Oct. 11, 1938. O. E. WOLFF 2,133,264

MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

Filed Oct. 8, 1936 6 Sheets-Sheet 1

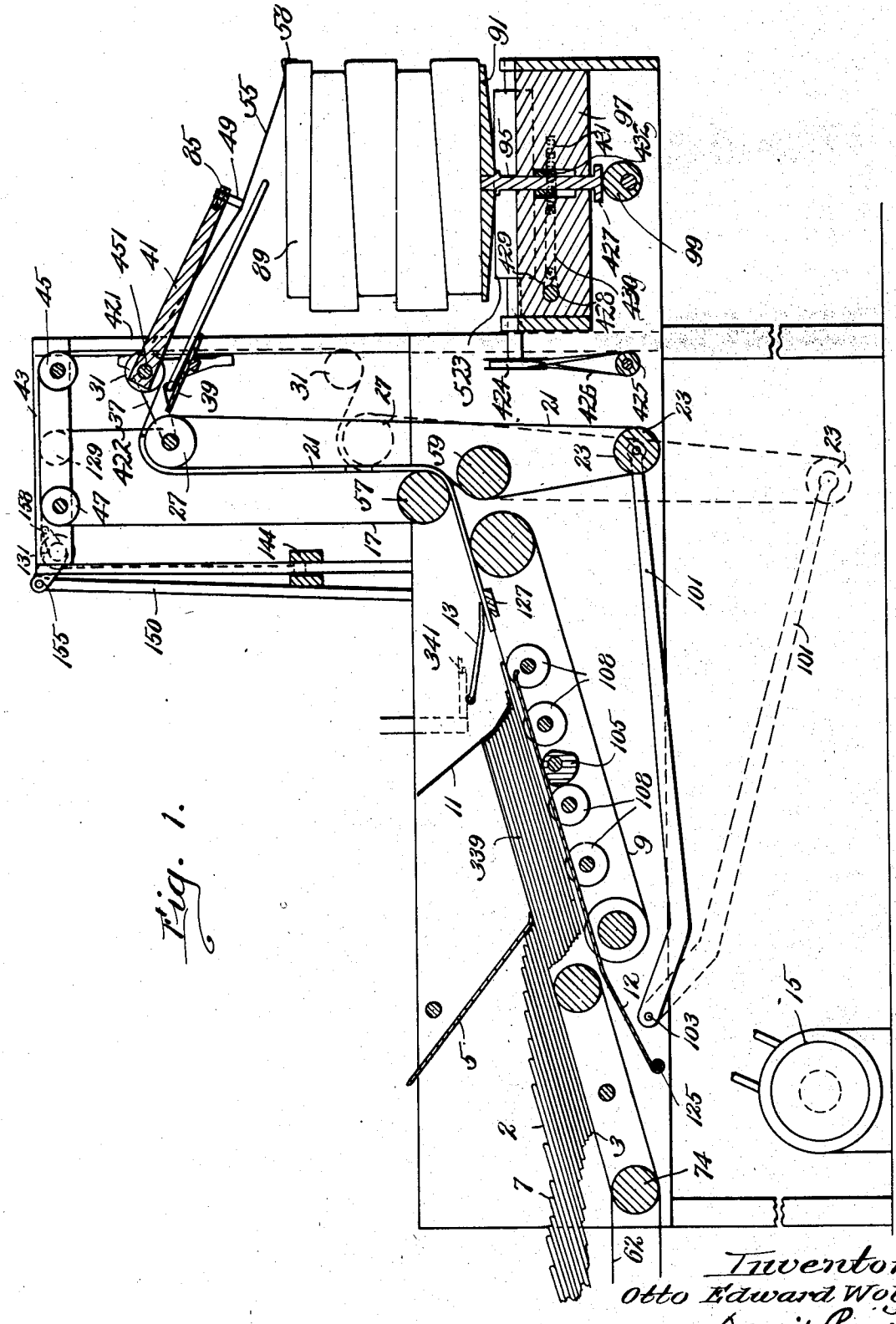


Fig. 1.

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MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

Filed Oct. 8, 1936 6 Sheets-Sheet 2

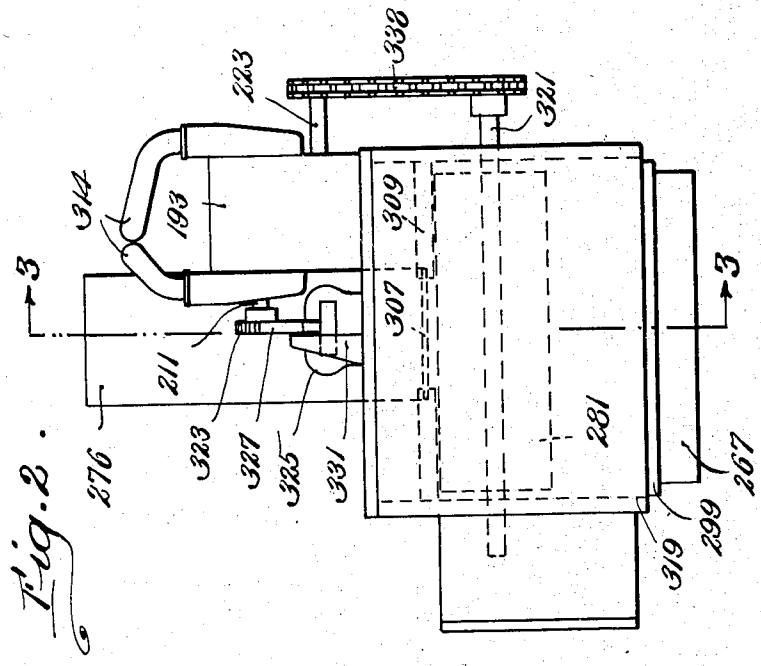


Fig. 2.

