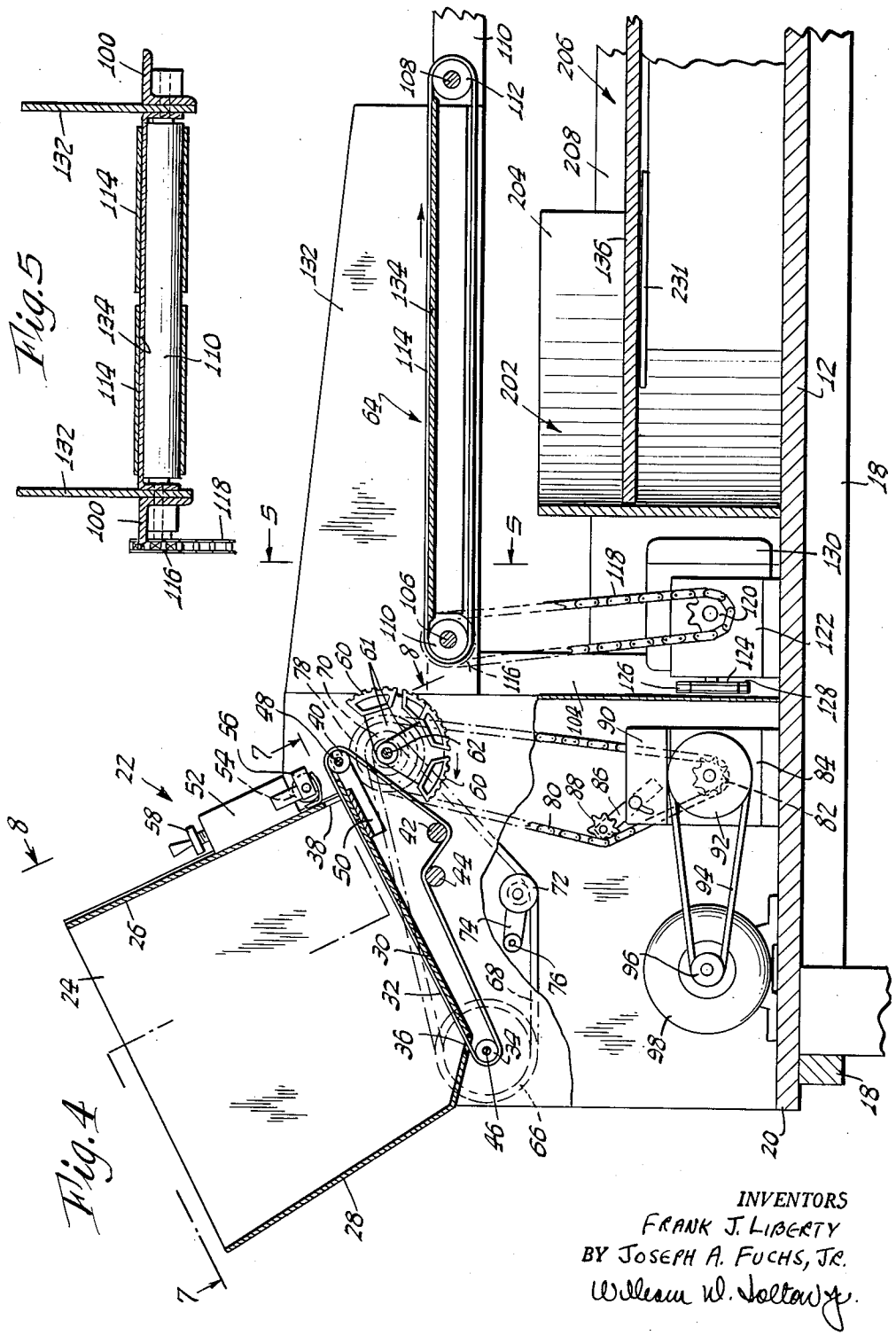


Fig. 4

Fig. 5

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MAIL HANDLING DEVICE

Filed March 16, 1960 4 Sheets-Sheet 4

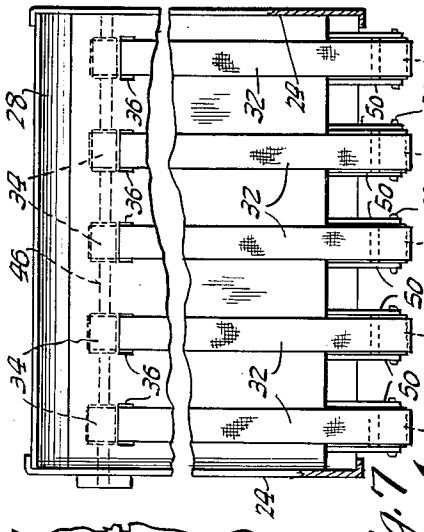


Fig. 7

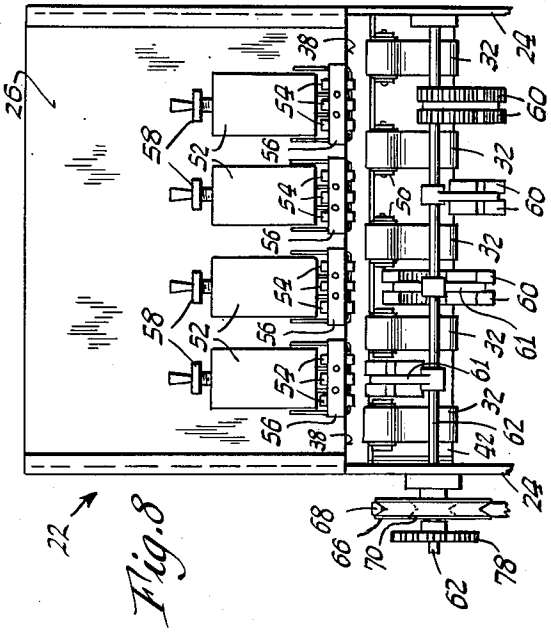


Fig. 8

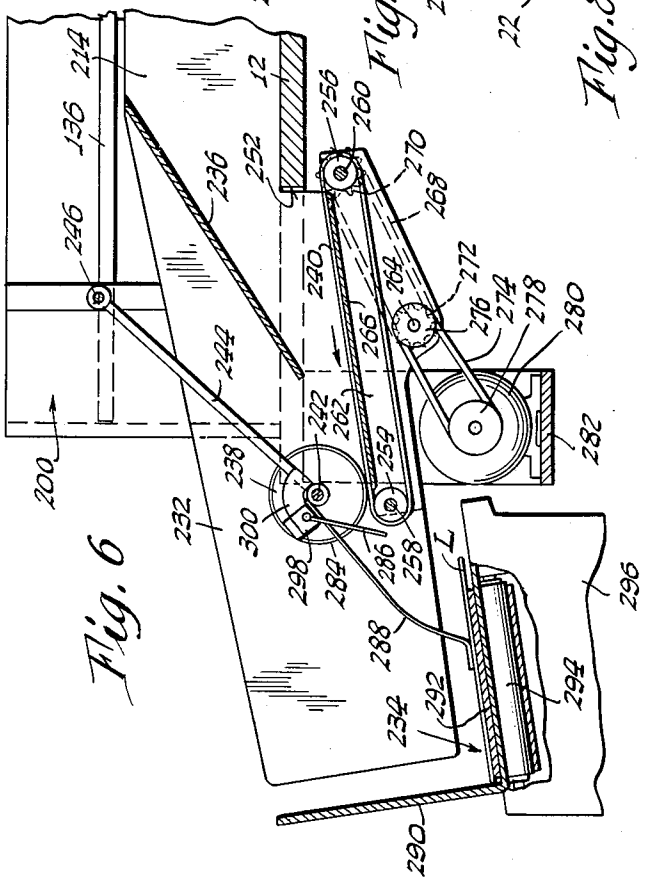


Fig. 6

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United States Patent Office

3,061,067

Patented Oct. 30, 1962

3,061,067
MAIL HANDLING DEVICE

Frank J. Liberty, Glenbrook, Conn., and Joseph A. Fuchs, Jr., Rye, N.Y., assignors to Pitney-Bowes, Inc., Stamford, Conn., a corporation of Delaware

Filed Mar. 16, 1960, Ser. No. 15,336
12 Claims. (Cl. 198—30)

This invention relates to a mail-handling device, and more particularly, to such a device for edging pieces of letter mail preparatory to subsequent mail-processing operations.

Ordinarily, mail to which gummed stamps have been applied, when picked up and delivered to a Post Office for processing, is mixed and non-oriented, and includes packages, newspapers, letter mail, etc. After culling out everything but the letter mail, the latter including post cards as well as filled envelopes, the letter mail must be faced (arranged with the respective gummed stamps facing in one direction and ordinarily with all of the gummed stamps at one corner), cancelled (all of the gummed stamps must be over-printed with a cancellation mark), and sorted (for their destinations and according to air mail, first class mail, etc.). It is common practice, and necessary to accommodate many of the present-day machines for facing, cancelling, sorting and other mail-processing operations, that the letter mail first be put into edged condition (i.e. that the letter mail be oriented with at least one edge of each piece thereof in alignment with a corresponding edge of all of the remaining pieces). This is often done manually and, in the past, has involved at least some kind of manual operation.

It is advantageous, in edging letter mail, that the edged letters be delivered in streamed condition (i.e., with the respective leading edges of the pieces of letter mail delivered in one-by-one sequence). The streaming may be sufficient only that the leading edge of each one of at least most of the letters of the stream is spaced behind the leading edge of the next preceding letter but at times ahead of the trailing edge of the latter. With increased streaming, the leading edge of each letter of the stream will be spaced behind the trailing edge of the next preceding letter.

Accordingly, an object of this invention is the provision of an improved device for edging mixed non-oriented letter mail.

Another object of the invention is to provide a novel device for edging and streaming mixed non-oriented letter mail.

A further object of the invention is the provision of such a device which requires no manual operations from the time the non-oriented letter mail is delivered thereto.

Still another object is to provide such a device which is efficient and simple in operation, inexpensive to construct and capable of handling a comparatively high volume of letter mail per unit time interval.

Further objects and advantages will become apparent as the description proceeds.

