Nov. 19, 1940. L. F. HAGEMAN 2,221,917

SELECTIVE SEPARATION OF CONTINUOUS INTERLEAVED RECORD ASSEMBLY

Filed Dec. 9, 1938 2 Sheets-Sheet 1

Fig. 1.

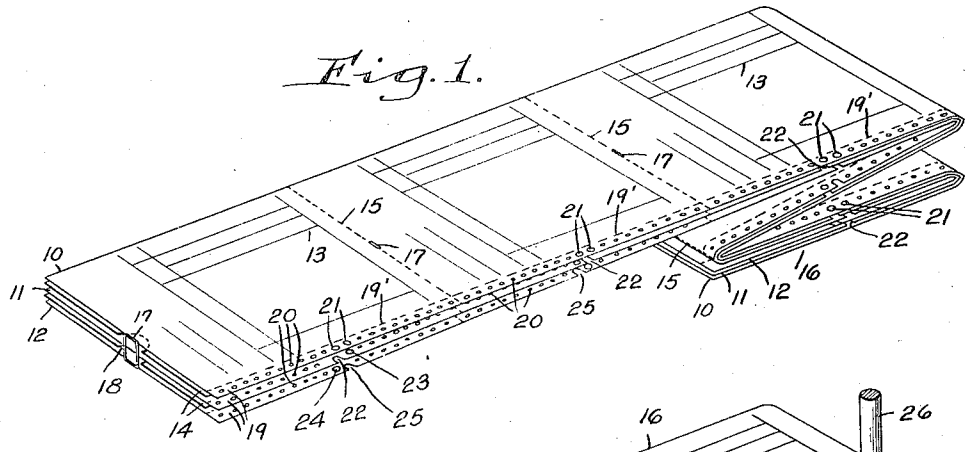


Fig. 2.

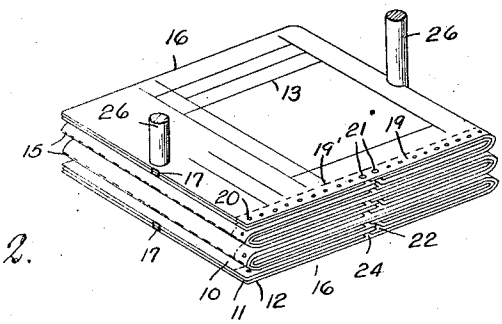


Fig. 9.

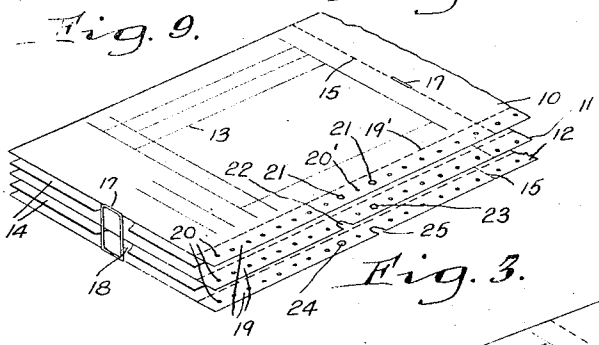
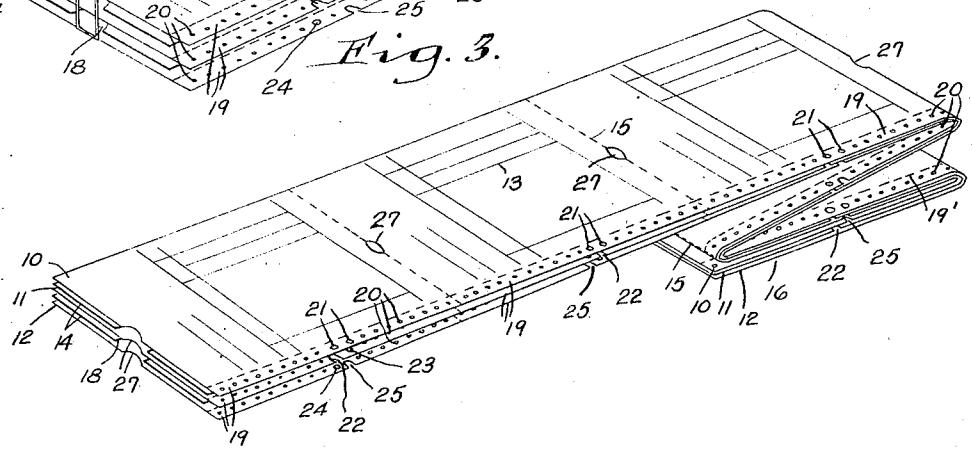


