

June 12, 1945.

A. W. METZNER

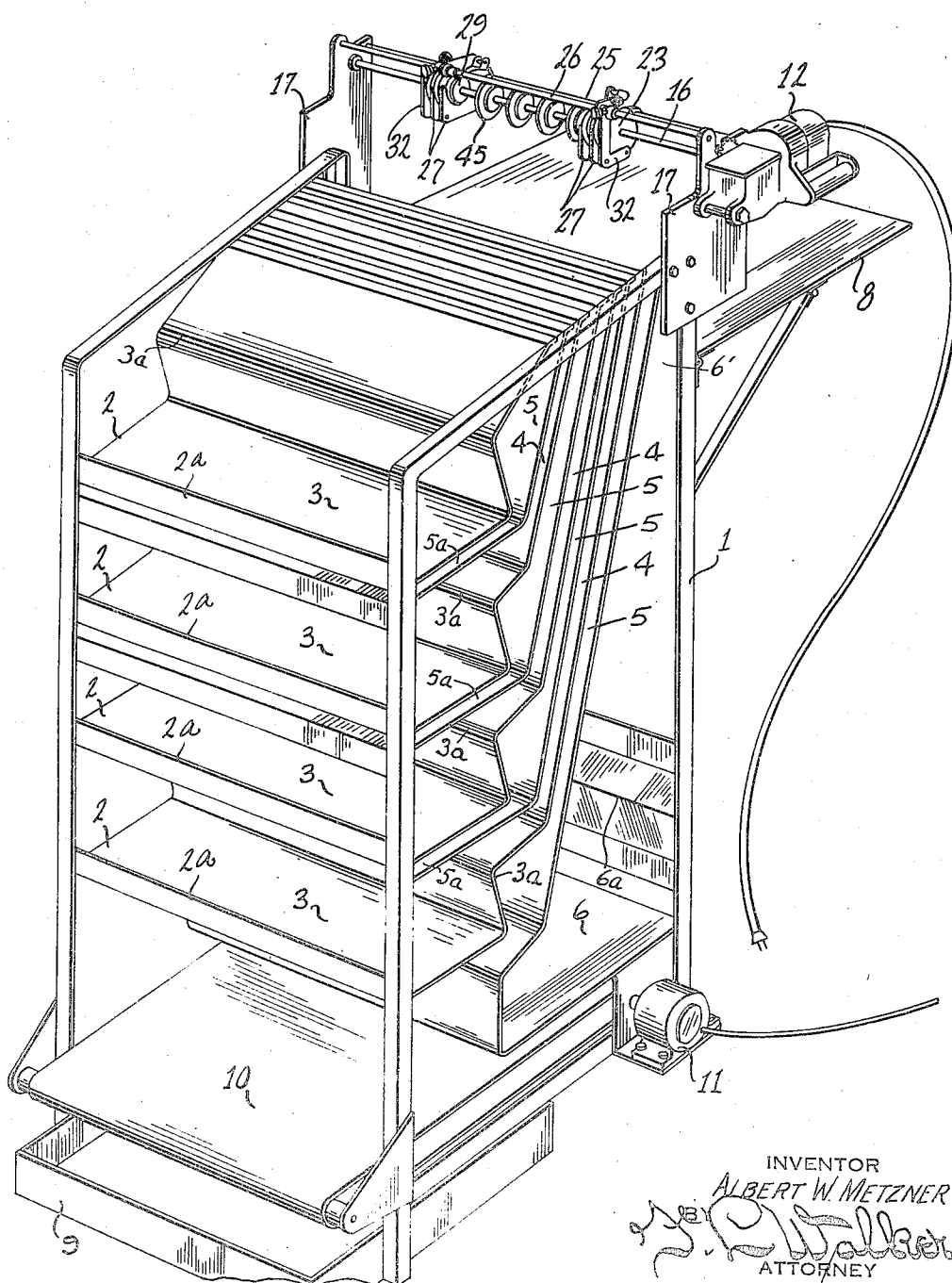
2,377,896

CARBON SEPARATOR

Filed Aug. 25, 1939

4 Sheets-Sheet 1

Fig. 1



INVENTOR
ALBERT W. METZNER
BY *Albert W. Metzner*
ATTORNEY

June 12, 1945.

