April 26, 1938. C. R. MABON 2,115,392

MANIFOLDING RECORD

Filed March 1, 1934 2 Sheets-Sheet 1

Fig. 1.

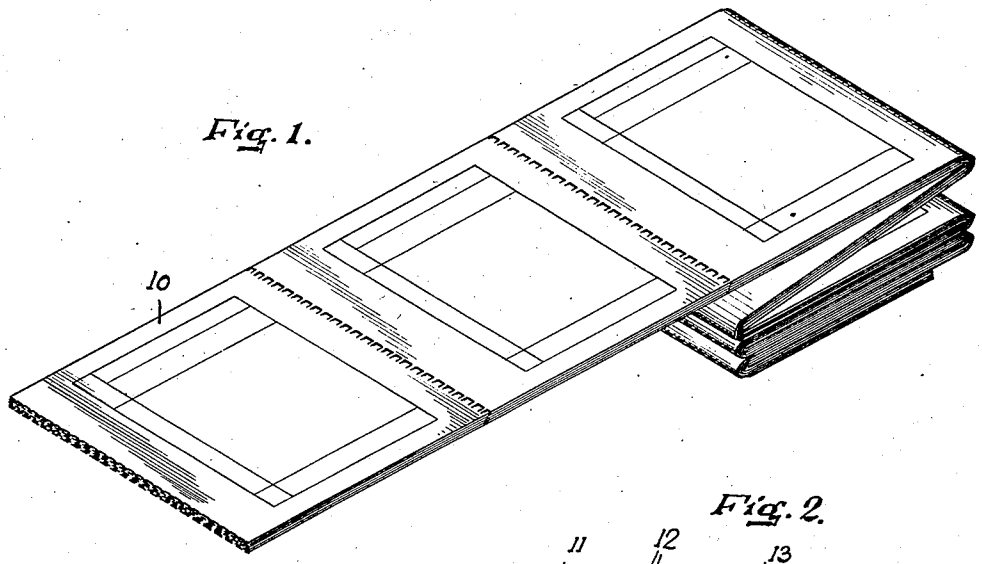


Fig. 2.

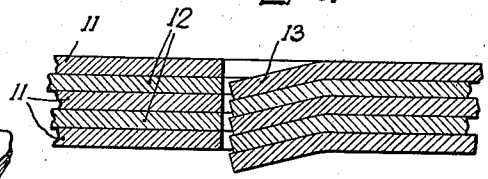


Fig. 4.

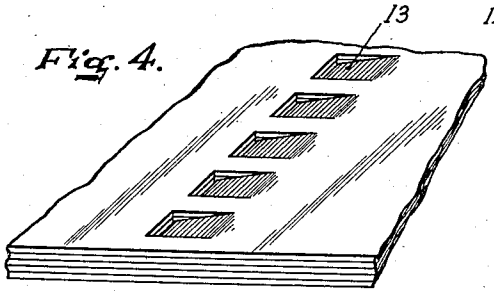


Fig. 3.

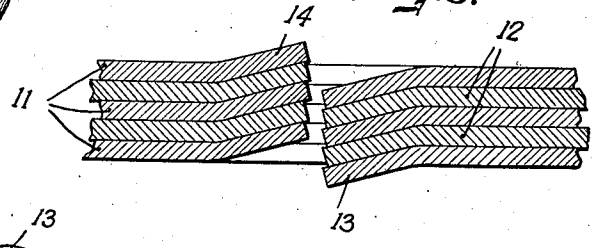
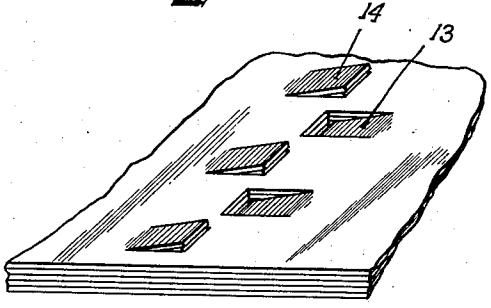


Fig. 5.