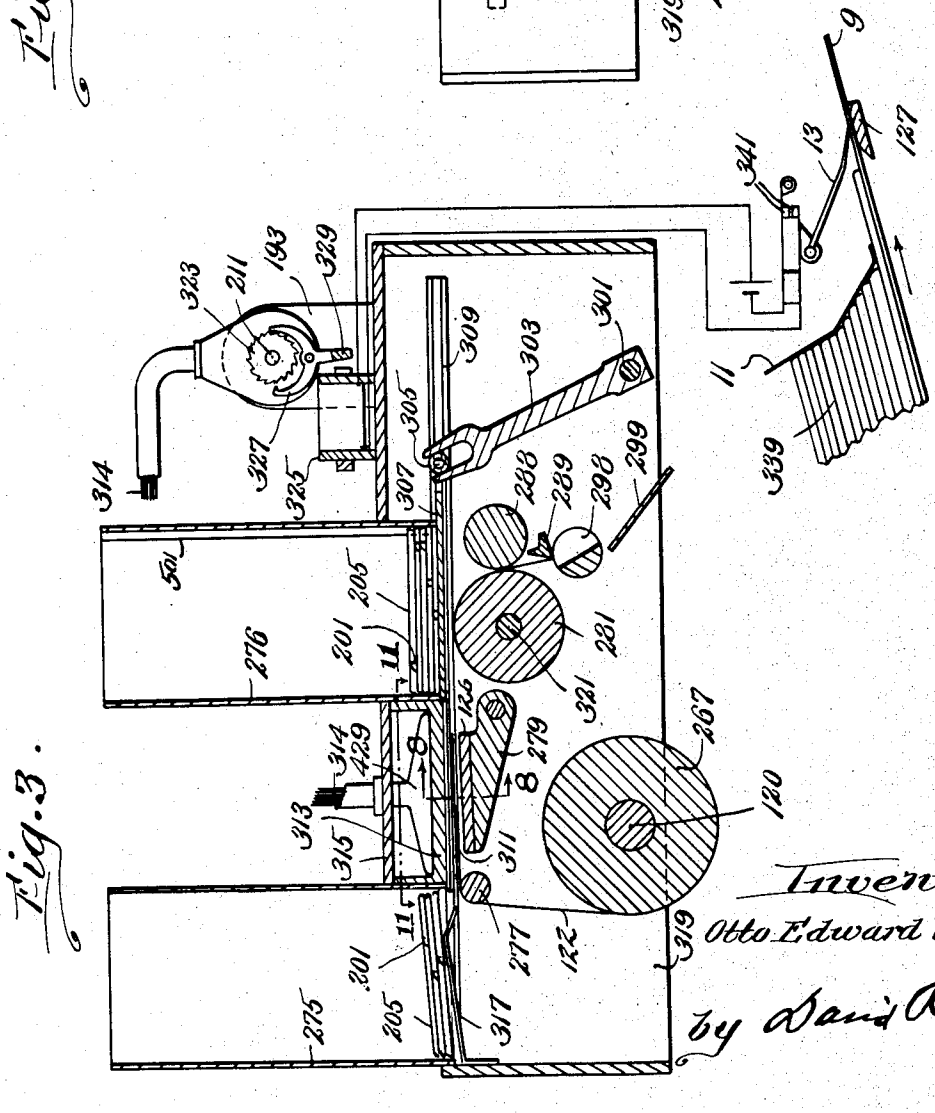


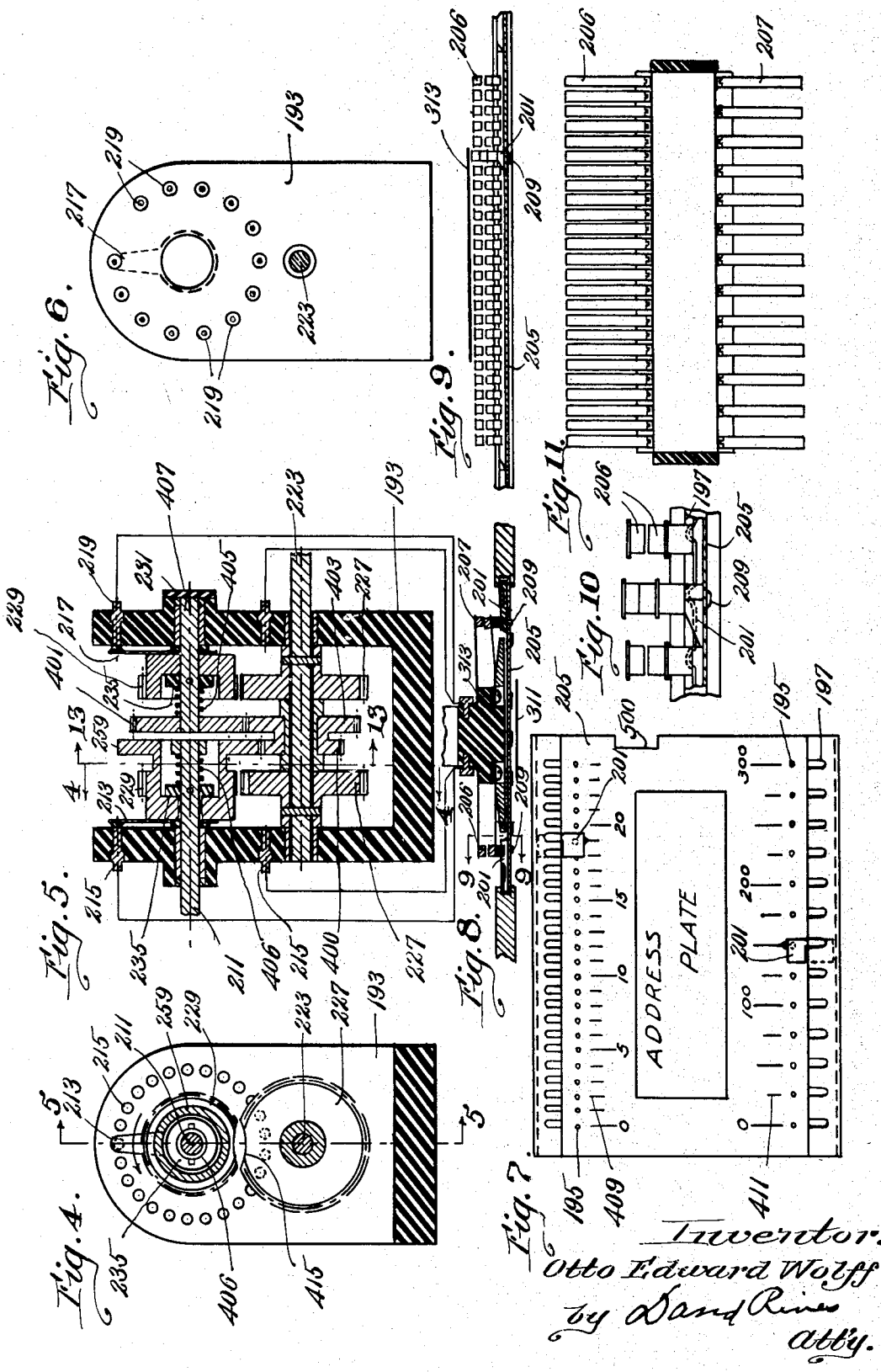
Fig. 3.

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MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

Filed Oct. 8, 1936 6 Sheets-Sheet 3



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Oct. 11, 1938. O. E. WOLFF 2,133,264

MACHINE FOR SEPARATING COUNTING, AND DELIVERING SHEET MATERIAL

Filed Oct. 8, 1936 6 Sheets-Sheet 4

Fig. 12.

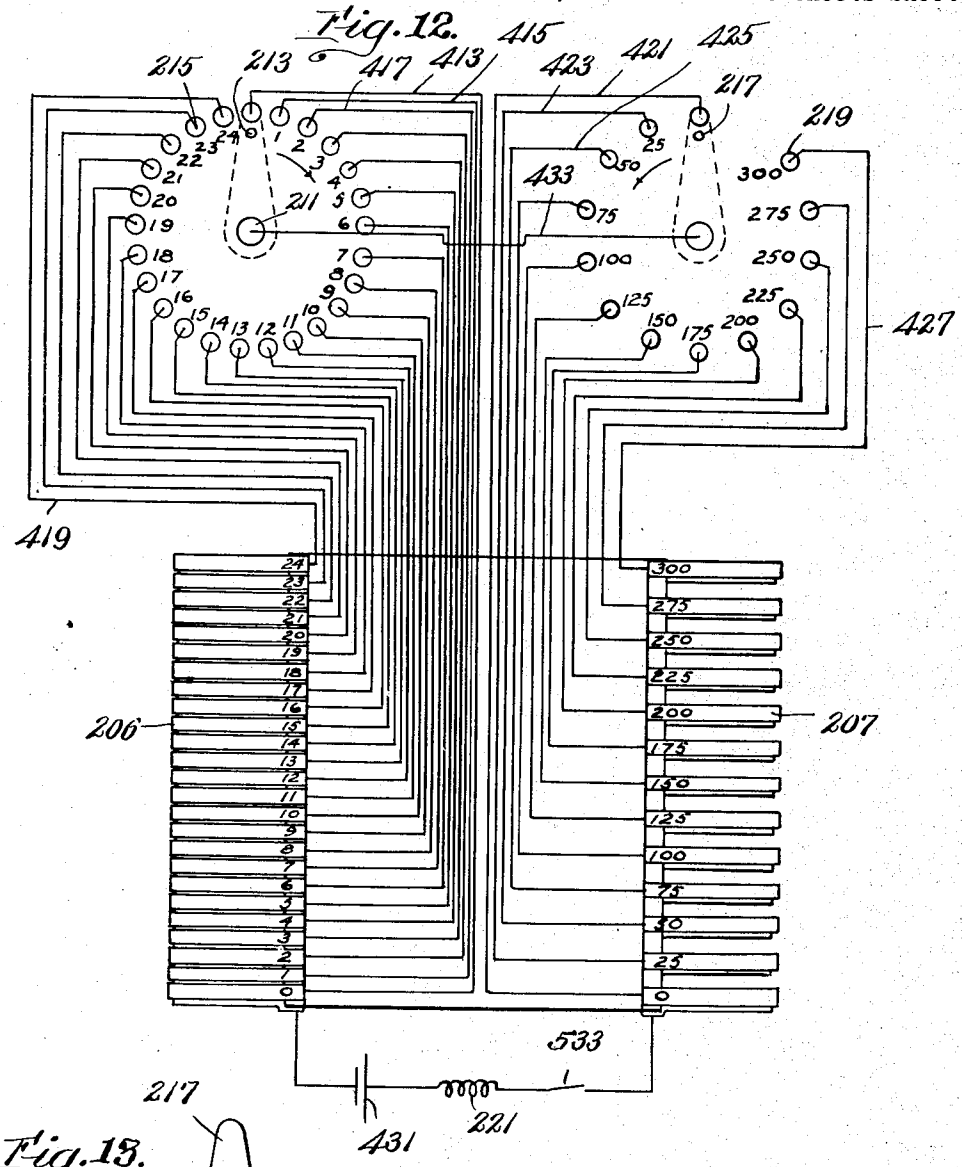
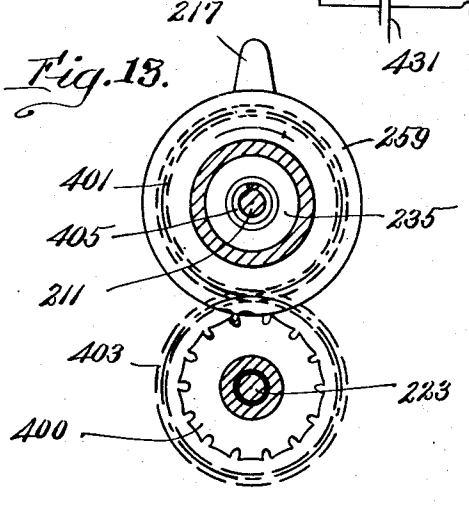