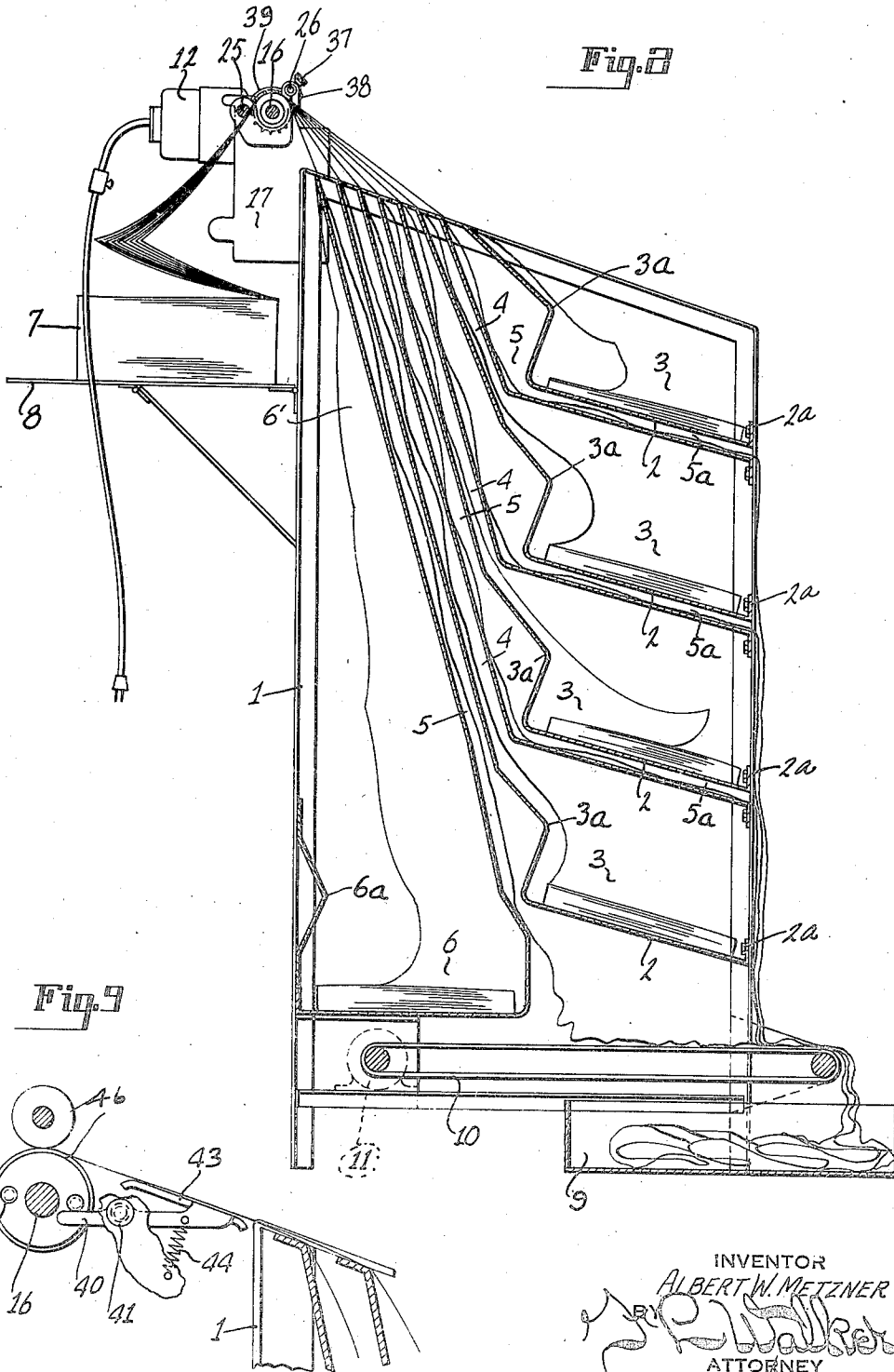
A. W. METZNER

2,377,896

CARBON SEPARATOR

Filed Aug. 25, 1939

4 Sheets-Sheet 2



INVENTOR
ALBERT W. METZNER
BY *[Signature]*
ATTORNEY

June 12, 1945.

A. W. METZNER

2,377,896

CARBON SEPARATOR

Filed Aug. 25, 1939

4 Sheets-Sheet 3

Fig. 3

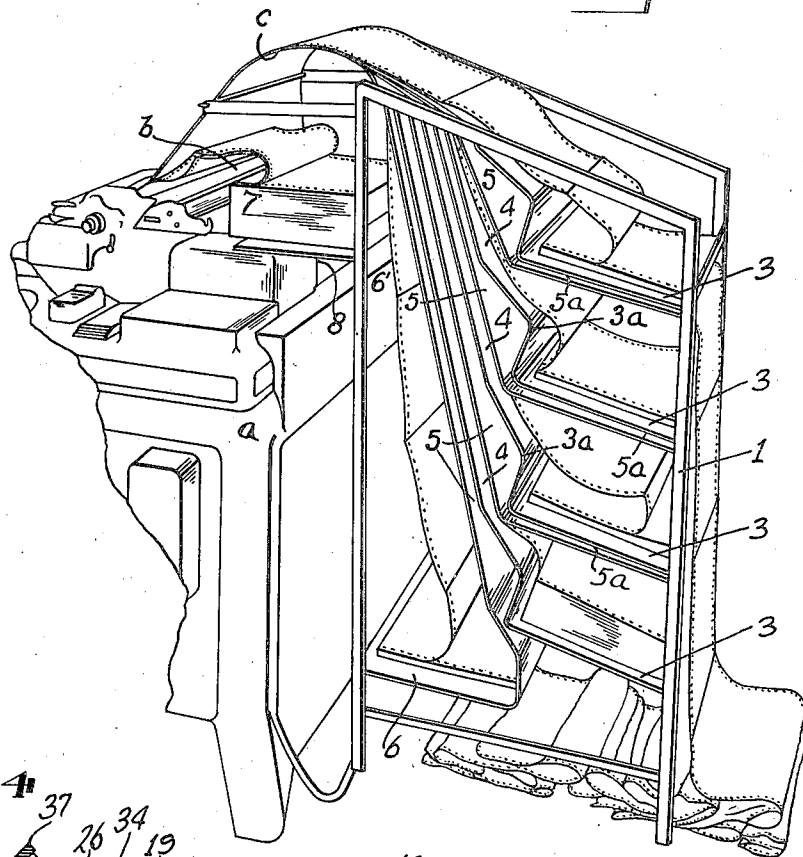
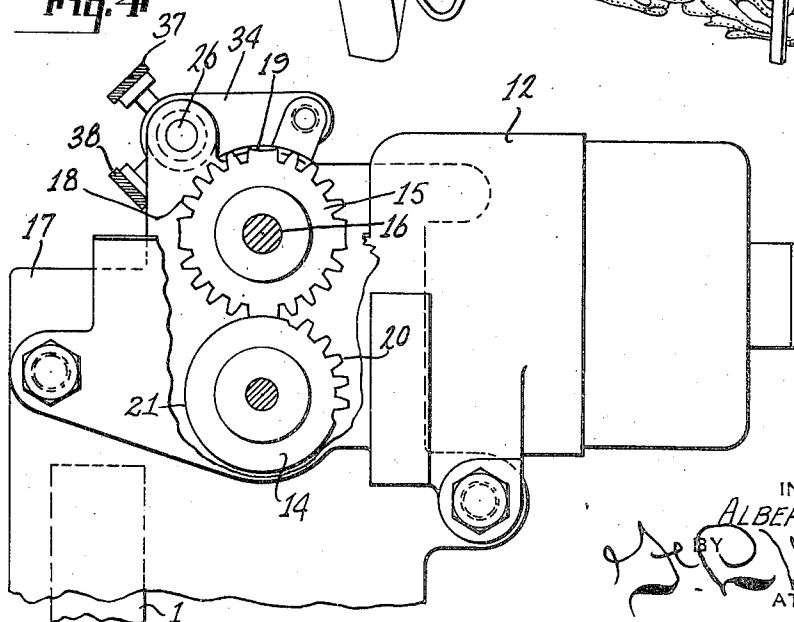