Fig. 3.



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Fig. 4.

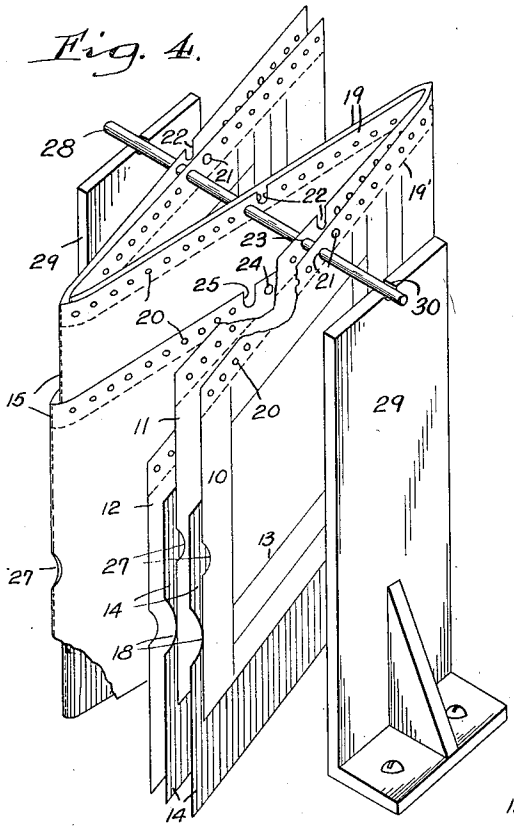


Fig. 6.

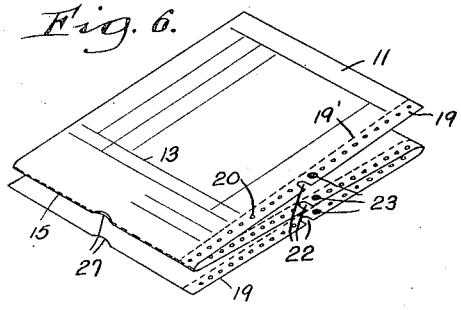


Fig. 5.

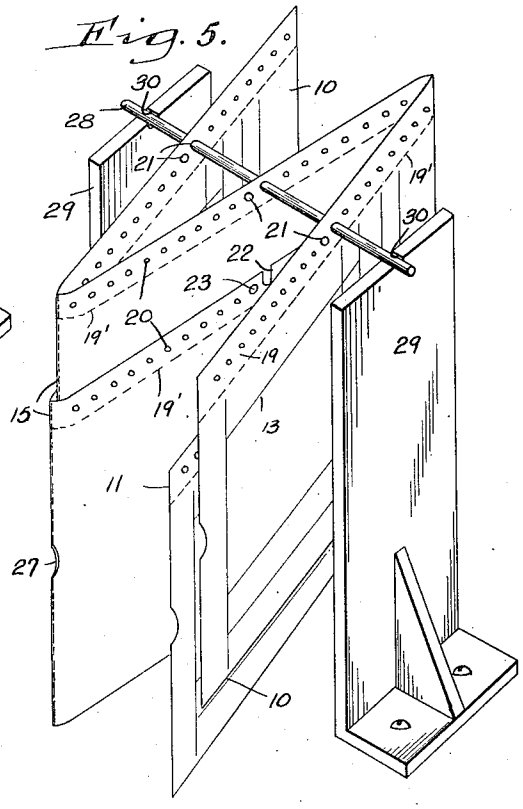


Fig. 7.