Fig. 13.



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MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

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Fig. 14

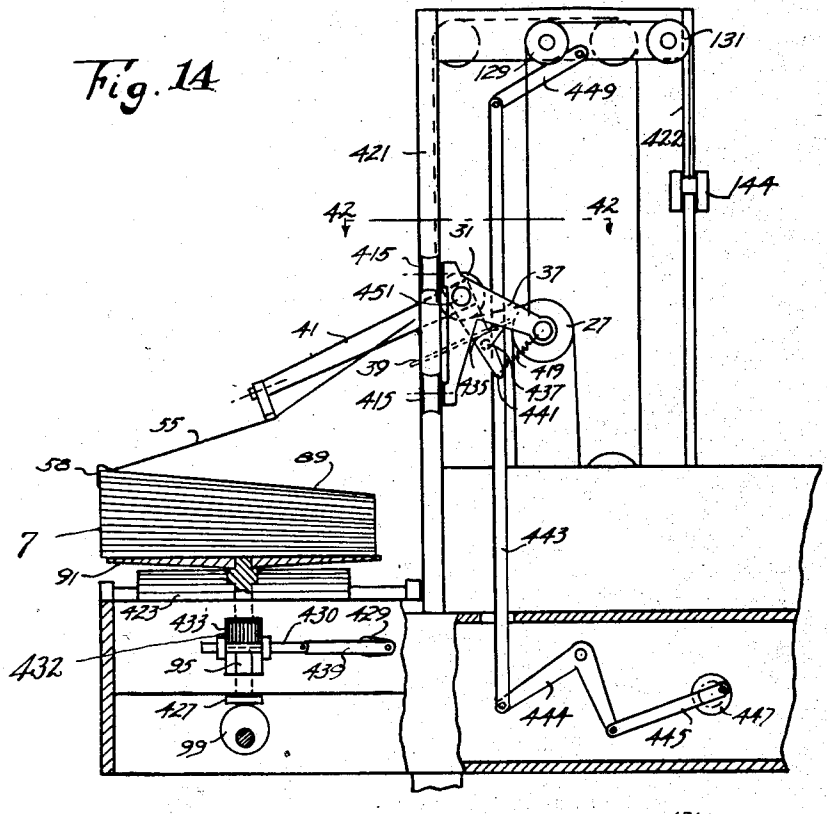
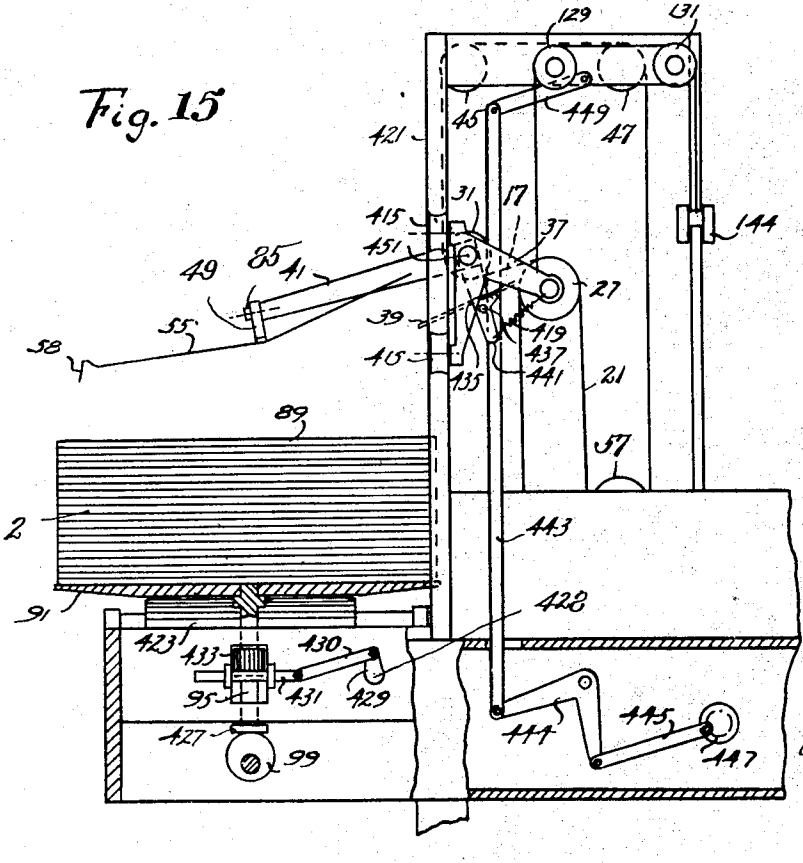


Fig. 15



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MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