An embodiment of the invention is shown in the accompanying drawings wherein:

FIG. 1 is a top plan view of a letter mail edging device incorporating a first rotatable disc and a second rotatable disc according to the invention;

FIG. 2 is a front elevational view thereof, partly in section;

FIG. 3 is a fragmentary sectional view taken along line 3—3 in FIG. 2, and showing the construction of the means rotatably supporting the second disc;

FIG. 4 is an elevational sectional view broken away in part and taken along line 4—4 in FIG. 1, this view showing details of the means for depositing non-oriented pieces of letter mail on the first disc;

FIG. 5 is a fragmentary sectional view taken along line 5—5 in FIG. 4;

FIG. 6 is a fragmentary sectional view taken along line 6—6 in FIG. 1 and showing the delivery portion of the edging machine along with a power stacker;

FIG. 7 is a view partly in section taken along line 7—7 in FIG. 4; and

FIG. 8 is a fragmentary view taken along line 8—8 in FIG. 4.

General Description

The edging device as shown in the drawing includes a rotatable circular disc upon which pieces of mixed non-oriented letter mail are deposited. A guide extends about a substantial portion of the periphery of said disc and then diverges therefrom. The circular disc is rotated at a sufficient speed that the pieces of letter mail deposited thereon are urged in the direction of rotation of the disc by the frictional force between the disc and the pieces of letter mail and in the direction toward the guide by centrifugal force. In this manner the pieces of letter mail are edged against the guide and streamed in the direction of movement of the radially outer margin of the disc whereby the pieces of letter mail are discharged from the disc along the diverging portion of the guide in edged and streamed condition. It will be apparent that the larger the diameter of the disc, the less wieldy it is. For this and other reasons later to be described, the disclosed embodiment of the invention includes a second disc disposed in slightly underhanging, substantially side-by-side relation to the first-named disc. It will be apparent that a single disc having a diameter D occupies substantially more floor area but provides no more peripheral length (circumference) than do two side-by-side discs each having a diameter of

$$\frac{D}{2}$$

According to the disclosed embodiment of the invention, the diverging portion of the guide for the first disc leads to the second disc, and the latter rotates in the direction opposite to that of the first disc. The second disc is provided with a second guide extending about a substantial portion of the periphery of the second disc and then diverging therefrom. It will be apparent that the pieces of letter mail follow substantially a figure-eight path from the time they are deposited on the first disc until they are discharged from the second disc. An additional advantage of two smaller discs over a single larger one emerges when the second disc is rotated at a greater (peripheral) velocity than that of the first disc in that the increased velocity of the second disc increases the magnitude of the streaming of the pieces of letter mail. Of course, only a single peripheral velocity is available at any given time with a single disc.

The stream of edged pieces of letter mail, after it is guided off the second disc by the diverging portion of the second guide surface, can be utilized in a number of different ways. One of these is illustrated in the drawing wherein the diverging portion of the second guide deflects the pieces onto a horizontal belt and against a stop provided by a power stacker. Automatic means are also provided by the power stacker for advancing the belt laterally by increments as the pieces move onto the belt. In this manner, the pieces of mail are overlapped with their leading edges in alignment. With a row of pieces of letter mail so edged, groups of the pieces can be scooped up in edged condition by a workman for inspection or, for example, for loading into a facing and cancelling apparatus such as that disclosed in U.S. patent application Serial No. 784,255 filed on December 31, 1958, by H. S. Hazelton, Jr., now Patent No. 2,947,406.

Detailed Description

Referring to the drawing, an edging device embodying the invention is generally indicated at **10** and includes a table top **12** supported by six legs **14**, the latter being reinforced by attachment to a platform **16** and to reinforcing members **8**. Table top **12** includes an extension **20** on which is supported a feeding unit generally designated by the reference numeral **22**. Feeding unit **22** includes two side walls **24**, **24**, a front wall **26** and a rear wall **28**. Front wall **26**, rear wall **28** and the upper portions of side walls **24**, **24** form, along with a bottom plate **30**, a hopper into which batches of mixed non-oriented pieces of letter mail are dropped from the conventional type of mail bag and/or other containers. As best shown in FIG. 4, the bottom plate **30** of the hopper is inclined upwardly at a substantial angle to the horizontal. As best shown in FIGS. 4, 7 and 8, each one of five mutually spaced, endless belts **32** leads about an individual roller **34**, through an individual aperture **36** at the rear of the hopper, along the bottom plate **30**, through a common elongated aperture **38** at the front of the hopper, about an individual roller **40**, about a common shaft **42**, about a common shaft **44** and back to the respective roller **34**. Rollers **34** are fixed on a common shaft **46**; rollers **40** are rotatably mounted on individual fixed shafts **48**; and each of the shafts **48** is supported by a pair of brackets **50** carried by the bottom plate **30** of the hopper. Shafts **42**, **44** and **46** are bearinged at their ends by side walls **24**, **24**. Shaft **46** is driven in the clockwise direction as viewed in FIG. 4 to drive the upper reaches of the belts **32** in the upward direction along the incline provided by the bottom plate **30** of the hopper. Belts **32** are formed of a high-friction surfaced material such as rubber covered fabric whereby the lowermost non-oriented pieces of letter mail in the hopper are frictionally urged by the belts up the incline. Mounted on the front wall **26** of the hopper are four separator units **52** of well known construction. For the purposes of this description it will suffice to note that each separator unit **52** includes three separator stones **54** fixedly carried by a bracket **56** which is yieldably biased downwardly to a stop position adjusted by a thumb screw **58**. For details of the structure of the separator units **52**, reference may be had to U.S. Patent No. 2,635,874, granted on September 21, 1953, to W. T. LaBore. Ordinarily, the downward stop position to which separator stones **54** are adjusted is about the combined thickness of approximately two or three average-size pieces of letter mail above the outer surfaces of the belts **32**. In this manner, only several pieces of letter mail at a time will clear the separator stones **54**. Each set of three separator stones cooperates with one of four pairs of rubber bumper shoes **60** which are supported by respective brackets **61** in staggered relation about a shaft **62**. Shaft **62** is rotatably supported by side walls **24**, **24** and is driven in the clockwise direction as viewed in FIG. 4 at a velocity such that the peripheral speed of the shoes **60** is substantially greater than the linear speed of the belts **32**. As a result, the pieces of letter mail which have cleared the separator stones **54** will be thrown by the pairs of shoes **60** onto a conveyor generally indicated at **64**.