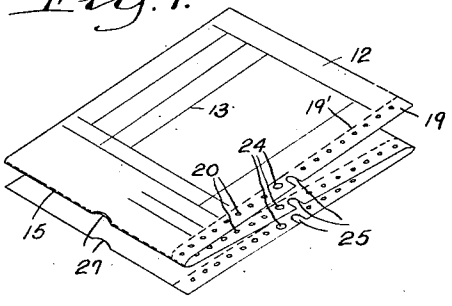
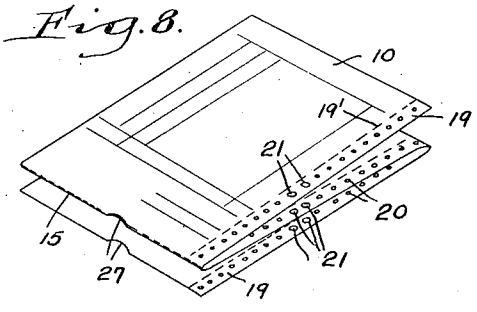


Fig. 8.



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UNITED STATES PATENT OFFICE

2,221,917

SELECTIVE SEPARATION OF CONTINUOUS INTERLEAVED RECORD ASSEMBLY

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Application December 9, 1938, Serial No. 244,823

10 Claims. (Cl. 282—12)

This invention relates to improvements in methods and means for separating long continuous interleaved strips from each other, and more particularly to improvements in methods and means for separating long continuous interleaved record and transfer strips which are interfolded in the form of a zigzag pack.

It is a general object of the invention to provide a method and means of the character mentioned whereby the long continuous interleaved strips may be quickly and easily separated from each other by a simple operation without damaging the strips, without soiling the fingers with the transfer material, and without the use of complicated mechanism.

A further object of the invention is to provide an improved method and means whereby interleaved zigzag folded strips may be readily separated from each other, while the strips remain in their original zigzag folded condition, thus requiring very small operating space and simplifying and expediting the operation.

A further object of the invention is to provide simple structural formations in interleaved strip assemblies ordinarily provided with marginal pin feed apertures, whereby the strips, by a simple operation requiring only the unskilled work of an ordinary operator, may be separated from each other.

Other objects of the invention will be in part pointed out in the following detailed description of certain illustrative but preferred embodiments of the invention, and will be in part obvious in connection therewith.

The invention accordingly comprises an article of manufacture having the features, properties and relation of elements, and also comprises the several steps and the relation of one or more of such steps to each of the others, which will be exemplified in the article and method hereinafter disclosed, and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature and objects of the invention reference is had to the following detailed description and to the accompanying drawings in which:

Fig. 1 is a perspective view of an assembly of record and transfer strips embodying the invention;

Fig. 2 is a perspective view of a zigzag folded strip assembly illustrating diagrammatically the method of removing the strip attachments;

Fig. 3 is a view similar to Fig. 1 showing the strip assembly after the attachments have been removed;

Fig. 4 is a detail perspective view illustrating the method of removing the zigzag folded strips from each other;

Fig. 5 is a view similar to Fig. 4 illustrating another step in the separation of the interfolded strips;

Figs. 6, 7 and 8 are perspective views showing fragments of the different strips after being separated from each other; and

Fig. 9 is a fragmentary perspective view similar to Fig. 1 but showing a slightly modified form of the structure for affecting strip separation.

Referring to the drawings for a detailed disclosure of the invention, the illustrative embodiment has been incorporated in an assembly of long continuous record strips 10, 11 and 12 of paper or similar material, each preferably provided with blank forms 13 for receiving inscriptions. These strips are interleaved with each other in manifolding relation, carbon strips 14 being interleaved in transfer relation with the record strips. Both the record and transfer strips are formed at longitudinally spaced intervals with transverse weakened severance lines 15 formed by perforating, scoring, or the like. These assembled strips are preferably zigzag folded along transverse lines so as to dispose them in the form of zigzag pack 16. The reverse folding of the strips is, as shown, preferably along the transverse lines of weakening 15.