Filed Oct. 8, 1936 6 Sheets-Sheet 6

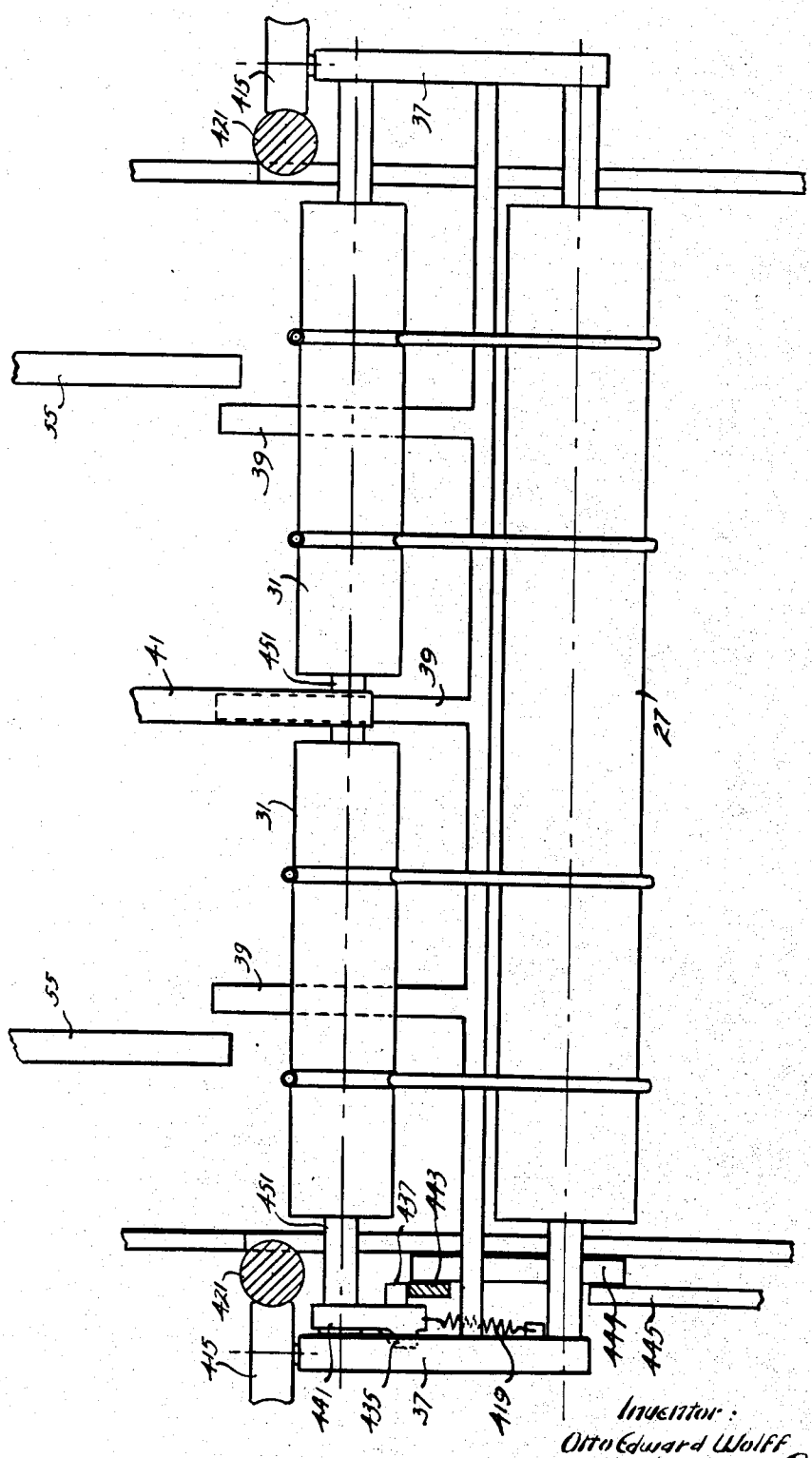


Fig. 16

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Patented Oct. 11, 1938

2,133,264

UNITED STATES PATENT OFFICE

2,133,264

MACHINE FOR SEPARATING, COUNTING, AND DELIVERING SHEET MATERIAL

Otto Edward Wolff, Belmont, Mass., assignor, by mesne assignments, to Paul S. Bauer, Belmont, Mass., trustee of the R. S. Bauer Trust

Application October 8, 1936, Serial No. 104,628

11 Claims. (Cl. 93—93)

The present invention relates to means for handling sheet material, and more particularly such sheet material as newspapers and periodicals.

As newspapers, for example, are delivered from the press, they are collected into bundles containing the proper number to be forwarded to the various newsdealers, and the bundles are then usually wrapped in preaddressed wrappers. These operations have heretofore been performed partly or wholly by hand.

An object of the present invention is to provide a new machine for automatically performing several or all of the various operations of separating the newspapers or other sheet material, counting them out, and delivering the counted objects.

A further object is to provide novel mechanism for performing any or all of the above-described operations.

The present invention relates also to counting machines, and more particularly to machines for counting newspapers or other sheets.

It is desirable, in newspaper printing, to count automatically the number of papers actually reaching the mailing room from the press room. Such proposals as have heretofore been made for automatic counting of the newspapers, in the condition that they reach the press room, have not, however, proved satisfactory, so that they are still counted by human attendants. This is inaccurate and relatively slow.

Another object of the invention, therefore, is to provide a new and improved counter for sheets, like newspapers.

With this end in view, a feature of the invention, if the sheets are fairly regularly spaced and positioned, resides in the use of a simple finger or other contact member that is positioned at a predetermined point and is arranged to ride over the sheets, as they are fed under it by the conveyor. The finger controls a contact member or members to control an electric circuit for operating a counter. This control may, for example, be effected through a relay for a counter magnet.

Another object is to provide a novel machine the purpose of which is to permit the grouping or stacking of a predetermined number of the objects.

Still another object is to provide a counter in conjunction with a selecting device.

The present invention relates also to sheet-feeding-and-counting machines, and more particularly to machines for counting sheets or bundles of sheets. This feature of the invention has particular application to the counting of newspapers, either as they come from the press, or returned newspapers, magazines and the like, but is applicable also to other articles, like paper sheets.

Other and further objects will be explained hereinafter, and will be particularly pointed out in the appended claims.

The invention will now be explained in connection with the accompanying drawings, in which Fig. 1 is a longitudinal vertical section of a machine embodying the present invention in its preferred form; Fig. 2 is an end view of the selector-and-address mechanism embodied in the machine of Fig. 1; Fig. 3 is a vertical section, taken upon the line 3—3 of Fig. 2, looking in the direction of the arrows; Fig. 4 is a vertical section of the selector mechanism, taken upon the line 4—4 of Fig. 5, looking to the left, in the direction of the arrows; Fig. 5 is a vertical section taken upon the line 5—5 of Fig. 4, looking in the direction of the arrows; Fig. 6 is a corresponding end view, looking from the right of Fig. 5; Fig. 7 is a plan of an address plate; Fig. 8 is a vertical section taken upon the line 8—8 of Fig. 3, but upon a larger scale, looking in the direction of the arrows; Fig. 9 is a vertical section taken upon the line 9—9 of Fig. 8, looking in the direction of the arrows; Fig. 10 is a detail view of the mechanism shown in Fig. 9, but upon a larger scale; Fig. 11 is a horizontal section taken upon the line 11—11 of Fig. 3, but upon a larger scale, looking downward in the direction of the arrows; Fig. 12 is a circuit diagram of the selector; Fig. 13 is a section taken upon the line 13—13 of Fig. 5, looking to the right, in the direction of the arrows; Fig. 14 is a modification of the mechanism shown at the right of Fig. 1; Fig. 15 is a similar view, with the parts in different position; and Fig. 16 is a horizontal section taken upon the line 16—16 of Fig. 14, looking downward in the direction of the arrows, but upon a larger scale, the newspaper stack being omitted, for clearness.

A plurality of newspapers or other sheets 2 are shown in Fig. 1 in lapped relation, upon inclined continuously traveling conveyor belts 3, mounted over pulleys 74. The left-hand ends (as shown in Fig. 1) of the inclined conveyor belts 3 may be disposed adjacent to a newspaper press, a stack of newspapers, another conveyor 62, or any other source of supply of newspapers. The belts 3 receive the newspapers 2 from the source of supply and feed them under a lower projecting finger of an inclinedly disposed shield wall 5, disposed in the path of travel of the

papers, just beyond the right-hand ends of the conveyor belts 3, into a hopper 339, between the wall 5 and a similarly inclinedly disposed shield wall 11. The shield wall 11 is also disposed in the path of travel of the papers. Though the machine is shown in connection with newspapers, preferably fed with one of the edges 7 forward, it will be understood that other sheet material, such as magazines and other periodicals, may also be treated in this machine, or parts thereof; and the terms "newspaper," "paper," "sheet" and the like will, therefore, to avoid circumlocution of language, be often employed in the specification and the claims, in this generic sense, except where the context or the state of the art may require otherwise.