Fig. 4



INVENTOR

ALBERT W. METZNER

BY

ATTORNEY

June 12, 1945.

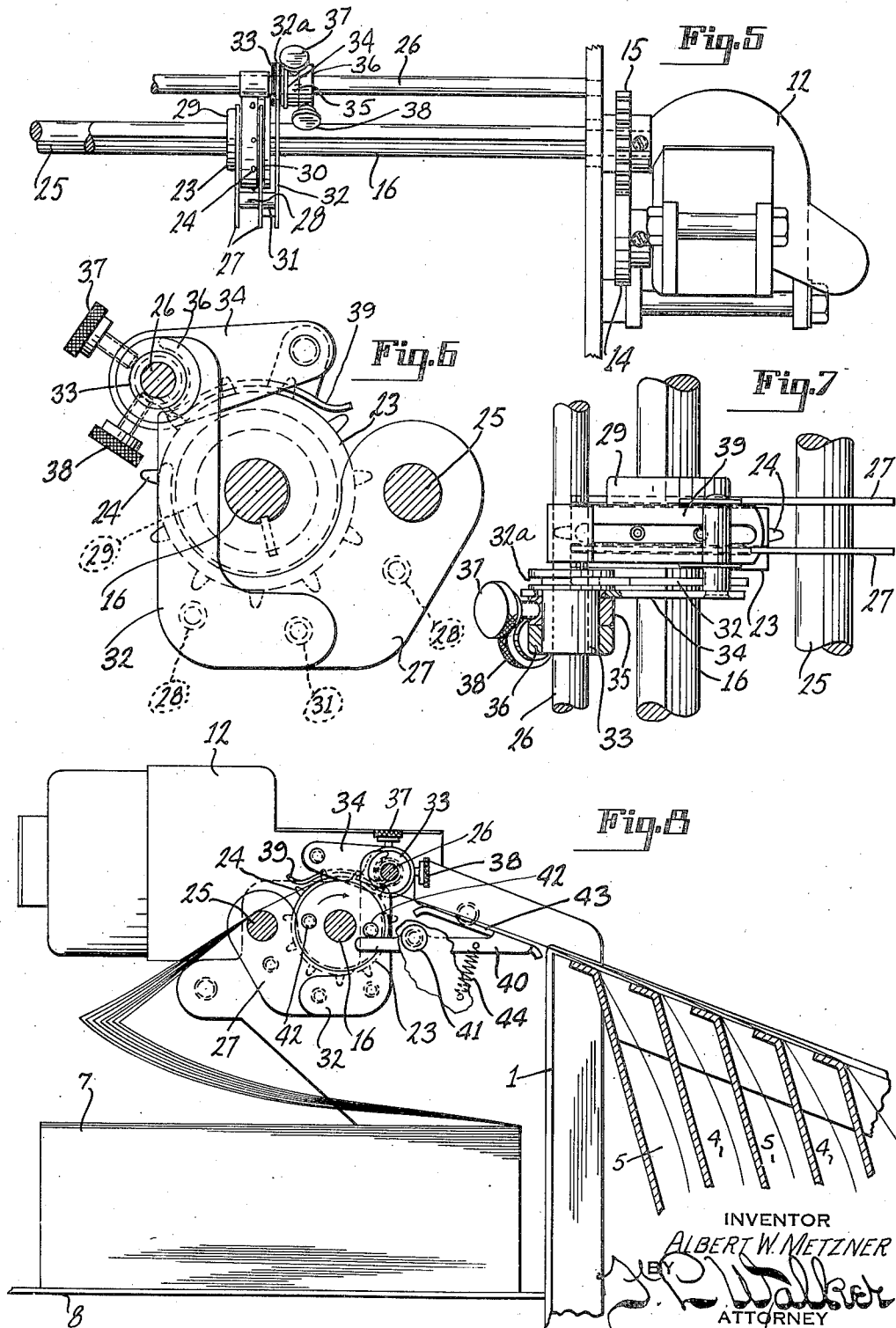
A. W. METZNER

2,377,896

CARBON SEPARATOR

Filed Aug. 25, 1939

4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,377,896

CARBON SEPARATOR

Albert W. Metzner, Dayton, Ohio, assignor to
Katherine M. Sherman, William C. Sherman,
and Wellmore B. Turner, executors of John Q.
Sherman, deceased

Application August 25, 1939, Serial No. 291,945

38 Claims. (Cl. 271-2.1)

This invention pertains to strip feeding and separating apparatus, and more particularly to means for automatically separating superposed manifold record strips and interleaved carbon strips into individual packets.