As shown, the transfer strips 14 are coated on their lower surfaces with carbon or similar transfer material for the purpose of transferring to the underlying record strips, inscriptions written upon the top or original record strip. Also as shown, it is common in assemblies of this nature to attach the strips together as, for example, by means of attaching staples 17 ordinarily positioned directly upon the transverse tearoff lines 15. It will be understood that other forms of attaching means are often found in this type of strip assembly, and may be substituted for those shown.

Frequently, in this type of strip assembly, means are provided whereby the record and transfer sheets of a set of assembly sheets severed from the complete assembly along the weakened line 15, may be separated or stripped from each other. This selective separating means is diagrammatically indicated at 18 and its structure and arrangement may be substantially as disclosed in detail in Patent No. 2,083,295 Conklin, granted June 8, 1937. Since this feature may be utilized only as an alternative to the strip separating means described more in detail below,

and is not particularly a part of the present invention, it need not be further herein described.

As shown in the drawings, it is common in this class of strip assemblies, for the carbon or transfer strips to terminate at one longitudinal edge thereof inside or short of the corresponding longitudinal edges of the record strips. This provides for the longitudinal feed bands or margins 19 of the record strips projecting outwardly beyond the adjacent longitudinal edges of the transfer strips. These feed bands 19 are in superposed relation with each other and each is formed with a series of pin feed apertures 20, the apertures being longitudinally spaced for cooperation with feeding mechanism of the type employing pins adapted to enter into feeding engagement with the apertures. In order that the feed band 19 may be readily detached, it is often desirable to provide a longitudinally disposed weakened severance line 19' between the body of the record strip and the feed band. This severance line may be formed by weakening the strip in known manner, such as perforating, scoring, or the like.

As mentioned above, the transverse weakened lines 15 divide each of the record and transfer strips into a series of record and transfer sheets which are interleaved with each other in sheet sets, each set being defined or bounded at its ends by the lines 15. When the strip assembly is folded into the zigzag pack 16 these sheet sets are disposed in superposed relation with each other. Thus all of the fastening devices 17 are positioned in relatively superposed relation in two sets or series positioned respectively at the opposite ends of the pack 16.

In order to separate the zigzag folded strips intact from each other after the fastening devices 17 have been removed, said strips are provided with selective separating formations preferably arranged along the longitudinal margins thereof and at each set of sheets. As shown in the illustrative embodiment, this selective strip separating means includes closed apertures 21 in the top strip 10 preferably, as shown, forming a part of the pin feed apertures 20. These closed or separating apertures 21 are, as shown, preferably postioned at each set of sheets along the assembly and preferably as near as possible to the center of length of the sheet sets. This positioning of the apertures 21 provides for the balanced withdrawal of the zigzag folded strips from each other, as more fully described below.

Positioned in depthwise alignment with the strip separating apertures 21, are additional strip separating apertures 22 and 23 formed in the intermediate record strip 11 and also preferably positioned in each leaf or sheet set of the assembly. The separating apertures 22 and 23 also preferably form parts of the series of pin feed apertures 20. Each of the apertures 22 opens through the adjacent edge of the strip 11, while the apertures 23 are closed similarly to the apertures 21. The lower strip 12 is also provided with strip separating apertures 24 and 25, the aperture 24 being closed similarly to apertures 21 and 23, while the apertures 25 open through the adjacent strip edge as do the apertures 22. All of these strip separating apertures as shown preferably from parts of the corresponding series of pin feed apertures 20. The strip separating apertures are relatively positioned in the several sheet sets so that, when the strips are zigzag folded, the apertures are respectively aligned with each other depthwise of the zigzag folded pack. This is clearly shown in Figs. 1, 2 and 3.