If the hopper 339 is empty, the newspapers 2 are conveyed thereinto by the conveyor 3, under the shield wall 5, and on to a conveyor that is disposed at the bottom of the hopper 339, constituted of inclinedly disposed continuously traveling belts 9. The belts 9 are spaced slightly below the shield wall 11, but the space or gap or opening between them may be blocked or closed, as hereinafter described. The number of belts 9 may be four, with spaces between them. They pass over idler rolls 103.

As the first newspaper 2 is delivered by the conveyor belts 3 into the hopper 339, it is carried by the belts 9 forward, or toward the right, as viewed in Fig. 1. When the said space or opening between the shield wall 11 and the belts 9 is blocked or closed, this first newspaper 2 will engage the shield wall 11, so that the further progress of this first newspaper 2 will be temporarily blocked. The second newspaper 2 is similarly carried forward, to the right, on top of the first newspaper 2, until its further progress is similarly blocked. The third newspaper 2 is similarly carried forward, to the right, on top of the second newspaper, into similar engagement with the wall 11, and so on.

The conveyor 3 continues thus to feed the papers 2, in superposed relation, into the hopper 339, until the level of the stack of papers thus accumulated therein is high enough to touch the bottom projecting finger of the shield 5, as shown more particularly in Fig. 1. As no more sheets can then be fed past the shield 5, the level of papers on the belts 3 in the hopper 339, and their consequent weight upon the belts 9, will be practically constant.

When the said space between the shield wall 11 and the belts 9 becomes opened, as will be explained more fully hereinafter, the conveyor belts 9 will feed the lowermost newspapers 2 in the hopper 339 forward, under the shield 11 and into the space outside, to the right of the hopper 339, as viewed in Fig. 1. The next-lowest paper will then be similarly fed out of the hopper, and so on. The shield wall 11 may be made adjustable to regulate the said space between the finger 16 and the belts 9, thereby to control the number of newspapers 2 passing thereunder at any one time.

After the papers have thus been caused to travel out of the hopper 339, they are fed further forward toward a table 91, on which they become accumulated in the form of a stack 89. During the feeding of the papers out of the hopper 339, and before they reach the table 91, they are counted. As each newspaper 2 advances from left to right, as viewed in Fig. 1, out of the hopper 339, its forward edge 7 engages, and passes under, a counting finger 13, illustrated more particularly in Figs. 1 and 3, above the right-hand portions of the belts 9.

Each raising and lowering of the counting finger 13 will result in registering a count, as will be hereinafter explained, to indicate that another newspaper 2 has been conveyed by the conveyor belts 9 from out of the hopper 339 and stacked on the table 91.

After leaving the counting finger 13, the papers 2 are fed into the bite between vertically disposed continuously traveling lift belts 17 and 21 of a conveyor, the delivery end of which feeds the newspaper 2, as they are received from the hopper 339, vertically upward. The conveyor belts 17 pass over a lower pulley or roll 57, a discharge pulley or roll 27, and smaller pulleys or rolls 31, 45 and 47. The conveyor belts 21 pass over the pulley 27, an intermediately disposed pulley 59, and an idler pulley 23. To maintain tension in the belts 21, the idler pulley 23 is free to move in a vertically disposed arc at the end of arms 101 pivoted to the frame of the machine at 103.

In order to maintain the point of delivery of the papers 2 above the topmost paper of the stack 89, the said delivery end of the conveyor, including the upper portions of the belts 17 and 21, and the rolls 27 and 31, is disposed above the belts 9 and the table 91.

The discharge pulleys or rolls 27 and 31 are carried by arm members 37 that are freely movable vertically. In this vertical movement, they are guided by wheels 415, that are carried by the arm members 37, so as to roll on a vertically disposed track of a supporting column 421.

Upon reaching the bite between the conveyor belts 17 and 21, the papers are turned upward, around the large pulley 57, and toward and over the pulley 27. Each paper 2 is then fed from above the table 91, at the left thereof, as viewed in Fig. 1, at a downward incline, on to the top of the stack 89 accumulated on the table 91. During this downwardly inclined feeding, the papers travel over a downwardly inclined guide 39, and under downwardly inclined guide arms or members 55, toward and against stops, constituted of integrally bent portions 58 of the guide members 55. The bent portions 58 project downward, so as to be engaged by the forward edges 7 of the newspapers, thus limiting the further travel of the papers. The newspapers thus become successively deposited on the top of the stack 89 on the table 91, each on top of the previously deposited paper 2, in engagement with the stops 58. The stack 89 rises higher and higher as the newspapers are successively conveyed thereto, until the desired number of newspapers, as determined by the count of the counting finger 13, has been collected in the stack 89. The guide members 55 constitute part of the elevator assembly that moves up with the discharge pulleys or rolls 27 and 31 as the height of the stack 89 increases.

The guide members 55 are respectively disposed at opposite sides of the center of the stack 89 of the papers, and predetermine the position occupied by the stack 89 on the table 91. To equalize the pressure exerted by them on the uppermost sheet of the stack 89, these two guide members 55 may be separated by a yoke 49 that is pivoted at 85 to an arm 41. The guide members 55 are thus always maintained in proper position for guiding the papers to the top of the stack 89.

Through the medium of the yoke 49 and the

arm 41, the freely movable rolls 27 and 31 and the arm members 37 by which they are carried, the upper portion of the conveyor 21, and related parts are automatically raised vertically, in accordance with the height of the stack 89. This is effected by the impact of the papers, passing under the guides 55, in opposition to the force of gravity. The weight of the parts normally maintains the guide arms 55 yieldingly in engagement with the top of the stack 89 and pressing yieldingly downward thereon. To reduce the upward force which the papers must exert in order to lift the guide members 55 higher and higher as they travel thereunder, a counterweight 144 is connected to the members 37 by cords 422, running over pulleys 131 and 129.

The idler pulley 23 and related parts move up and down with the delivery end of the conveyor 17, 21. The lowermost positions of the pulleys 27 and 31 and the arms 101 with the idler pulley 23 are indicated in Fig. 1 by dotted lines.

At such times as the said space under the shield wall 11 and above the belts 9 is blocked, so as to stop the further feed of the newspapers 2 out of the hopper 339, it is desirable that the continuously traveling belts 9 do not engage the lowermost newspaper 2 in the hopper 339. Provision is, therefore, made for lifting the stack of newspapers in the hopper 339 up, out of contact with the belts 9, in synchronism with the movements of the other parts of the machine. The mechanism for bringing this about will now be described.

A table 12 is constituted of a plurality of bar supports respectively disposed between the belts 9. These bar supports are rigidly secured together, in a common frame-work, to a pivotally mounted rod 125. The table 12 normally occupies an ineffective position, below the surface of the plurality of belts of the conveyor 9. In this ineffective position, the table 12 does not interfere with the feeding of the newspapers 2 by the belts 9 out of the hopper 339, through the said space under the shield wall 11. Upon the completion of a cycle of operations, immediately after every feeding of the desired predetermined number of papers 2 out of the hopper 339, the table 12 is raised pivotally as a unit about the rod 125, from its normally ineffective position, up between the belts 9, into its effective position. This may be brought about in any desired manner, as by a half-revolution of a cam 105. It is this raising of the table 12 that results in blocking the said gap or space under the shield wall 11, thus stopping the further feed of the papers out of the hopper 339 below the shield 11. It results also, however, in lifting the newspapers 2 up off the belts 9, so that the belts 9 could not further convey the newspapers out of the hopper 339 even if the said space were not blocked. Upon the lowering of the table 12 from its effective position, above the belts 9, to its ineffective position, below these belts, the feeding of the papers 2 out of the hopper 339 by the belts 9 recommences, and the machine goes through another cycle of operations.