In modern commercial practice, assemblies of continuous form stationery, comprising superposed interfolded strips of continuous series-connected detachable printed forms and interleaved strips of carbon or transfer material, are progressively advanced through writing, imprinting, tabulating or other recording machines in which plural duplicate copies of inscribed matter are produced. Sometimes succeeding sets or books of copies are collectively detached by tearing the assembly of strips transversely on longitudinally spaced weakened division lines intermediate succeeding printed forms. However, the approved practice is to bodily separate the record strips and interleaved carbon strips and refold them into individual packets while in their initial intact form. To do so manually entails tedious time consuming operations.

In the present invention there is contemplated a unitary structure which is interchangeably usable in association with different writing, tabulating or recording machines. It is adapted to either withdraw interfolded continuous record strips collectively from a source of supply, or to receive them directly from the writing or imprinting machine and simultaneously rapidly separate them one from another and direct the separated strips into individual compartments wherein they are refolded into separate packets.

Ordinarily some difficulty is encountered in separating such manifold assemblies after inscription, due to the tenacious character of the carbon material coating, which possesses a tendency to adhere to the adjacent sheet against which it has been forcibly pressed during the writing or imprinting operation. A further difficulty of separation arises from the static electricity generated by the rapidly moving strips which induces in the strips a great affinity of one for another, causing them to cling together. In the present instance, a vibratory or jogging action is imparted to the strips which greatly facilitates their separation.

The present apparatus, which is of compact form, combines practical utility with convenience; flat pack form loading facilities with an efficient means and method of separating the continuous interleaved carbon strips from the strips of inscribed record forms and the latter from each other, the strips being neatly refolded in receiving compartments.

The provision of a supply or loading compartment from which the manifold assembly may be delivered to the writing or imprinting apparatus and received thence back to the separator or delivered direct to the feeding device of the present separator unit for separation and individual refolding, insures proper feeding of the assembled strips, so that the entire operation is smooth and continuous without the necessity of operator attention.

The object of the invention is to improve the construction as well as the means and mode of operation of strip feeding and separating apparatus whereby it may not only be economically manufactured and operated, but will be more efficient in use, automatic in operation, uniform in action, having relatively few operating parts, and unlikely to get out of repair.

A further object of the invention is to provide a compact structure of sturdy construction and relatively large capacity, capable of separating and refolding a considerable number of strips uniformly and rapidly.

A further object of the invention is to provide an apparatus of great flexibility capable of accommodating a wide range of form widths and lengths.

A further object of the invention is to provide a portable apparatus which may be readily moved from place to place into operative relation with different writing and imprinting machines.

A further object of the invention is to utilize gravity pull upon the strips being separated to keep the strips relatively tight and eliminate slack with minimum moving parts and hence trouble free operation.

A further object of the invention is to provide means for overcoming the adhesive tendency of adjacent strips due to either the tenacity of the surface of the carbon material or the mutual attraction of the strips incident to static electricity.

A further object of the invention is to provide a strip feeding and separating apparatus possessing the advantageous structural features and inherent meritorious characteristics herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawings.

In the drawings, wherein is shown the preferred but obviously not necessarily the only

form of embodiment of the invention, Fig. 1 is a perspective view of an assembled strip separator unit embodying the present invention. Fig. 2 is a sectional side elevation. Fig. 3 is a perspective view illustrating the direct association of the separator unit with a writing or imprinting machine. Fig. 4 is a detail view of the driving mechanism. Fig. 5 is a detail front elevation of a portion of the strip feeding mechanism. Fig. 6 is an enlarged detail side elevation, and Fig. 7 an enlarged detail plan view partly in section of one of the strip feeding units. Fig. 8 is a side elevation partly in section of the assembled separator, embodying a vibratory guide plate for the strips to which a flutter motion is transmitted simultaneously with the feeding movement of the strips. Fig. 9 is a view similar to Fig. 8, showing the use of frictional feeding rollers in lieu of pin type feeding devices.

Like parts are indicated by similar characters of reference throughout the several views.

The present carbon separating apparatus is a further development of the separator disclosed in copending application, Serial No. 14,854. The present unit comprises an upright frame 1, which, to minimize weight and afford maximum strength and rigidity, comprises a series of angle bars, preferably united with each other by welding, but which may be otherwise joined. Within the frame 1 is a vertical series of relatively spaced shelves 2—2 disposed one above another having upturned forward flanges 2a. The shelves, which thus form therebetween individual strip receiving compartments 3, are slightly inclined to the horizontal, which facilitates the automatic refolding action of the strips as they enter the respective receiving compartments.

Disposed back of the receiving compartments 3 and communicating with the respective compartments 3 are a series of parallel passageways or chutes 4 for directing the record strips into the receiving compartments. Arranged in alternating parallel relation with the record strip guide chutes 4 is a second series of similar passageways or chutes 5 through which the interleaved carbon strips are directed. The latter passageways 5 continue at 5a beneath the respective shelves 2 to the front of the unit and discharge the separated carbon strips beyond the record strip receiving compartments. At their upper ends the alternating passages 4 and 5 terminate at the top of the unit in closely adjacent relation with the motor actuated feeding means. There may be any number of record strip receiving compartments 3 and communicating guide passages, and a like number less one of chutes 5—5a for the carbon strips. At the rear of each of the receiving compartments 3 beyond the exit through which the strips pass from the corresponding chute 4 into the compartment, the continuation of the chute wall is formed into an angular strip deflector bulge 3a. The inclined several strip deflector formations 3a serve to guide the entering strips so that the deposited portions of the strips more easily fall into their original zigzag folds as they enter the receiving compartments, thus automatically forming folded packets within the compartments, each of which comprises a single reversely folded strip.