As shown, one aperture 21 of each pair of closed apertures of strip 10 is in depthwise alignment with the open apertures 22 of the strip 11, and also with the closed apertures 24 of the underlying strip 12, while the other closed aperture 21 of each pair is in depthwise alignment with the closed apertures 23 of the strip 11, and with the open apertures 25 of the strip 12. The carbon strips 14 being narrower than the record strips so as not to overlap the feed bands 19 of the record strips, are ordinarily unprovided either with pin feed apertures or with strip separating apertures. In cases where the carbons extend outwardly to overlap the feed bands they will be similarly provided with pin feed apertures and with strip separating apertures arranged similarly to those of the record strips, for effecting selective strip separation.

Ordinarily it is desirable to make the strip separating apertures, both the open and the closed ones, slightly larger in diameter than the other regular strip feed apertures 20 of the pin feed series. One reason for this is that the apertures of the superposed strips, when said strips are zigzag folded into the pack 16, are caused to be longitudinally disaligned very slightly due to the folding of the strips at the ends of the pack. Since, as described more in detail below, it is desired to insert a strip removing implement through all of the aligned superposed apertures, it is advantageous to have the apertures sufficiently large to receive the implement freely and without obstruction to the entry thereof.

This enlargement of the strip separating apertures over the feed apertures 20 ordinarily will not interfere at all with the correct operation of the pin feed mechanism to accurately advance the strips. This is principally for the reason that most pin feed mechanisms used for this purpose have a multiplicity of longitudinally spaced pins in simultaneous feeding engagement with the pin feed apertures of the assembly. In some cases, however, it may be desirable to make correction for this enlargement of the strip separating apertures. A slight modification for effecting this result is shown in Fig. 9. As there illustrated, there may be one or more pin feed apertures 20' spaced in the series intermediate the strip separating apertures 21, 22, 23, etc. Therefore, it will be seen that with this arrangement one of the feed pins will engage with the apertures 20' when an adjacent or next successive feed pin is in engagement with one of the strip separating apertures. By means of this arrangement, the correct and accurate feeding of the strip assembly is assured under all conditions.

When it is desired to separate the long continuous strips from each other and from the assembly, the first step is to remove the strip fastening devices 17. When said fastening devices are positioned substantially at the longitudinal margins of the pack 16 as above described, their release may be simultaneously effected by a simple operation. As indicated diagrammatically in Fig. 2, this release may be effected by means of punching apparatus embodying the punches 26, the longitudinal spacing of which may be adjusted so as to register with the opposite ends of the pack 16 in alignment with the fastening devices 17. When thus arranged, the punches 26 descend and punch out the opposite margins of the pack including the fastening devices 17. When the fastening devices have been thus

removed, small strip sections are removed from the strips as indicated at 27.

When the strips have been thus freed from attachment with each other, the separation thereof may be readily accomplished very quickly, and by means of a very simple separating implement adapted to cooperate with the selectively arranged strip separating apertures 21, 22, 23, 24 and 25. Such an implement is illustrated in Figs. 4 and 5 in the form of a separating rod 28 which may be of metal or other suitable material. The separating rod 28 is of appropriate length to extend entirely through the assembly or pad 16, and of a diameter to freely enter the strip separating apertures. Since the separating apertures will ordinarily be slightly disaligned with each other in each sheet set due to the strip folding as described, the separating rod is preferably made slightly smaller than the aperture diameters and may be rounded or pointed or similarly appropriately formed at its entering ends.

Also as shown in Figs. 4 and 5, rests or supporting brackets 29 may be appropriately attached in spaced relation to each other to any convenient supporting surface. These supports may have notches or apertures 30 for receiving the opposite end portions of the separating rod 28. The brackets 29 may be made of any desired height for the accommodation of strips of different width, the height being somewhat greater than the maximum strip width.