It will be clear that feeding unit **22** acts, in effect, as a de-clumper in that it delivers pieces of letter mail in unclumped fashion to the conveyor **64** at a roughly regulated rate of flow. Adjustment of this rate of flow can be effected by vertically adjusting the downward stop position of the separator stones **54** of the separator units **52**.

Endless belts **32** are driven by means of a pulley wheel **66** fixed on shaft **46**, this pulley wheel being driven by a V-belt **68** which is also trained about a pulley wheel **70** fixed on shaft **62** and about a tensioning pulley wheel **72**. Pulley wheel **72** is carried by a bracket **74** which is adjustably locked in pivotal position about a stub shaft **76** carried by one of the side walls **24** to tension V-belt **68**. Shaft **62** fixedly carries a sprocket wheel **78** which meshes with a sprocket chain **80**, the latter also being in mesh with a sprocket wheel **82** fixed on the output shaft of a speed reducing unit **84**. A bracket **86** rotatably carrying a sprocket wheel **88** which meshes with the chain **80**, is locked in pivotally adjusted position about its lower end to tension the sprocket chain. The lower end of bracket **86** is pivotally carried by a frame member **90** of the speed reducing unit **84**. An input pulley wheel **92** of the speed reducing unit **84** is driven, in turn, by a V-belt **94** trained about a pulley wheel **96** fixed to the shaft of an electric motor **98**. Speed reducing unit **84** and motor **98** are fixedly supported on table top **12** and table extension **20**.

Referring to FIGS. 1, 2, 4 and 5, conveyor **64** includes a pair of side frame members **100**, **100**, and an end frame member **102** supported by legs **104** fixed to the table top **12**. A pair of spaced shafts **106** and **108**, respectively, are supported for rotation by the frame of the conveyor **64**. A roller **110** is fixed on shaft **106** and a roller **112** is fixed on shaft **108**. A pair of endless belts **114** are trained about rollers **110** and **112**. Shaft **106** fixedly carries a sprocket wheel **116** which is driven by a sprocket chain **118** and sprocket wheel **120**. Sprocket wheel **120** is fixed on the output shaft of a speed reducing unit **122**, the input shaft of which mounts a pulley wheel **124**. A belt **126** drivingly connects pulley wheel **124** and a pulley wheel **128**, the latter being mounted on the shaft of an electric motor **130**. Speed reducing unit **122** and motor **130** are fixed on the table top **12**. Belts **114**, **114** are thereby driven for movement of the upper reaches thereof in the direction of the respective arrows in FIGS. 1 and 4. A pair of upright side guides **132**, **132**, and a platform **134** on which the upper reaches of belts **114**, **114** ride, are also supported by the frame of the conveyor **64**.

The pieces L of letter mail thrown onto the upper reaches of the belts **114**, **114** by bumper shoes **60**, are conveyed forwardly and drop off the end of the conveyor belts onto a first circular disc **136**. Disc **136** is supported for rotation about a vertical axis. A second circular disc **138** is supported for rotation about a vertical axis parallel to and spaced from the axis of rotation of disc **136**. For convenience in distinguishing therebetween, discs **136** and **138** will hereinafter be referred to in this description as the primary disc and the secondary disc, respectively. As is apparent from FIG. 2, secondary disc **138** is disposed in substantially side-by-side relation to the primary disc **136** and at a level slightly below that of the primary disc. Primary disc **136** is fixed, as by screws **140**, to a flange **142** carried by a hub **144** which is pinned to a vertical shaft **146**. Secondary disc **138** likewise is fixed, as by screws **148**, to a flange **150** carried by a hub **152** which is pinned to a vertical shaft **154**. Shafts **146** and **154** are supported for rotation about their respective vertical axes by bearing-supporting members **156** and **158**, respectively.

Bearing-supporting members **156** and **158** are identical with each other and a detailed description of one will suffice for both. Referring to FIG. 3, a ball bearing **160** is supported at each end of the bearing supporting member **158**. Shaft **154** is supported for rotation within member **158** by these ball bearings **160**. Bearing-supporting member **158** has an integral flange **162** fixed by screws **164** to table top **12** thereby to mount member **158** within an aperture in the table top. Bearing-suporting member **156** for the primary disc **136** is similarly mounted within an aperture in table top **12**.