The raising of the table 12, upon the completion of each cycle of operations, is automatically effected by the cam 105, in synchronism with the operation of the rest of the machine. It is similarly automatically lowered at the commencement of a new cycle of operations. The circuits for effecting this result will be described hereinafter. The cam 105, which thus controls the feed of the papers below the shield 11, is controlled by an electromagnetic coil 221 that may be operated in the same manner as other electromagnetic coils described at considerable length in application, Serial No. 43,928, filed October 7, 1935, and of which the present application is a continuation-in-part. The circuit of the coil 221 is controlled in accordance with a counter-and-selector mechanism, illustrated in Figs. 2 and 3, under the control of the counting finger 13. One semi-revolution of the shaft 170, at the end of a cycle of operations, results in the cam 105 raising the table 12 to stop the feed. The next semi-revolution of the shaft 170, at the commencement of a new cycle of operations, results in the lowering of the cam 105, and the consequent lowering of the table 12 by gravity, whereupon the feeding of the papers 2 out of the hopper 339 by the belts recommences.

If the papers are fed forward with a folded end leading, they naturally arrive on the table 91 in the same way. When the correct number of papers, twenty-five as an illustration, have been so fed and stacked on the table 91, the table 12 is raised to stop the feed of additional papers, the guide arms 55 are likewise raised, and the table and the stack thereon turned a half revolution, in order to alternate the folded edges, by means of a shaft 95 on which the table 91 is supported. The guide arms 55 are then dropped, so as to become restored in effective position, the table 12 is lowered and the feed of the papers is resumed, resulting in a reversed position of the newspapers on the stack.

To effect the raising of the guide arms 55, a lug 158 on one arm of a bell crank 155 is moved up against the cord 422 upon the downward movement of the connecting rod 150 that is connected to the other arm of the bell crank. The lug 158 is provided with frictional material that binds frictionally against the cord 422 as the lug 158 is moved upward, thus pulling the cord 422 upward and to the left, thereby causing the raising of the guide arms 55 and the parts attached thereto.

A modified structure is illustrated in Figs. 14 to 16, as hereinafter explained.

To turn the table 91, a half revolution is effected, in timed relation to the operations above described, of a shaft 428, on which there is mounted a crank 429 connected with one end of a connecting rod 430. The other end of the connecting rod 430 is provided with a rack 431 that meshes with a gear 432 secured to the shaft 95. The face of the gear 432 is wide enough so that it will still be in mesh with the rack 431 when the table 91 is in its lowermost position, as presently to be described. For every half-revolution of the shaft 428, obviously, the shaft 95 will be turned through a half revolution; and when the shaft 428 is returned to its original position, the shaft 95 will likewise be returned to its original position. These half-revolutions will be effected at the end of the feeding of the papers 2 in groups of twenty-five or any other desired number.

To remove the stack of sheets, the table 91 is lowered below elongated rolls 523, which are turned from a shaft 425 by belts 426 and pulleys 424. To this end, the table 91 may be constituted of parallelly disposed slats alternating in position with the positions of the rolls 523, so that the slats may be lowered below the rolls 523 in the spaces between these rolls. When the level of the table 91 is thus lowered under that of the tops of the rolls 523, the papers 2, being thus lowered

into contact with the moving rolls 523, are moved by them off the table 91 and on to a table (not shown) at the side of the machine, either in front of or behind the plane of the papers, as viewed in Fig. 1. The table 91 is lowered by rotation of a cam 69 engaging against a follower 427 at the lower end of the shaft 95.

The wrapping paper is fed intermittently from a roll or reel of wrapping paper 267 that is mounted to turn upon a spindle or rod 120, disposed at the left-hand side of the machine, and a little to the left of the hopper 339, as viewed in Fig. 1. From the roll 267, the wrapping-paper web 122 rises substantially vertically to a guide roll 277, over which it passes to the right, over a platen 126 and under a backing plate 313 of the addressing mechanism. As will be explained hereinafter, the platen 126 is intermittently moved upward to force the interposed wrapping-paper web 122 against a type-backed ribbon 311 between the web 122 and an address plate 205. Different address plates 205 will thus produce different addresses and other insignia upon the web 122.

At a suitable moment, the portion of the web 122 thus addressed is fed forward, to the right, between feed rolls 281 and 288, the former of which is larger than the latter, and may be constituted of rubber, while the latter may be constituted of metal. One revolution of the feed roll 281 about its shaft 321 results in feeding the required length of wrapper from the reel 267. Such revolution of the feed roll 281 will be produced after a predetermined degree of rotation of the shaft 386, as will be explained later. The web 122 is fed between a cutter bed 289 and a cutter roll 298; and, over a guide 299 (Fig. 3), to the belts 3. At the completion of the revolution of the feed roll 281, the cutter roll 298 is actuated, in synchronism with the other movements of the machine parts, to make one revolution, thereby severing the addressed wrapper or "snipe" from the remainder of the web 122.

The papers passing under the finger 13 (Fig. 3) close contact members 341 to make a circuit which energizes an electromagnet 325 to turn a ratchet wheel 323 one tooth for each paper. The ratchet wheel 323 is fixed to a shaft 211, which extends into the frame of the selector 193. The electromagnet 325 actuates an armature 329 connected with a spring-controlled intermediately pivoted double pawl 327 for actuating the counter ratchet wheel 323 to count the sheets fed by the conveyor 9 out of the hopper 339. One of the teeth of the pawl is held normally in engagement with a ratchet tooth of the ratchet wheel 323 by a spring, but is adapted to be rocked, in one direction, out of contact therewith, in opposition to the action of the spring, by the magnetic field of the coil 325. The other tooth of the pawl will, at the same time, become moved into engagement with another tooth of the ratchet wheel 323, thereby effecting one step of movement of the counter. Upon the opening of the circuit of the coil 325, the spring will rock the pawl 327 in the opposite direction, to cause the said other tooth to disengage the ratchet wheel, and the first-named tooth to reengage the ratchet wheel, thereby effecting a further step of movement of the ratchet wheel. The pawl thus moves like an ordinary escapement, its two teeth engaging the teeth of the ratchet wheel alternately to effect step-by-step movement of the ratchet wheel. The shaft 211 rotates a contact arm 213 (Figs. 4 to 6) over a circular row of contact members 215, so as to engage these contact members 215 successively. The connection of the arm 213 to the shaft 211 is through a disc clutch 235, which is pressed, by a spring 406, against an intermittent gear member 259 (Fig. 13) that is fixed to the contact arm 213. The gear member 259 is so arranged with reference to a train of gears 400, 403 and 401 that it moves a contact arm 217 from one contact point 219 of a circular row of contact members 215 to the next as the arm 213 completes each revolution. The gears 400 and 403 are integrally connected together, the former meshing with the gear member 259 and the latter with the gear 401. The gear 401 is mounted upon a shaft 407 that drives the contact arm 217 frictionally in the same manner that the shaft 211 drives the contact arm 213 frictionally through the same kind of clutch 235, pressed by a spring 405 against an intermittent gear member 229 to which the contact arm 217 is fixed.

With twenty-five contact members 215, numbered 0 to 24 in Fig. 12, and all of which may be successively closed in the course of one revolution of the arm 213, the movement of the shaft 211 between any two contact members 215,—the 24th and 25th contact members, for example,—will cause the aforesaid movement of the contact arm 217 from one contact member 219 to the next contact member 219. Thirteen contact members 219 are shown in Fig. 12, marked 0, 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275 and 300.

The circuits of the contact members 215 and 219, respectively, are further controlled by previously closed pairs of contact members 206, 207 under the control of lugs 201 on an address plate 205.

As shown arbitrarily, there are twenty-five pairs of contact members 206, numbered 0 to 24 in Fig. 12, and thirteen pairs of contact members 207, marked 0, 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275 and 300 in the same Fig. 12. The maximum count of the unit row 206, therefore, is 24, the 25th and its multiples being counted off on the group row 207. Of course, any number may be applied to each row, but in the case of newspapers, 25 is convenient as they are turned in groups of 25 or multiples of 25.