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April 26, 1938. C. R. MABON 2,115,392

MANIFOLDING RECORD

Filed March 1, 1934 2 Sheets-Sheet 2

Fig. 6.

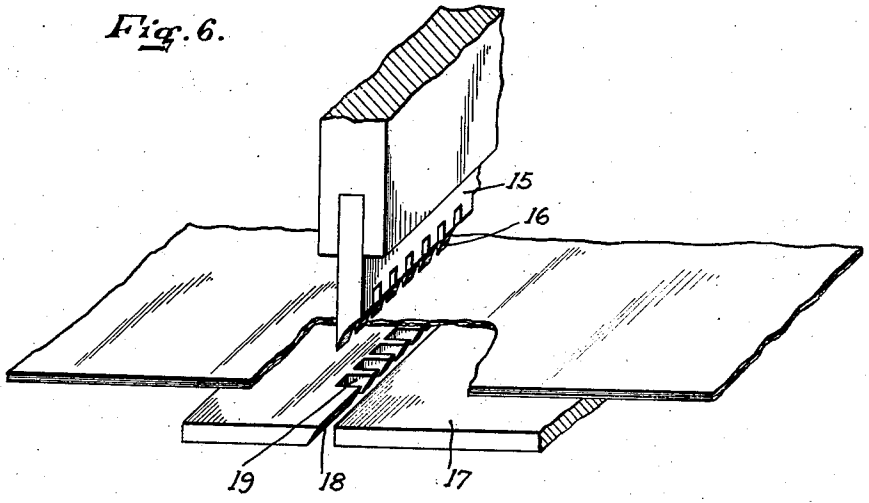


Fig. 7.

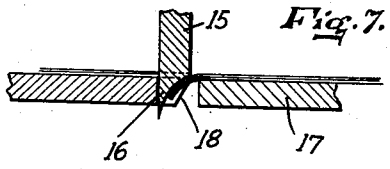


Fig. 3A.

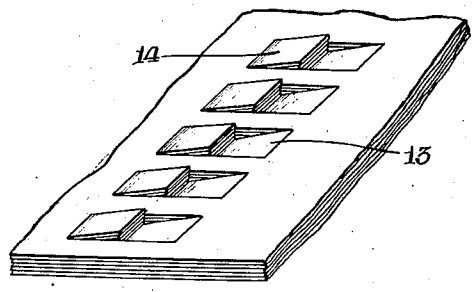
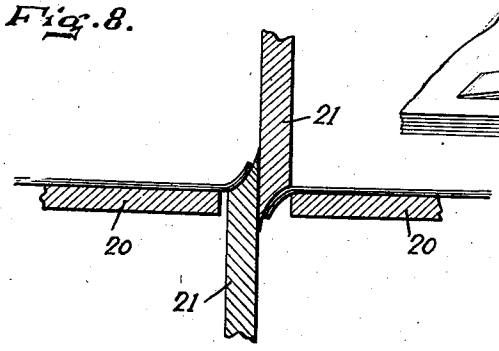


Fig. 8.



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Patented Apr. 26, 1938 2,115,392

UNITED STATES PATENT OFFICE

2,115,392

MANIFOLDING RECORD

Carl Robert Mabon, Niagara Falls, N. Y., assignor, by mesne assignments, to Gilman Fanfold Corporation, a corporation of Delaware

Application March 1, 1934, Serial No. 713,455

12 Claims. (Cl. 282—12)

This invention relates to improvements in records or manifolding assemblies, wherein long continuous record and carbon strips are interleaved in manifolding transfer relation with each other, and more particularly the invention relates to an improved means for attaching such strips together in the assembly, and to the provision for severing the inscribed sections from the complete assembly.

It is a general object of the invention to provide an improved manifolding assembly of the class mentioned having an improved structural form of weakened tear-off lines which are adapted to hold the strips together in collocated position with reference to each other.

By means of the present invention a record comprising a plurality of superposed layers is provided with a novel structure functioning in a novel and advantageous manner to effectually guard against accidental shifting of one layer with respect to other layers. Moreover, by the present invention, a structure is furnished which will in no wise interfere with the present mechanisms as incorporated in registers, typewriter, billing machines, etc., in connection with which the record is intended for use.