To the rear of the chute assembly at the bottom of the unit is an additional compartment 6 which, in the event the maximum number of strips is being separated, is utilized as an additional receiving compartment. An angular strip deflector 6a, corresponding to the previously men-

tioned strip deflectors 3a on the rear wall of the compartment 6 likewise serves to guide the entering strip into its original zigzag folded formation as it collects into a packet on the bottom of the compartment 6. If a number of strips less than the capacity of the unit is being operated upon, the compartment 6 may be utilized as a supply compartment from which the assembly of superposed interfolded record strips and interleaved carbon strips is collectively withdrawn through the passageway 6' adjacent to said chutes 4 and 5 leading to the compartment 6, either for passage through an associated writing or imprinting machine and thence back to the separator unit as shown in Fig. 3, or directly to the strip feeding device of the separator unit. When associated with a writing or imprinting machine, as shown at a in Fig. 3, the superposed strips to be separated are collectively directed from the supply packet 7 on the shelf 8 over a guide frame b about the platen roll and past the writing position of the machine a and thence back to the separator apparatus over a guide bridge c. In event the compartment 6 is used to receive one of the separated record strips, the supply packet 7 is positioned on a shelf 8 projecting from the rear of the unit. The separated carbon strips discharged at the front of the unit through the chute extensions 5a fall by gravity to the floor or into a receptacle 9 removably positioned beneath the unit. To facilitate the delivery of the strips into the receptacle, a traveling apron belt 10 is mounted at the bottom of the unit and actuated by a motor 11.

The conveyor belt 10 may be of any desired length to deliver the carbon strips at a distance from the unit. In the event the removed carbon strips are to be reused, the chute continuations 5a may be enlarged into a duplicate set of receiving compartments similar to the compartments 3, into which the carbon strips may be received and automatically refolded in the same manner that the record strips are received in the compartments 3.

If the separating unit is of sufficient capacity, the interleaved carbon strips may be directed through alternate guide passages 4 into corresponding strip receiving compartments 3, thus effecting refolding of both record and carbon strips in alternating compartments 3.

The passageways 4 communicate with the elevated rear ends of the compartments 3. The strips being under influence of gravity, plus a degree of "push" influence of the common feeding device, readily reassume their former zigzag folded relation upon their original fold lines. Such automatic folding action is greatly facilitated by the inclination of the receiving compartments 3.

Various forms of feeding means may be utilized. Since the strips are being separated and no registry of corresponding areas of the strips are involved, the use of conventional frictional feed means, especially for separation of strips devoid of feed holes or other longitudinally spaced configurations, may be utilized. In such event, the assembly of strips is fed between ordinary contacting friction rolls as illustrated in Fig. 9. However, if the strips are provided with longitudinally spaced feed holes, a positive pin type feeding unit is preferably, although not necessarily, employed, thus enabling unison positive advancement of the strips to be separated.

In the present instance there is shown in Figs. 4 to 8, inclusive, a motor actuated pin type feeding

device wherein an electric motor 12 having incorporated therein speed reduction means is mounted at the top of the frame 1. Upon the drive shaft of the motor is mounted a segmental gear 14 meshing with a Geneva type gear 15 upon the extremity of a transversely arranged feed shaft 16. The shaft 16 is journaled in side plates 17 attached to the frame 1. The motor 12 is attached to one of the side plates 17. The intermeshing gears 14 and 15 are so designed that at each rotation of the motor driven gear 14 the segmental teeth have intermittent engagement with the driven gear 15 to advance the latter through only a partial rotation. The Geneva gear 15 comprises alternating toothed segments 18 and arcuately indented segments 19. The driving gear 14 has but one toothed segment 20, which upon rotation has intermeshing engagement with succeeding toothed segments 18 to effect a partial rotation of the gear 15 and with it the shaft 16 and pin type feeding devices carried thereby. Intermediate periods of intermeshing engagement of the gear sectors, the concentric smooth portion 21 of the gear 14, the radius of which agrees with that of the segmental indentations of the gear 15, engage therein to lock the latter against relative rotation. Thus the feeding devices carried by the shaft 16 are given intermittent step-by-step motion through succeeding partial rotations. This transmits to the strip assembly being collectively advanced a succession of impulses or "jerky" motion, which is found sufficient to break the cohesion of superposed strips before they reach the chutes 4-6. Such jogging motion or vibratory feeding action is not peculiar to any specific type of feeding device, but is usable in conjunction with either impositive frictional feeding means or with positive pin type or other form of feeding devices.

The particular pin type feeding unit herein shown for illustrative purpose, but without intent to unduly limit the invention thereto, is best illustrated in Figs. 5, 6 and 7. As shown in Fig. 1, there are mounted on the shaft 16, in relatively spaced relation corresponding to transverse spacing of the marginal holes in the strip assembly, a pair of pin wheel units 23 axially adjustable on the shaft to accommodate strips of different width. In the event that the strips have marginal feed holes in one margin only, but one of the pin type units will be employed, the other being shifted axially on the shaft to an ineffective position.