Figs. 4 and 5 are largely diagrammatic for the purpose of illustrating the method of operation. The zigzag folded pack 16 with fastening staples 17 removed, is placed in vertical position in edgewise relation between the supports 29 and the separating rod 28 inserted through the aligned closed apertures 21 and 23 of the two upper record strips 10 and 11. The rod thus passes through the aligned open apertures 25 of the lower strip 12. Also the rod does not engage the transfer strips 14 because of the inwardly spaced longitudinal edges thereof. When in this position the rod may be jogged or vibrated slightly up and down, either manually or by appropriate mechanism. This action tends to overcome the static friction between the strips and those not positively engaged by the rod in the closed apertures thereof move downwardly by gravity. As described, the selectively arranged separating apertures are positioned substantially centrally of the sheet sets of the zigzag pack, thus balancing the strip separating effort. One of the initial stages of the operation is shown in Fig. 4 wherein the record strip 12, together with the carbon strips 14 have become partially separated from the other two record strips. Completion of the separation may be readily effected by lifting the two strips engaged by the rod away from the other strips. A second stage of separation is illustrated in Fig. 5 wherein the separating rod engages only the closed aligned separating apertures 21 of strip 10, and also engages in the open apertures 22 of the strip 11. The vibration of the rod 28 as described above then causes separation of the two strips from each other.

It will be noted from the foregoing disclosure that the assembly strips may be quickly and easily separated from each other while the strips are still intact, and the sheets of each strip are still connected together. Also, the separation is effected while all of the strips still remain in their zigzag folded condition and it is unnecessary at any stage of the separating operation to straighten the strips out. The separation is thus greatly expedited and very little space is required for the operation. It is unnecessary for the operator to touch the carbon strips, and soiling of the fingers or record strips is avoided. Often after the record strips have been inscribed, it is desirable to keep one or more of the strips intact and in its zigzag folded condition for the purpose of filing and for similar uses. This condition is satisfactorily met by these improvements. In case it is desired to separate the carbon strips alone from all of the record strips, the selective separating formations will be modified so that all of the record strips will have the closed separating apertures positioned for simultaneous engagement by the separating rod 28.

Since certain changes in carrying out the above process, and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of separating long continuous interleaved strips zigzag folded into superposed sets of sheets to form a zigzag pack, and being attached together substantially at the fold lines, including initially removing the strip attachments, simultaneously selectively engaging a plurality of the sheets of one of the zigzag folded strips to the exclusion of the sheets of another strip, and then exerting separating effort upon the selectively engaged sheets so as to withdraw the strip while still in zigzag folded condition.

2. An assembly of long continuous interleaved strips zigzag folded to form superposed sets of sheets arranged in a zigzag pack, the sheets of one of said strips having apertures arranged in a series along a longitudinal strip margin and opening through the adjacent sheet edges of said sets and arranged in depthwise alignment in the zigzag pack, the sheets of another strip having closed apertures arranged in a series along a longitudinal strip margin and in the sheet sets in depthwise alignment with said opening apertures, whereby sheets with closed apertures may be simultaneously engaged by a removing implement to the exclusion of the sheets with the said opening apertures, so that the strips with the closed apertures may be withdrawn from the pack while still in zigzag folded condition.

3. An assembly of long continuous interleaved strips zigzag folded to form superposed sets of sheets arranged in a zigzag pack, the sheets of a plurality of said strips having longitudinally spaced strip separating apertures arranged in a longitudinal series along the longitudinal strip margins, one of said apertures of each said sheet opening through the adjacent sheet edges and another of said apertures of each sheet being closed, the closed apertures of each strip being respectively in depthwise alignment throughout the zigzag pack with the said opening apertures of another said strip, whereby the said closed apertures of either of said strips may be simultaneously engaged by a removing implement to the exclusion of removing engagement with the other apertured strip, so that the said engaged strip may be withdrawn from the pack while still in zigzag folded condition, each said apertured

strip having a longitudinal series of pin feed apertures and said opening and closed separating apertures being respectively substantially coincident with certain of said pin feed apertures.