According to another feature of improvement, the sheets or strips making up the record assembly are structurally modified so as to cause the modified parts of the different superposed strips to engage and interlock with each other in such a manner as to retain them in their proper assembled relation.

Another object is to provide an improved interlocking structure of the strips of the record assembly so as to retain them in collocated position, and at the same time to weaken said strips along the lines of the interlocking strip structure to facilitate severance thereof along these lines, whereby groups or sets of relatively superposed inscribed sheets may be severed from the assembly.

Still another object of the invention is to provide an improved structural form of perforation for weakening a plurality of superposed strips for severance at intervals therealong, and for interlocking in such a manner as to retain these strips in assembled relation.

Further objects of the invention are those of providing a mechanism as well as devising a method of manufacture by means of which the record and structure may be readily and economically produced, without it being necessary to modify or reconstruct record producing mechanism as at present existing.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating practical embodiments of the invention, and in which—

Fig. 1 is a perspective view of one form of record incorporating the improved structure;

Fig. 2 is a fragmentary enlarged sectional view of a portion of such record;

Fig. 3 is a view similar to Fig. 2, but showing a slightly different structure;

Fig. 3A is a fragmentary perspective view of the embodiment of the invention shown in Fig. 3;

Fig. 4 is a fragmentary perspective view of the embodiment of Figs. 1 and 2;

Fig. 5 is a perspective view similar to Figs. 3A and 4 but showing a further modified embodiment of the invention;

Fig. 6 is a perspective view of the apparatus which may be employed to produce a record of the type shown in Figs. 1, 2 and 4;

Fig. 7 is a sectional side view of the parts shown in Fig. 6; and

Fig. 8 is a view similar to Fig. 7, but showing the apparatus employed in the method which is followed in producing a record of the type shown in Figs. 3 and 5.

The present invention lends itself to use in connection with practically every type of record wherein superposed layers or strips are employed, as for instance in records wherein the record strips are separate, individual strips, or in fanfold records wherein the strips are integrally connected together at the longitudinal side edge of the record. Preferably, however, and as illustrated, it is embodied in a zigzag record comprising superposed layers of carbon and inscription receiving material, the record between the lines of fold being conveniently furnished with indicia at least in its uppermost inscription receiving layer, so that a set of leaves or record forms are provided between the lines of fold. This set is preferably severed along the lines of fold subsequent to receiving the lines of inscription, and its component parts are distributed as may be desirable or necessary.

Heretofore a simple line of perforations, scoring, or other form of weakening has been formed along the line of fold so that, in cooperation with a tearing bar, or even independently thereof, the inscribed set of record forms might be severed from the body of the record. It is proposed by the present invention that in lieu of these lines of perforations alone an interlocking structure will be provided along this line

which will in no wise interfere with the severance of the record set, but will, in fact, facilitate such separation, while at the same time preventing accidental displacement of the superposed layers of the set. Of course, if a zigzag record is not employed, the structure, instead of being located in line with the line of folds, may be otherwise disposed. In fact, even where the structure is embodied in the preferred form of record, it need not necessarily occur in line with the fold line, nor need it (as illustrated) extend entirely across the record.

Accordingly, as shown in Figs. 1 and 2, a set or manifolding assembly 10 of the long continuous traveler type is shown including relatively superposed record strips 11 preferably carrying suitable blank forms and also including carbons or transfer strips 12 also of the long continuous traveler type and interleaved in transfer manifolding relation with the record strips. The assembly may include any desired number of record strips with interleaved transfer strips, but instead of the transfer strips it may be desirable in some cases to coat the under surfaces of the record strips with transfer material for the purpose of making the transfer inscriptions. The transfer strips may be coated with transfer material on the under surface alone in the usual manner, or on both the upper and lower surfaces if desired. The record assembly is preferably folded along transverse lines as shown in Fig. 1, so that the sets of form leaves occupy superposed positions. It will be understood that the sets of form leaves are arranged in a series along the manifolding assembly, being formed either by the transverse fold lines or by the weakened transverse severance lines formed in both the record and carbon strips and described in detail below. The transverse severance lines mentioned may, as shown in Fig. 1, be located substantially upon the fold lines of the assembly, or they may be spaced therealong at other points as desired. These transverse weakened severance lines are of special improved construction provided by slitting the superposed strips along lines deviating from straight lines so as to provide a series of flexible tongues 13 integrally attached to the respective strips and having free end and side edges provided by the deviating slits.