A pulley wheel **166** is fixedly carried at the lower end of vertical shaft **154**. An endless belt **168** is trained about the pulley wheel **166** and about a pulley wheel **170** mounted on the output shaft of a speed reducing unit **172**. The input shaft of the speed-reducing unit **172** carries a pulley wheel **174** driven by a belt **176**, the latter

being driven by a pulley wheel 178 mounted on the shaft of an electric motor 180. In similar fashion, a pulley wheel 182 fixed at the lower end of the vertical shaft 146 drives an endless belt 184, the latter being driven by a pulley wheel 186 mounted on the output shaft of a speed-reducing unit 188. A belt 190 drives a pulley wheel 192 on the input shaft of the speed-reducing unit 188 and is driven by a pulley wheel 194 on the shaft of an electric motor 196.

A guide generally designated at 200 includes an arcuate portion 202 extending from a point adjacent and below the forward end portion of the right hand one of side frame members 100, 100 (as viewed in FIG. 1), about a substantial portion of the periphery of the primary disc 136, to a point adjacent and below the rearward end portion of the same one of the side frame members 100. The guide 200 also includes a substantially straight portion 204 which then diverges along a substantially tangential line from the periphery of the primary disc 136 and leads to a point over the secondary disc 138. A second guide generally designated at 206 includes an arcuate portion 208 extending from one end 210, about a substantial portion of the periphery of the secondary disc 138, to its other end 212. The second guide 206 also includes a portion 214 which extends from the point 212 in diverging relation to the secondary disc 138 thereby to lead away from the disc 138. The guides 200 and 206 are formed of smooth-surfaced steel strip and are retained in place by means of L-shaped brackets 216 which are attached to the respective guides and to the table top 12.

Primary disc 136 is driven in the clockwise direction as viewed in FIG. 1 by motor 196 and the associated transmission described above, and secondary disc 138 is driven in the counterclockwise direction as viewed in this same figure by motor 180 and the associated transmission. The pieces L of letter mail drop onto the primary disc 136 (from conveyor 64) at a radial location on this disc intermediate the center and the peripheral margin thereof. The upper surface of the primary disc 136, as well as the upper surface of the secondary disc 138, is formed of a friction material, such as the surface of ordinary plywood, which provides a coefficient of friction between the upper surface and a piece of letter mail greater than that between two pieces of letter mail. The coefficient of friction between a piece of letter mail and the upper surfaces of the respective discs must be sufficiently high that the pieces of letter mail will be efficiently driven by the respective disc in the direction of rotation of the latter. This same coefficient of friction must be sufficiently low that centrifugal force acting on the pieces will overcome the frictional force between the respective disc and the pieces of letter mail in order that the pieces of letter mail will be efficiently driven radially of the respective disc. The coefficient of friction between the upper surface of each of the discs and a piece of letter mail can be increased by roughening the respective disc surface or decreased by smoothing it. The effect, when the pieces of letter mail are deposited on the rotating primary disc, is to urge the pieces into edged condition against the guide 200 and to stream the pieces in the direction of rotation of the primary disc. In most instances, the pieces of letter mail are rectangular in shape and one of the two longest edges of each piece will ordinarily be edged against the guide 200. It will be noted that since the coefficient of friction between the upper surface of the primary disc 136 and a piece of letter mail is greater than that between two pieces of letter mail, the tendency is for the lowermost one of a plurality of overlapping pieces of letter mail deposited on the primary disc to move forwardly and out from under the remaining ones of the overlapped pieces whereby the streaming effect is enhanced. The action of the rotating primary disc 136 and guide 200, without more, is effective to edge and stream the pieces of letter mail deposited on the primary disc.

In order to improve the efficiency with which the letters are edged while on the primary disc 136, a plurality of presser members 218 is provided. Each presser member 218 takes the form of a roller covered at its outer periphery by a soft rubber strip 220 (see FIGS. 1 and 2). FIG. 1 shows five such rollers 218 disposed in mutually spaced relation along the radially outer margin of the primary disc 136. Mounting means is provided for each roller 218, this mounting means taking the form of a crank-shaped rod 222. Each roller 218 is carried at the lower end of one of the rods 222 for rotation about an axis intersecting the axis of rotation of the primary disc 136. The upper end of each rod 222 is carried by a cylindrical block 224 for free pivotal movement of the rod about this upper end. Each block 224 is releasably secured in any suitable manner to the uppermost portion of guide 200.

Under its own weight and that of the associated rod 222, each roller 218 is yieldably urged against the primary disc 136. Therefore, as the pieces of letter mail pass under each roller 218, these pieces are pressed by that roller into firmer driven engagement with the primary disc. Since each roller 218 rotates about an axis intersecting the axis of rotation of the primary disc 136, each roller 218 will urge the pieces of letter mail thereunder horizontally in the direction perpendicular to the axis of rotation of that roller thereby tending to drive the respective pieces of letter mail toward and into edged condition against the guide 200. It will therefore be apparent that each roller 218 acts to improve the edging efficiency of the primary disc and to improve the driving force exerted by the primary disc against the pieces of letter mail. The efficiency with which the pieces of letter mail are streamed by the primary disc is also improved by the rollers 218 in that, since they are idler rollers and do not rotate frictionlessly on their respective rods 222, they will tend to apply a slight retarding effect on the uppermost ones of the pieces of letter mail passing thereunder. This slight retarding force on a single piece of letter mail passing thereunder will be small as compared with the increase in driving force exerted by the primary disc on the single piece of letter mail. When, for example, two overlapping pieces of letter mail pass under one of the presser rollers 218, the combination of the increased driving force of the disc against the lower piece of letter mail, the retarding force of the roller 218 against the upper piece of letter mail, and slippage between the overlapping pieces of letter mail (due to the lower coefficient of friction therebetween), leads to an increased tendency for the lowermost piece to move forwardly out from under the remaining pieces. The result is an improvement in the streaming efficiency of the first disc.