Two rows of contact members 206 and 207 are shown because, for the quantity to be covered, accuracy and convenience could not be obtained by placing 300 contacts in one row. The contact arm 213 constitutes a units counter, cooperating with the contact members 206, and the contact arm 217 constitutes a multiple counter, in multiples of 25, cooperating with the contact members 207. If a greater count were needed, however, it would be possible to extend the number of scales 409 and 411.

Each of the contact members 215 is wired to one of the sets of contact members 206 (Fig. 12) and each of the contact members 219 is wired to one of the sets of contact members 207. For example, the first or 0 contact member 215 is connected by a conductor 413 with the first or 0 pair of contact members 206; the second or 1 contact member 215 by a conductor 415 with the second or 1 pair of contact members 206; the third or 2 contact member 215 by a conductor 417 with the third or 2 pair of contact members 206; and so on; the last or 24 contact member 215 being connected by a conductor 419 with the last or 24 pair of contact members 206. The first or 0 contact member 217 is similarly connected

by a conductor 421 with the first or 0 pair of contact members 207; the second or 25 contact member 213 by a conductor 423 with the second or 25 pair of contact members 207; the third or 50 contact member 217 by a conductor 425 with the third or 50 pair of contact members 207; and so on; the last or 300 contact member 219 being connected by a conductor 427 with the last or 300 pair of contact members 207.

There are two lugs 201 on each address plate 205, one on each side (Fig. 7). They are manually adjustable to any of a plurality of positions along scales 409 and 411 at the sides of the address plate for the purpose of closing any desired pair of contact members 206 and any desired pair of contact members 207, thus to count out a desired number of papers, as will presently be explained. The divisions of the lower scale 411 are units of 25, and the divisions of the upper scale 409 correspond to individual counts. These lugs 201 are so arranged on the plate 205 that, when the plate 205 is moved into position under the two rows of contact members 206, 207, one of the lugs 201 will close a pair of contact members 206 and the other lug 201 a pair of contact members 207. Which two contact members 206 or 207 will be closed by the respective lugs 201 depends on the position of the lugs 201 on the address plate 205, and the lugs 201 are manually actuable selectively to any desired position.

The position of the lugs 201 on the address plate determines, therefore, the place on the rows of contact members 215 and 219 where the simultaneous contacts of the arms 213 and 217 will effect a closing of the circuit. This circuit, as before stated, is through the electromagnetic mechanism 221, which stops the feed of the papers past the shield 11, thereby rendering the feeding means 9 ineffective at the end of the feeding of a predetermined number of the sheets 2.

The electric system is normally ineffective to energize the coil 221, though the lower contact members 206 and 207 are continuously connected into circuit, in series with a source of energy, such as a battery 431. The circuit extends from the battery 431, through the coil 221, and the lower contact members 207 marked 0, 25, 50, . . . to the pair of contact members 207 that are closed by one of the lugs 201; thence, by way of one of the conductors, some of which are indicated at 421, 423, 425 and 427, to the corresponding contact member 219; thence through the contact arm 217, and by way of a conductor 433, to the contact arm 213 and one of the contact members 215; thence, by way of one of the conductors, some of which are indicated at 413, 415, 417 and 419, to that pair of contact members 206 that are closed by the other lug 201 and that are connected to the said contact member 215; and thence through the lower contact members 206 below the said pair of closed contact members 206, as viewed in Fig. 12, back to the other side of the battery 431. The closing of this circuit by the said closed pairs of contact members 206 and 207 and the said contact members 215 and 219 at the end of a predetermined count of the counter, determined by the positions of the lugs 201, will effect the energization of the coil 221, thus rendering the circuit effective to actuate the cam 105, as before described, and thus stop the feed of the papers 2 out of the hopper 339 below the shield 11. It will be noted that the arms 213 and 217 can not, in themselves, effect this result; they must cooperate with the pairs of contact members 206 and 207 that have previously been closed by the lugs 201, and, at a predetermined point of their rotation, this they do by controlling those contact members 215 and 217 that are connected into circuit with the said closed contact members 206 and 207. The circuit is under the control of a switch 533.

The selector arms 213 and 217 must be reset to the starting position as a new plate 205 is moved into place. This is effected by mechanism now to be described.

At the completion of the count, a wrapper or label, with the address thereon, is fed on the stack, or to some other suitable place, from the roll of paper 267, by a single rotation of the feed roll 281 driven by the shaft 321 (Figs. 2 and 3). This shaft 321, as illustrated more particularly in Fig. 2, drives also, through the medium of a chain 338, the shaft 223 of the selector that shifts the address plates 205. Pinned or otherwise fixed to the shaft 223 are gears 227, cut away at 415, as shown more particularly in Figs. 4 and 5. Two similar but smaller gears 229, on the same shafts 211 and 407 that respectively hold the contact arms 213 and 217, are also cut away, as shown in Figs. 4 and 5.

If the arms 213 and 217 are not in the starting positions, the rotation of the gears 227 will bring them into mesh with the gears 229, and rotate them, against the friction of the clutches 235, until the cut-away sections are brought into the position shown in Figs. 4 and 5, when the gears 227 and 229 will no longer mesh, and the arms 213 and 217 will then have been brought to the starting positions. The shaft 223 and the gears 227 will continue turning until returned to the positions shown in Figs. 4 and 5. In this position, the gears 229 cannot mesh with the gears 227 when the counting begins.

The closing of the stop-feed circuit is effected as follows: The shaft 211 is driven from the counter 323, which makes a 25th of a revolution for each article counted. This serves to move the contact arm 213 from one contact member 215 to the next contact member 215 over the circle of 25 contacts. As the arm passes from the 24 contact member to the 0 contact member 215, the contact arm 217 is moved through the above-described intermittent gearing 1/4th of a revolution from one contact member 219 to the next contact member 219. When each arm 213 or 217 is in engagement with the contact member 215 or 217 that is in circuit with the contact members 206 or 207 that have been closed by the address plate 205, the circuit through the stop-feed mechanism relay 221 is closed, causing actuation of the cam 105, and thus preventing the feed of further sheets 2 out of the hopper 339 by the conveyor 9. The arms 213 and 217 are then moved to their initial positions by a single rotation of the shaft 223. As the cut-away gears 227 are fixed to the shaft 223, they rotate from their ineffective positions to engage the cut-away gears 229, rotating with them, through the above-described friction clutches 235, the respective arms 213 or 217, assuming that these do not already happen to be in the starting positions. This also returns the intermittent gear 259 to its initial position, so that it will not turn the arm 217 until the 25th paper has been counted off.

In addition to the address and other desired insignia from the plate 205, two scales (not shown) corresponding to the scales 409 and 411 on the plate 205, may be printed on the label, wrapper or tag that goes with the stack, along

with the address and other data. Holes 195 in the plate 205 accommodate a projection 209 on the bottom of each lug 201. These projections 209 extend through the address plate to a position below the bottom thereof. As these projections indicate, by their position on the plate 205, the number of papers counted, they are utilized to print or otherwise make marks on the label, wrapper or tag opposite the said scales (not shown) to indicate what quantity is contained in that group.

The plates are initially stacked in the magazine 276. A cut-out 500 in the plate slides over a vertical slide 501. This insures that no plate will be placed in the magazine in the reversed position.

A fork 303, oscillating about a pivot 301, engages an anti-friction lug 305 to operate a slide 307 in ways 309. The slide 307 thus moves the lowermost plate 205 from under the magazine 276 to a definite position underneath the backing plate 313, at the same time, moving the previous plate 205 into the receptacle 275, over a spring 317. In this position of the plate 205 under the backing plate 313, the lugs 201 will be under the contact members indicated on the address plate. The plate remains in this position while the papers are being counted off and, at the same time, the name and address and other insignia are printed from the plate on to the wrapper label. Above the backing plate 313, a member 429 carries the wiring 314 through a cover plate 315.