The units 23 are splined on the shaft 16 and have circumferentially spaced radially projecting pins 24 for engagement in the longitudinally spaced feed configurations of the strips. The engagement of the axially adjustable pin wheels 23 in the marginal holes of the strips in closely spaced relation with the entrance orifices of the chutes 4 and 5 serves to guide the strips to the chutes by maintaining them in a predetermined path of travel and positively preventing lateral deviation therefrom. By relative adjustment toward and from each other, the pin wheels serve to guide strips of different widths. In spaced parallel relation with the driven shaft 16 are two stationary shafts 25 and 26 mounted also in the side plates 17. Slidably mounted upon the shaft 25 contiguous to the pin wheel unit are two plates 27 interconnected one to the other by interposed spacers 28. These plates 27 have therein reentrant circular recesses. That in one plate partially surrounds and conforms to the lateral hub 29 of the pin wheel unit, while the other en-

gages in a peripheral groove 30 in the unit. These plates serve to maintain the axial adjustment of the pin type unit on the shaft 16. Disposed in a parallel spaced plane and interconnected with one of the plates 27 by spacers 31 is a third plate 32 which at its upper end has a bifurcated engagement in a peripheral groove 32a of a sleeve 33 surrounding the second parallel shaft 26. The sleeve 33 is rabbeted or formed with a head in which the peripheral groove 32a is located.

Journalled on such sleeve is an arm 34 having a hub 35 surrounding the sleeve 33 and held thereon against the peripherally grooved head by a collar 36. The hub 35 may be affixed to the sleeve in any selected position of rotation by a set screw 37. A second set screw 38 extending through the collar 36 and thence through the sleeve 33, in either of which it may be screw threaded, engages with the shaft 26 to retain the sleeve 33 and with it the several plates and the pin wheel disposed therebetween in their position of axial adjustment on said shaft 26.

The arm 34 carries an arcuate slotted strip guide plate 39, which overlies the strip assembly engaged by the pin wheel to prevent accidental disengagement. The slot in the plate 39 registers with the path of travel of the feeding pins which project through the registering marginal holes in the strips into the longitudinal slot in the plate. The ends of the plate 39 are slightly upturned to facilitate the passage of the strips relative thereto.

In lieu of the intermittent feed or jogging advancement of the strips, which is cooperative with either impositive or positive feed, the strips may be given a vibratory motion while the feed is continuous. Such construction is illustrated in Fig. 8, wherein a spring actuated lever 40 is pivoted at 41 with one end of the lever extending into the path of one or more roller studs 42 carried by the feeding unit 23. The opposite end of the lever carries a flutter plate 43 disposed in approximate parallel relation with the path of the strips as they pass from the common feeding device to the individual chutes 4. The successive engagement of the roller studs 42 with the end of the lever 40 transmits thereto a vibratory motion against the retractive tendency of the spring 44. The flutter motion of the plate 43 vibrates the assembly of the strips rapidly and through sufficient range to break any cohesion of adjacent strips, thereby enabling the several strips to freely enter the chutes 4 independently of each other. Like the pulsating feed method of insuring freedom of the several strips as they enter the chutes, the present flutter means of breaking cohesion will be effective with either type of feeding device.

To medially support the strip assembly while being advanced by the pin type units 23, a series of discs 45 are mounted on the shaft 16 intermediate the feeding units. However, such supporting discs may be omitted in event the flutter plate 43 is employed. Such vibratory plate will duofunctionally serve as a guide for medially supporting the traveling strips.

In Fig. 9, a pair of coacting friction rollers is shown for collectively feeding the strip assembly, in lieu of the pin type feeding units 23. While the flutter plate 43 is shown in Fig. 9 in association with the friction feed means, it is to be understood that in lieu thereof the Geneva gear drive may be employed for transmitting to the feed rolls 46 an intermittent jogging motion. In the event that it is desired to have the record strips embodied in a single packet after removal of the interleaved transfer material from there-

between, it is only necessary to direct the strips of transfer material through the chutes 4 into the compartments 3, and simultaneously direct the record strips through the chutes 5—5a. By stopping the motor 11 and conveyor 10, or by positioning receptacle or box in front of the apparatus into which the record strips may be delivered simultaneously, the latter will automatically collectively refold on their original fold lines into a single packet, but minus the interleaved transfer material.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In a strip separating unit, a frame having therein a vertical series of strip receiving compartments arranged one above another, a plurality of parallel chutes extending downwardly from the top of the unit and respectively communicating with different compartments for directing thereto individual strips of an assembly, and a second plurality of parallel chutes arranged alternately with the chutes of the first plurality and extending thence intermediate the vertically spaced compartments to the exterior of the unit for delivery of other strips from the unit, and feeding means located at the top of the unit for collectively advancing an assembly of superposed strips, one to each of said chutes.

2. In a strip separating apparatus, in combination a plurality of strip receiving compartments arranged in a vertical series one above another, a plurality of separate passageways of which alternate passageways lead to different compartments, the intermediate passageways leading to a common compartment, and means for collectively advancing individual strips of a plurality through the respective passageways to the corresponding compartments.

3. In a strip separating apparatus, a plurality of strip receiving compartments arranged in vertical series one above another, a plurality of approximately upright chutes for independent strips arranged side by side, alternate chutes of the plurality communicating with different compartments, the intermediate chutes communicating with a common compartment, a traveling conveyor in said common compartment discharging beyond the compartment, and means for simultaneously advancing individual strips of a collective assembly through different chutes into their corresponding strip receiving compartments.

4. In a strip separating apparatus, a plurality of strip receiving compartments arranged in substantially perpendicular series, a group of substantially upright contiguous guide chutes,

alternate chutes of the group communicating with different compartments, and at least one chute of the group discharging beyond the substantially perpendicular series of compartments.

5. A strip separating apparatus wherein alternating record and transfer strips of an initially collectively interfolded packet are separated from each other and certain of the strips refolded into individual packets, including a plurality of strip receiving compartments arranged one over another in vertical series, and a plurality of strip guides disposed in contiguous relation to each other, alternate strip guides communicating with the different strip receiving compartments, the intermediate strip guides discharging beyond the compartments, and strip feeding means common to a plurality of superposed strips for advancing the strips individually relative to the respective strip guides.