The diverging portion 204 of the guide 200 directs the stream of edged pieces of letter mail to a location above the secondary disc 138 and in the direction of rotation of the latter. After clearing the end of the diverging portion 204 of the guide 200, the pieces of letter mail gravitate to the upper surface of the secondary disc 136 at a location as close to the periphery of the disc 136 as is practical in order to ensure that the pieces of the largest width to be handled by the edging device 10 will clear the end 210 of guide 206. The stream is directed by the diverging portion 204 of the guide 200 in substantially the direction of movement of the respective portions of the secondary disc 138 on which the pieces of letter mail are deposited. The combination of the frictional force exerted by the secondary disc, the resulting centrifugal force, and the inertial force of the pieces of letter mail, act to urge the latter in the direction of rotation of the secondary disc and into edged condition against the guide 206. From the time the pieces of letter mail leave the end of guide portion 204 until they land on the secondary disc, any overlapping ones of these pieces tend to separate in the vertical direction because they are then, for the most part, free of vertically upward forces there-

against. In this regard, since the pieces of letter mail, as they move from the primary to the secondary disc, are in an unstable state and are unsupported by vertically upward forces, there is virtually no resistance to any tendency for them to separate whereas any movement of one piece against another results in deflection of the latter away from that one piece. This is believed to aid in the streaming effect on the pieces of letter mail because the frictional forces therebetween are correspondingly reduced permitting greater acceleration of a lowermost piece out from under one or more overlapping pieces when said lowermost piece moves into driven engagement with the secondary disc.

As noted above, one of the two longest edges of each piece will ordinarily be edged against the guide **200** for the primary disc **136**. The forces acting on the pieces of letter mail, as they land on the secondary disc **138**, act to bring the opposite one of these two longest edges of each piece into edged condition against the guide **206** for the secondary disc **138**. Since the widths of the pieces of letter mail vary from piece to piece, the consequent lateral shifting or shuffling of any overlapped pieces of the stream tends to aid the edging and streaming efficiency of the device **10**.

The primary and secondary discs **136** and **138**, respectively, are driven at rotational speeds sufficient that the pieces of letter mail continue to slip relative to the respective discs throughout their entire figure-eight path of movement along the radially outer margins of the discs. By driving the secondary disc **138** at a peripheral speed greater than that of the primary disc **136**, the edging and streaming effects are correspondingly increased on the secondary disc. Considering further the aspects of two substantially side-by-side discs as opposed to a single disc, a single disc is less wieldy and occupies more floor space as compared with two side-by-side discs which provide the same overall peripheral length, as previously noted.

A single presser member or roller **226** is mounted for cooperation with the secondary disc **138** in a manner and by means identical to that of each of the presser members **218** which cooperate with the primary disc **136**. Presser members **218** and **226** also provides the additional advantage of counteracting any tendency for the pieces of letter mail to "plane" upwardly away from driven engagement with the discs. This planing tends to occur to lighter pieces such as post cards which have a leading edge bent upwardly thereby creating an airfoil effect. Further to counteract this planing of the pieces of letter mail, a deflector **228** (see FIG. 2) is provided at the exit portion of the secondary disc **138**. Deflector **228** is inclined in a downward direction to deflect any planing pieces back toward the secondary disc. Deflector **228** is integral with an upstanding portion **230** which is attached to the diverging portion **204** of the guide **200** for the primary disc **136**. A guard **231** may be fixed to the diverging portion **204** of the guide **200**, as shown in FIGS. 1, 2 and 4, physically to isolate the stream of edged pieces of letter mail at the beginning of the diverging portion **214** of the guide **206** from the adjacent portion of the primary disc **136**.

The stream of edged pieces of letter mail which issues from the edging device **10** along the diverging portion **214** of the guide **206** for the secondary disc **136**, can be utilized in a number of different ways. One of these is illustrated in the drawing (see FIGS. 1 and 6). The diverging portion **214** of the guide **206** is integral with an extension **232** that leads over the side edge of table top **12** to a location over a power stacker generally designated at **234**. As the stream of pieces of letter mail leave the secondary disc **138** in edged condition against the diverging portion **214** of the guide **206**, they are deflected slightly downwardly by a rigid deflector **236**, the latter being supported in cantilever fashion by guide extension **232**. Deflector **236** deflects the pieces of letter mail into the bite between a pair of idler rollers **238, 238** and three driven endless belts **240**. Idler rollers **238, 238**, are rotatably supported on a shaft **242** carried at the end of a rod **244**. The upper end of the rod **244** is fixed to another rod **246** pivotally supported at its ends by two bearings **248** and **250**, respectively. Bearing **248** is fixed to the inlet end of guide **200**, and bearing **250** is fixed to the inlet end of guide **206**. Belts **240** are supported, directly below a rectangular cut-out portion **252** of the table top **12**, by two spaced rollers **254** and **256**, respectively. Roller **254** is rotatable about a shaft **258**, and roller **256** is fixed on a rotatable shaft **260**. Shaft **258** is fixed at its ends to a pair of mirror-image brackets **262** (only one of which can be seen in FIG. 6), and shaft **260** is rotatably supported at its ends by these brackets **262**. Brackets **262** also support a rotatable shaft **264** and a platform **266**, the latter providing support for the upper reaches of the endless belts **240**. An endless, ribbed, rubber belt **268** drives a toothed pulley wheel **270** fixed on shaft **260** and is driven by a toothed pulley wheel **272** fixed on the shaft **264**. An endless V-belt **274** drives a pulley wheel **276** fixed on shaft **264** and is driven by a pulley wheel **278** fixed on the shaft of an electric motor **280**. Motor **280** is supported by a U-shaped hanger **282** secured to the underside of the table top **12** and drives the endless belts **240** in the direction indicated by the arrow in FIG. 6. Each of the rollers **238** is formed of a material such as steel and is covered by a pair of strips **284** of friction material such as soft rubber. Under the force of gravity, rollers **238** are yieldably urged downwardly about the pivotal axis of rod **246** and into driven engagement with belts **240**. The pieces of letter mail, under their own inertia and the driving force of rollers **238** and belts **240**, first trip a switch arm **286**, then are downwardly deflected by a flexible deflector **288**, and strike a stop defined by a guide wall **290** of the power stacker **234**. Deflector **288** also provides the functions of preventing bouncing of the pieces of letter mail when they strike guide wall **290** by exerting a frictional force against the pieces, and presses the pieces downwardly into engagement with a stacker belt **292** of the power stacker **234**.