In the guide-raising mechanism illustrated in Figs. 14, 15 and 16, the guides 55 are raised from the top of the stack of papers 89 by pivoting the arm 41 about the axis of the shaft 451 upon which the pulley 31 is mounted at one end of the arms 37. This may be effected in any desired way, as by fixing the arm 41 to a sleeve that is rotatable about the shaft 451. This sleeve may be rocked through the necessary arc by means of an arm 441 that is also fixed to the sleeve. The arm 441 is disposed at the outer end of the pulley 31, as shown more particularly in Fig. 16, so as not to interfere with the passage of the papers. The rocking of the arm 441 may be effected in any desired manner, as by means of a horizontal movement of a vertically disposed link 443 engaging against a pin 437 on the arm 441. The said horizontal movement of the link 443 may be produced by a bell-crank lever 444 that is connected to the lower end of the link 443 and that is rocked by a link 445 from a crank 447. An arm 449 that is connected to the upper end of the link 443 cooperates with the bell-crank lever 444 to keep the link 443 always vertically disposed in all of its positions. When the guides 55 are in the normal position, as shown in Fig. 14, the link 443 is not in contact with the pin 443 or, for that matter, with any part of the vertically moving carriage attached to the arms 37. The guides 55 are maintained in this position by a spring 419 pulling upon the arm 441 to cause a stop 435 on the arm 441 to engage the arms 37 to prevent further movement. To raise the guides 55 to the position shown in Fig. 15, the crank 447 is turned through a half revolution, thus rocking the bell-crank lever 444 and imparting a movement upward and to the left of the link 443. This link 443, in turn, thus comes into contact with the pin 437, resulting in the upward swinging of the guides 55 away from the papers 89 on the stack.

Further modifications will occur to persons skilled in the art, and all such are considered to fall within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. Apparatus of the character described comprising a conveyor, means for feeding sheets to the conveyor in superposed relation, a wall in the path of travel of the sheets from the feeding means to the conveyor for preventing the superposition of more than a predetermined number of the sheets on the conveyor, a second wall in the path of travel of the sheets conveyed by the conveyor, the second wall being separated slightly from the conveyor to permit the conveyor to convey a predetermined number of the sheets on the conveyor through the space of separation between the conveyor and the second wall, and means for blocking the said space to prevent the conveyor from conveying sheets through the said space.

2. Apparatus of the character described comprising a table on which sheets may be stacked, a conveyor for feeding the sheets to the table, a member maintained by gravity in engagement with the topmost sheet of the stack and automatically raisable in opposition to the force exerted by gravity as the height of the stack increases, means connecting the portion of the conveyor that delivers the sheets to the table with the member to cause it to be raised with the member in opposition to the force exerted by gravity in accordance with the height of the stack, a counterweight, a cord connecting the counterweight with the member and the said portion of the conveyor, means for stopping the feed of the sheets by the conveyor to the table after a predetermined number of sheets has been fed by the conveyor to the table, means for raising and lowering the cord to raise and lower the member and the said portion of the conveyor, and means for turning the table between the raising and lowering movements of the member and the said portion of the conveyor and thereupon resuming the feed of the sheets by the conveyor to the table.

3. Apparatus of the character described comprising means for feeding sheets, a counter for counting the sheets, a normally ineffective electric circuit, a plurality of selectively actuable contact members, and means operable at the end of a predetermined count of the counter and cooperative with the selectively actuable contact members for rendering the electric system effective to render the feeding means ineffective at the end of the feeding of a predetermined number of the sheets.

4. Apparatus of the character described comprising a hopper for receiving a plurality of sheets, a conveyor at one end of the hopper against which the sheets in the hopper are pressed, the hopper having a wall extending to very close to the conveyor, but with a space near the conveyor to permit the conveyor to convey a sheet or sheets from the hopper to outside the hopper, a counter for counting the sheets conveyed by the conveyor from the hopper through the said space to outside the hopper, a normally ineffective electric system, a plurality of selectively actuable contact members, and means operable at the end of a predetermined count of the counter and cooperative with the selectively actuable contact members to render the electric system effective to block the said space to prevent the sheets from passing through the said space at the end of the conveying of a

predetermined number of the said sheets through the said space.

5. Apparatus of the character described comprising a hopper for receiving a plurality of sheets, a conveyor at one end of the hopper against which the sheets in the hopper are pressed, the hopper having a wall extending to very close to the conveyor, but with a space near the conveyor to permit the conveyor to convey a sheet or sheets from the hopper to outside the hopper, a counter for counting the sheets conveyed by the conveyor from the hopper through the said space to outside the hopper, a normally ineffective electric system, a plurality of selectively actuable contact members, a plurality of contact members respectively cooperative with the selectively actuable contact members to render the electric system effective to block the said space to prevent the sheets from passing through the said space at the end of the conveying of a predetermined number of the said sheets through the said space, and means controlled by the counter for controlling the second-named contact members.

6. Apparatus of the character described comprising a hopper for receiving a plurality of sheets, a conveyor for conveying the sheets out of the hopper, means for counting the conveyed sheets, a contact member actuated by the counter, a plurality of cooperating contact members adapted to be engaged by the first-named contact member, a plurality of normally ineffective contact members equal in number to the cooperating contact members, one corresponding to each of the cooperating contact members, means for rendering the normally ineffective contact members selectively effective, and means controlled by the first-named contact member upon its engagement with the contact member corresponding to the said normally ineffctive contact member for preventing the conveyor from further conveying the sheets out of the hopper after a predetermined number of the sheets has been fed out of the hopper.

7. Apparatus of the character described comprising a hopper for containing a plurality of sheets and having a wall extending to very close to one end of the hopper, providing a space near the said end, a conveyor for conveying a sheet or sheets out of the hopper, through the said space, to outside the hopper, a counter for counting the sheets conveyed by the conveyor from the hopper through the said space to outside the hopper, a normally ineffective electric system, a plurality of selectively actuable contact members, a plurality of contact members respectively cooperative with the selectively actuable contact members to render the electric system effective to block the said space to prevent the sheets from passing through the said space at the end of the conveying of a predetermined number of the said sheets through the said space, and means controlled by the counter for controlling the second-named contact members.

8. Apparatus of the character described comprising a conveyor for conveying sheets from under a stack of sheets resting flatwise on the conveyor, means for feeding sheets flatwise to the top of the stack of sheets on the conveyor, and means for preventing the accumulation of more than a predetermined number of the sheets in the stack on the conveyor at any one time.

9. Apparatus of the character described comprising a belt conveyor for conveying sheets from under a stack of sheets resting flatwise on the conveyor, a second conveyor for feeding sheets to the top of the stack of sheets on the first-named conveyor, and a wall in the path of travel of the sheets from the second conveyor to the belt conveyor for preventing the accumulation of more than a predetermined number of sheets in the stack on the conveyor at any one time.

10. Apparatus of the character described comprising a table on which sheets may be stacked, a conveyor for feeding the sheets to the table, a member maintained by gravity in engagement with the topmost sheet of the stack and automatically raisable in opposition to the force exerted by gravity as the height of the stack increases, means connecting the portion of the conveyor that delivers the sheets to the table with the member to cause it to be raised with the member in opposition to the force exerted by gravity in accordance with the height of the stack, means for stopping the feed of the sheets by the conveyor to the table after a predetermined number of sheets has been fed by the conveyor to the table, and means for independently raising the member and the said portion of the conveyor.

11. Apparatus of the character described comprising a table on which sheets may be stacked, a conveyor for feeding the sheets to the table, a member maintained by gravity in engagement with the topmost sheet of the stack and automatically raisable in opposition to the force exerated by gravity as the height of the stack increases, means connecting the portion of the conveyor that delivers the sheets to the table with the member to cause it to be raised with the member in opposition to the force exerted by gravity in accordance with the height of the stack, means for stopping the feed of the sheets by the conveyor to the table after a predetermined number of sheets has been fed by the conveyor to the table, means for independently raising and lowering the member and the said portion of the conveyor, and means for turning the table between the raising and lowering movements of the member and the said portion of the conveyor and thereupon resuming the feed of the sheets by the conveyor to the table.

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