6. A strip separating apparatus wherein superposed continuous strips of an initial collective assembly are separated from each other and collected in individual packets, a plurality of strip receiving compartments arranged in vertical series one above another, and a plurality of individual strip guides arranged in juxtaposed relation, at least one for each compartment, means in at least one of said compartments for discharging its contents beyond the vertical series of compartments, and strip feeding means common to a plurality of superposed strips for simultaneously advancing plural strips relative to different guides into corresponding compartments.

7. A strip separating apparatus wherein superposed continuous strips of an initial collective assembly are separated from each other and collected in individual packets, a plurality of strip receiving compartments arranged in vertical series, a plurality of individual strip guides for directing individual strips into the respective compartments, conveyor means in at least one of said compartments for discharging the contents of said compartment at a point removed therefrom, and feeding means common to a collective assembly of superposed strips for simultaneously advancing individual strips relative to the respective guides into corresponding compartments.

8. A strip separating apparatus wherein an initial collective assembly of superposed strips is separated and the individual strips reformed into individual packets, a plurality of separate strip receiving compartments, a group of substantially upright guide passages for individual strips arranged side by side with certain of the guides communicating with particular receiving compartments, the remainder of the guides communicating with a common compartment, and strip feeding means common to a plurality of superposed strips for simultaneously advancing individual strips of the plurality relative to different strip guides into corresponding strip receiving compartments.

9. In a strip separating apparatus, a plurality of strip receiving compartments arranged at different levels, strip guide means for directing individual strips into different compartments, strip guide means for directing other strips to a common compartment, and feeding means common to an assembly of plural superposed strips for simultaneously advancing individual strips of the assembly relative to the strip guide means.

10. In a strip separating apparatus wherein strips of a collective packet are individually de-

posited into separate receivers, a strip feeding device common to a plurality of strips, separate receivers for individual strips to which the strips are simultaneously delivered, and driving means for effecting intermittent operation of the feeding device through a succession of step-by-step movements by which the automatic separation of adhering strips is facilitated.

11. In a strip separating apparatus wherein strips of a collective packet are individually deposited into separate receivers, a strip feeding device common to a plurality of strips, separate receivers for individual strips to which the strips are simultaneously delivered, alternating actuating and stop means for the strip feeding device controlling the advancement of the strips by which a jogging movement is imparted thereto which facilitates the automatic separation of adhering strips.

12. In a strip separating apparatus wherein strips of a collective packet are individually deposited into separate receivers, a strip feeding device common to a plurality of strips, separate receivers for individual strips to which the strips are simultaneously delivered, and a Geneva type motion transmitting means for the common strip feeding device transmitting thereto an intermittent movement by which a succession of impulses are transmitted to the strips and separation of adhering strips thereby facilitated.

13. In a strip separating apparatus wherein strips of a collective packet are individually deposited into separate receivers, a strip feeding device common to a plurality of strips, separate receivers for individual strips to which the strips are simultaneously delivered, and impulse transmitting means for effecting a vertical jogging effect upon the advancing strips adjacent the feeding device to facilitate automatic separation of adhering strips.

14. In a strip separating apparatus wherein strips of a collective packet are individually deposited into separate receivers, a strip feeding device common to a plurality of strips, separate receivers for individual strips to which the strips are simultaneously delivered, and a beater member repetitiously collectively engaging the plurality of strips adjacent the feeding device, facilitating separation of adhering strips thereof.

15. A strip separating apparatus wherein an assembly of superposed independent strips are separated from each other, a strip feeding means common to the assembly of strips and operative to advance the strips in unison, a plurality of guides for the individual strips relative to which the strips are individually advanced, and means for transmitting a succession of vibratory impulses to the strips intermediate the feeding device and the individual guides by which cohesion between any two or more of the strips is broken.

16. A strip separating apparatus wherein an assembly of superposed independent strips are separated from each other, a strip feeding means common to the assembly of strips and operative to advance the strips in unison, a flutter device over which the strips are collectively advanced to the guides and having repetitious engagement with the strip assembly, and means for transmitting thereto a vibratory motion.

17. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of receivers for the strips, and a plurality of chutes through which the strips are advanced to the receivers, the chutes through which alternate

strips are advanced being disposed to discharge the strips into a common receiver, and the remaining chutes being arranged to discharge each of the remaining strips into separate receivers.

18. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of receivers for the strips, and a plurality of chutes through which the strips are advanced to the receivers, the chutes being disposed to simultaneously discharge a plurality of strips into a common receiver and to simultaneously discharge each of the remaining strips into separate receivers.

19. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of receivers for the strips arranged in a vertical series one above another, and a plurality of chutes through which the strips are advanced to the receivers, the chutes through which alternate strips are advanced being arranged to discharge into the lowermost receiver of the plurality, the remaining chutes being arranged to discharge each of the remaining strips into a different receiver.

20. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of receivers for the strips superposed one over another, and a plurality of chutes through which the strips are individually advanced, alternate chutes of the plurality being arranged to discharge strips substantially horizontally intermediate succeeding superposed receivers, and other chutes being arranged to discharge, each into a different compartment.

21. In a strip separating apparatus, a pulsating strip feeding device for collectively advancing plural strips past a separation point, a plurality of separate receivers, and guide means for directing separated strips to individual receivers, the pulsating action of the feeding device acting to insure separation of otherwise adherent strips.

22. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of separate receivers for the separated strips, guide means for directing separated strips to individual receivers, and a beater device intermediate the feeding device and guide means for imparting to the strips a percussion action by which separation of otherwise adherent strips is assured.

23. In a strip separating apparatus, a strip feeding device for collectively advancing a plurality of strips past a separation point, a plurality of separate receivers for the separated strips, guide means for directing separated strips to individual receivers, and a shock imparting device adjacent the feeding device effective to separate otherwise adherent strips as they are advanced by the strip feeding device.