Power stacker **234** is of well known construction and therefore need not be particularly described herein. For the purposes of this description it will suffice to note that the stacker belt **292** is endless and travels about a pair of spaced rollers **294** (only one of which is shown in FIG. 6) rotatably supported by a frame **296**. By conventional drive means (not shown), the upper reach of the stacker belt is moved a constant increment in the direction of the arrow in FIG. 1 each time this drive means is energized. A normally open electrical switch **298** is operatively connected to energize this drive means each time the switch arm **286** is tripped. Switch **298** is carried by a bracket **300** fixed to pivotal rod **244**.

It will be clear that the streaming efficiency of the primary disc **136** alone and in combination with the secondary disc **138**, is partly a function of the rate at which pieces of letter mail are deposited on the primary disc. That is, for example, if hundreds of pieces of letter mail were to be suddenly deposited on the primary disc, they would be driven off both the primary and the secondary discs before sufficient time had elapsed to effect sufficient streaming that the leading edge of each piece was spaced behind the trailing edge of the next preceding piece. By vertically adjusting the downward stop position of the separator stones **54** of the separator units **52** of the feeding unit **22**, as described above, however, the desired streaming efficiency of the primary disc alone and in combination with the secondary disc, can be achieved.

Since many changes could be made in the embodiment of the invention as particularly described and shown herein without departing from the scope of the invention, it is intended that this embodiment be considered as exemplary and that the invention not be limited except as warranted by the following claims.

What is claimed is:

1. A letter-mail edging device comprising a circular disc, an arcuate guide extending about a substantial portion of the periphery of said disc, the upper surface of said disc being formed of material providing coefficient of friction between said upper surface and a piece of letter mail greater than that between two pieces of letter mail, means for rotating said disc about an axis at a sufficient velocity that pieces of letter mail deposited on said disc are urged in the direction of rotation of the disc and into edged condition against said arcuate guide, a presser member, and means mounting said presser member for yieldable urging of the presser member against said disc at the radially outer margin thereof whereby pieces of letter mail passing under said presser member are yieldably urged against the disc.

2. The device as set forth in claim 1 wherein said presser member comprises a roller and wherein said mounting means supports said roller for rotation about an axis intersecting the axis of rotation of said disc.

3. A letter-mail edging device comprising a circular disc, means providing an arcuate guide surface extending about a substantial portion of the outer periphery of said disc, the upper surface of said disc being formed of material providing a coefficient of friction between said upper surface of the disc and a piece of letter mail greater than that between two pieces of letter mail, means for rotating said disc about an axis at a sufficient velocity that pieces of letter mail deposited on said disc are urged in the direction of rotation of the disc and into edged condition against said arcuate guide, a plurality of presser members disposed in mutually spaced relation along the radially outer margin of said disc, and means mounting said presser members for yieldable urging of the presser members against said disc whereby pieces of letter mail passing under each of the presser members are yieldably urged by the latter against the disc.

4. The device as set forth in claim 3 wherein each of said presser members comprises a roller and wherein said mounting means supports each of said rollers for rotation about an axis intersecting the axis of rotation of said disc.

5. A letter-mail edging device comprising a first circular disc and a second circular disc, a first guide extending about a substantial portion of the periphery of said first disc and then diverging therefrom, a second guide extending about a substantial portion of the periphery of said second disc and then diverging therefrom, the upper surfaces of said first and second discs each being formed of material providing a coefficient of friction between each of said upper surfaces and a piece of letter mail greater than that between two pieces of letter mail, means for rotatably driving said first disc at a sufficient velocity that non-oriented pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide, the diverging portion of said first guide surface leading to said second disc, and means for rotatably driving said second disc at a sufficient velocity that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide.

6. A letter-mail edging device comprising a first circular disc supported for rotation, a second circular disc supported for rotation at a level below that of said first disc, a first guide extending about a substantial portion of the periphery of said first disc and then leading to said second disc, a second guide extending about a substantial portion of the periphery of said second disc and leading away from said second disc, means for rotatably driving said first disc at a sufficient velocity that non-oriented pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide, and means for rotatably driving said second disc at a velocity greater than that of said first disc and sufficient that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide.