4. An assembly of long continuous interleaved strips zigzag folded to form superposed sets of sheets arranged in a zigzag pack, the sheets of a plurality of said strips having longitudinally spaced strip separating apertures arranged in a longitudinal series along the longitudinal strip margins, one of said aperture of each said sheet opening through the adjacent sheet edges and another of said apertures of each sheet being closed, the closed apertures of each strip being respectively in depthwise alignment throughout the zigzag pack with the said opening apertures of another said strip, whereby the said closed apertures of either of said strips may be simultaneously engaged by a removing implement to the exclusion of removing engagement with the other apertured strip, so that the said engaged strip may be withdrawn from the pack while still in zigzag folded condition, each said apertured strip having a longitudinal series of pin feed apertures and said opening and closed separating apertures being respectively substantially coincident with certain of said pin feed apertures, said opening and closed apertures being larger than said feed apertures and longitudinally spaced a greater distance than the feed aperture spacing, and a feed aperture of each set being positioned between strip separating apertures of the same series.

5. An assembly of long continuous strips in relatively superposed relation and having aligned series of pin feed apertures arranged in a longitudinal series along each longitudinal strip margin, said strips being zigzag folded to form a zigzag pack of superposed sheets, one of the feed aperture of each said sheet of one strip opening through the strip edge, said opening apertures throughout said zigzag pack being positioned in depthwise alignment with each other and respectively with closed said feed apertures of another strip.

6. An assembly of long continuous interleaved record strips and at least one interleaved long continuous carbon strip, said record and carbon strips being zagzag folded to form a multiplicity of superposed sets of interleaved record and carbon sheets arranged in a zigzag pack, one longitudinal margin of each of said record strips extending laterally beyond the adjacent longitudinal edge of the carbon strip and being provided with a longitudinal series of pin feed apertures positioned beyond the edge of the carbon strip and extending over the record sheets of the sheet sets, said series of pin feed apertures being in superposed relation with each other, the record sheets of each of a multiplicity of said sheet sets having selectively arranged open and closed strip separating apertures respectively coincident with certain of said pin feed apertures, the said closed apertures being arranged in a series along one of said record strips and positioned at the respective record sheets thereof, the said open apertures being arranged in a series along another of said record strips and positioned at the respective record sheets thereof, and said open and closed apertures of said sheet sets being positioned in depthwise alignment with each other throughout the zigzag pack so as to provide for selective separation of the strips when in zigzag folded condition.

7. A long continuous manifolding strip divided to form a longitudinal series of attached sheets, said strip having a longitudinal series of pin feed apertures substantially equally longitudinally spaced and extending along each said sheet, one of said feed apertures at each said sheet opening through the sheet edge to form a selective separating means.

8. The method of separating long continuous interleaved strips zigzag folded into superposed sets of sheets to form a zigzag pack, which includes: simultaneously selectively engaging one of the zigzag folded strips at a multiplicity of points along a longitudinal marginal portion thereof coincident respectively with the said sheets of the strip, while avoiding similar engagement with another of said strips, and then exerting separating effort upon the selectively engaged sheets so as to withdraw the engaged strip in an edgewise direction from the longitudinal edge of the pack while still in zigzag folded condition.

9. The method of separating long continuous interleaved strips zigzag folded into superposed sets of sheets to form a zigzag pack, and being attached together substantially at the fold lines, including initially removing the strip attachments, simultaneously selectively engaging one of the zigzag folded strips at a multiplicity of points along a longitudinal marginal portion thereof coincident respectively with the said sheets of the strip, while avoiding similar engagement with another of said strips, and then exerting separating effort upon the selectively engaged sheets so as to withdraw the engaged strip in an edgewise direction from the longitudinal edge of the pack while still in zigzag folded condition.

10. An assembly of long continuous interleaved strips zigzag folded to form a multiplicity of superposed sets of seets arranged in a zigzag pack, a plurality of selective strip separating formations having parts respectively adapted to engage in separating relation with a separating implement, said separating formations lying in a series along a longitudinal margin of one of said continuous strips, one of said selective formations being positioned at each said sheet of the respective strip and at each said sheet set, and said selective formations being arranged in depthwise alignment with each other in the zigzag pack so as to be simultaneously selectively engageable by said implement to the exclusion of the sheets of another strip that is unprovided with separating formations corresponding to and aligned with those mentioned, whereby the strip having the separating formations may be selectively withdrawn in edgewise direction from the longitudinal edge of the zigzag pack while still in zigzag folded condition.

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