24. A strip separating apparatus, including a strip feeding device for collectively advancing an assembly of superposed strips to be separated, a plurality of strip receiving compartments into which certain of the strips are individually delivered from the strip feeding device, a plurality of guide chutes disposed in alternating relation with the strip receiving compartments, and a traveling conveyor onto which other strips delivered through the chutes from the strip feeding device are collectively received.

25. In a strip separating apparatus, a strip feeding device for collectively advancing an assembly

of alternating superposed strips of record and transfer material to be separated, an alternating succession of individual strip receptacles for the record strips and guide chutes for the transfer strips to which the strips are individually advanced from the strip feeding device, and a traveling conveyor common to the plurality of chutes upon which the transfer strips are collectively received.

26. In a strip separating apparatus, a strip feeding device for collectively advancing a manifolded assembly of superposed alternating record and transfer strips, a plurality of receivers into which different record strips of the assembly are advanced, a plurality of passageways through which the transfer strips are advanced apart from the record strips and a conveyor common to the plurality of passageways by which the transfer strips are collectively received and discharged from the apparatus.

27. An apparatus for separating a zigzag interfolded manifolded assembly of superposed alternating record and transfer strips, including a pin type feeding device having progressive feeding engagement with at least a portion of the strips of the assembly for collectively withdrawing the strips from a supply packet thereof and advancing the withdrawn strips beyond said feeding device, separate passageways for the record and transfer strips through which the said strips are advanced from the feeding device, receiving means for the record strips in which the record strips are refolded independently of the transfer strips in zigzag formation, and a conveyor by which the separated transfer strips are collected and discharged from the apparatus.

28. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, dividing partitions between the respective adjacent chutes, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, and strip folding means for causing certain of the strips to be folded in zigzag packs in the respective receiving compartments, certain of said receiving compartments having upper walls forming strip guides to which certain other of said chutes lead so as to guide the strips laterally and downwardly past said receiving compartments.

29. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, dividing partitions between the respective adjacent chutes, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, and strip folding means for causing certain of the strips to be folded in zigzag packs in the respective receiving compartments, said strip folding means including strip deflector plates adjacent to the respective receiving compartments and inclining inwardly with reference to the bodies of the compartments.

30. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, dividing partitions between the respective adjacent chutes, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes,

and strip folding means for causing certain of the strips to be folded in zigzag packs in the respective receiving compartments, said strip folding means including strip deflector plates adjacent to the respective receiving compartments and inclining inwardly with reference to the bodies of the compartments, certain of said receiving compartments having upper walls forming strip guides to which certain other of said chutes lead so as to guide the strips laterally and downwardly past said receiving compartments.

31. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in relatively superposed relation in a single column, and strip deflector plates adjacent to the respective receiving compartments and adjacent to the points of communication of the chutes therewith, said deflector plates being inclined to the general courses of the respective chutes and positioned for engagement with certain of said strips to cause them to be folded in the respective compartments.

32. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in relatively superposed relation in a single column, strip deflector plates adjacent to the respective receiving compartments causing certain of the strips to be folded in the respective compartments, and a plurality of independently adjustable strip guides adjacent to the chute entrance passageways for guiding the strips to the latter.

33. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in relatively superposed relation in a single column, strip deflector plates adjacent to the respective receiving compartments causing certain of the strips to be folded in the respective compartments, certain of said receiving compartments having upper walls forming strip guides to which certain other of said chutes lead so as to guide some of the strips laterally and downwardly past said receiving compartments, and a plurality of independently adjustable strip guides adjacent to the chute entrance passageways for guiding the strips to the latter.

34. In a strip separating apparatus, in combination, a plurality of gravity chutes of varying length in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in relatively superposed relation in a single column, and strip deflector plates adjacent to the respective receiving compartments causing certain of the strips to be folded in the

respective compartments, certain of said receiving compartments having upper walls forming strip guides to which certain other of said chutes lead so as to guide some of the strips laterally and downwardly past said receiving compartments.

35. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, strip folding means for causing certain of the strips to be folded in zigzag packs in the respective receiving compartments, a support for a supply pack of strips positioned at one side of the ends of said chutes, and a strip assembly guiding passageway for guiding the strip assembly to the writing mechanism of a writing machine.

36. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in superposed relation in a single column, strip deflector plates adjacent to the respective receiving compartments causing certain of the strips to be folded in the respective compartments, certain of said receiving compartments having upper walls forming strip guides to which certain other of said chutes lead so as to guide the strips laterally and downwardly past said receiving

compartments, a support for a supply pack of strips positioned at one side of the ends of said chutes, and a strip assembly guiding passageway for guiding the strip assembly to the writing mechanism of a writing machine.

37. In a strip separating apparatus, in combination, a plurality of gravity chutes of varying length in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, said receiving compartments being arranged in relatively superposed relation in a single column, strip deflector plates adjacent to the respective receiving compartments causing certain of the strips to be folded in the respective compartments, a support for a supply pack of strips positioned at one side of the ends of said chutes, and a strip assembly guiding passageway for guiding the strip assembly to the writing mechanism of a writing machine.

38. In a strip separating apparatus, in combination, a plurality of gravity chutes in upright position, side by side, in which strips from an assembly pass downwardly by gravity, receiving compartments with which the lower ends of certain said chutes respectively communicate so as to receive the strips from the chutes, strip folding means for causing certain of the strips to be folded in zigzag packs in the respective receiving compartments, and a plurality of independently adjustable strip guides adjacent to the chute entrance passageways for guiding the strips to the latter.

ALBERT W. METZNER.