7. A letter-mail edging device comprising a first circular disc supported for rotation about a first axis; a second circular disc supported at a level below that of said first disc and for rotation about a second axis spaced from and parallel to said first axis, a first guide extending about a substantial portion of the periphery of said first disc and leading to said second disc; a second guide extending about a substantial portion of the periphery of said second disc and then leading away from said second disc; means for rotatably driving said first disc at a sufficient velocity that non-oriented pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide; and means for rotatably driving said second disc, in the rotational direction opposite to that of said first disc, at a velocity greater than that of said first disc and sufficient that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide.

8. A device for edging and streaming pieces of letter mail; said device comprising a circular disc; a guide extending about a substantial portion of the periphery of said disc and then diverging therefrom; a hopper for receiving batches of mixed non-oriented pieces of letter mail; means for delivering a flow of non-oriented, unclumped pieces of letter mail from said hopper for deposit on said disc; means for rotatably driving said disc at a sufficient velocity that the pieces of letter mail deposited on said disc are streamed in the direction of rotation of said disc and into edged condition against said guide; a plurality of presser members disposed in mutually spaced relation along the radially outer margin of said disc; and means mounting said presser members for yieldable urging of the presser members against said disc whereby pieces of letter mail passing under each of the presser members are yieldably urged by the latter against the disc.

9. A letter-mail edging device comprising a first circular disc supported for rotation about a first axis; a second circular disc supported at a level below that of said first disc and for rotation about a second axis spaced from and parallel to said first axis; a first guide extending about a substantial portion of the periphery of said first disc and then diverging therefrom toward a location above said second disc; a second guide extending about a substantial portion of the periphery of said second disc and then leading away from said second disc; means for rotatably driving said first disc at a sufficient velocity that pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide; and means for rotatably driving said second disc, in the rotational direction opposite to that of said first disc, at a velocity greater than that of said first disc and sufficient that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide; the diverging portion of said first guide surface directing the pieces of letter mail in substantially the direction of movement of the respective portions of the second disc on which the pieces of letter mail are deposited.

10. A letter-mail edging device comprising a first circular disc supported for rotation about a first axis; a second circular disc supported at a level below that of said first disc and for rotation about a second axis spaced from and parallel to said first axis; a first guide extending about a substantial portion of the periphery of said first disc and then diverging therefrom toward a location above said second disc; a second guide extending about a substantial portion of the periphery of said second disc and then leading away from said second disc; the upper surfaces of said first and second discs each being formed of material

providing a coefficient of friction between each of said upper surfaces and a piece of letter mail greater than that between two pieces of letter mail; means for rotatably driving said first disc at a sufficient velocity that pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide; means for rotatably driving said second disc, in the rotational direction opposite to that of said first disc, at a velocity greater than that of said first disc and sufficient that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide; the diverging portion of said first guide directing the pieces of letter mail in substantially the direction of movement of the portion of the second disc on which the pieces of letter mail are deposited; a presser member for each of said discs; and means mounting said presser member for yieldable urging of each of the presser members against the respective one of said discs at the radially outer margin thereof whereby pieces of letter mail passing under each of the presser members are yieldably urged by the latter against the respective one of said discs.

11. A letter-mail edging device comprising a first circular disc supported for rotation about a first axis; a second circular disc supported at a level below that of said first disc and for rotation about a second axis spaced from and parallel to said first axis; a first guide extending about a substantial portion of the periphery of said second disc and then leading to said second disc; a second guide extending about a substantial portion of the periphery of said second disc and then leading away from said second disc; a hopper for receiving batches of mixed non-oriented pieces of letter mail; means for delivering a flow of non-oriented, unclumped pieces of letter mail from said hopper for deposit on said first disc; means for rotatably driving said first disc at a sufficient velocity that the pieces of letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide; means for rotatably driving said second disc, in the rotational direction opposite to that of said first disc, at a velocity greater than that of said first disc and sufficient that the pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide; a presser member for each of said discs; and means mounting said presser members for yieldable urging of each of the presser members against the respective one of said discs at the radially outer margin thereof whereby pieces of letter mail passing under each of the presser members are yieldably urged by the latter against the respective one of said discs.

12. A letter-mail edging device comprising a first circular disc supported for rotation about a first axis; a second circular disc supported at a level below that of said first disc and for rotation about a second axis spaced from and parallel to said first axis; a first guide extending about a substantial portion of the periphery of said first disc and leading to said second disc; a second guide extending about a substantial portion of the periphery of said second disc and then leading away from said second disc; means for rotatably driving said first disc at a sufficient velocity that pieces of non-oriented letter mail deposited on said first disc are urged in the direction of rotation of the latter and into edged condition against said first guide; means for rotatably driving said second disc, in the rotational direction opposite to that of said first disc, at a velocity greater than that of said first disc and sufficient that pieces of letter mail deposited on the second disc from said first disc are urged in the direction of rotation of the second disc and into edged condition against said second guide; a presser member for each of said discs; and means mounting said presser members for yieldable urging of each of the presser members against the respective one of said discs at the radially outer margin thereof whereby pieces of letter mail passing under each of the presser members are yieldably urged by the latter against the respective one of said discs.

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