Thus the face of the record in line with the point of severance is formed with a series of depressed areas in which the downwardly displaced edge of an upper layer bears against the adjacent edge of a lower layer. It is, of course, understood that this displacement might be of any desired degree, but in any event a structure is presented which prevents longitudinal shifting or creeping of one layer with respect to an adjacent layer. This occurs because the tongues will abut against the adjacent edges of the layers if a tendency to shift in one direction occurs, while the tongues might straighten out if relative shifting in an opposite direction is to occur.

In certain instances where it may be desired to safeguard in an even more emphatic manner against the possibility of shifting, the record may incorporate slits and displacement such that, in effect, two series of opposed and oppositely displaced tongues occur. This has best been illustrated in Figs. 3 and 5, in which the numeral 13 shows tongues displaced in the manner shown in Figs. 2 and 4, while the numeral 14 indicates the opposed tongues, it being noted, as in Fig. 3, that these tongues may be aligned longitudinally of the record with each other, while, as in Fig. 5, they may be staggered with respect to each other. Obviously by this structure danger of shifting either sideways or longitudinally of the layers, as well as the individual sheets thereof, will be reduced materially, if not completely eliminated, in that the layers will be so completely interlocked that a deliberate straightening of the tongues or relatively forcible separation of the sheets will be necessary to allow of slippage in any direction.

In the embodiments of Fig. 3 and 5, it will be noticed that the tongues 13 of one series are deflected with reference to the general plane of the assembly in a direction opposite to the deflection of the tongues 14 of the other series. However, in the various illustrative embodiments of the invention shown, each of the tongues is deflected depthwise of the assembly, that is, the tongue deflection is at an angle to the general plane of the strip in which the tongue is located, whereby each tongue in its deflected position will lie in the aperture of an adjacent strip in inclined position therein. Also, in Figs. 3 and 5, the tongues of the adjacent series are faced in opposite directions and toward each other, or in other words, their free end edges are positioned in opposite directions from their respective integral attachments with the strips from which they fly. In the embodiment of Figs. 2 and 4, the tongues all fly in the same direction with reference to their attached edges.

With a view to producing a structure of the present invention, the press upon which the record is made may be equipped with a structure of the nature shown in Figs. 6 to 8, but a separate apparatus including this structure might be employed. In the first two of these views, a blade 15 is formed with a series of punch elements 16, this blade cooperating with a suitable supporting plate 17 which is slotted as at 18 and notched as at 19 to receive the punches 16. Both the plate 17 and the blade 15 may be mounted upon, or form parts of, rotary cylinders, or, if desired, they might be otherwise driven. In any event, as the paper moves past this station, the punches 16 will move downwardly, thus cutting the record to provide a series of tongues which are displaced to form the structure shown in Figs. 2 and 3. Where mutually cooperating punches are employed, a plate 20 may be utilized to support the record, and the punches 21 reciprocate in plate openings to cut opposed tongues in the record, it being obvious that the individual punches may be offset with respect to each other if the tongues of the different series are to occupy relatively staggered positions.

In the several illustrative embodiments of the invention, each of the attaching tongues 13 or 14 is formed by a slit in the respective strip, said slit being so deviated or deflected from a straight line as to provide the tongue with a free end edge and with oppositely disposed free side edges adjacent to the end edge. Although the slit may be variously deviated from a straight line to provide a tongue of this type, it is herein shown as having oppositely disposed spaced side sections extending for at least a short distance along the opposite sides of the tongue and intersecting the end section which forms the free end of the tongue. As shown, each slit extends entirely through the strip at the end section thereof and for at least a portion of each side section, and at the parts of the latter adjoining the end section. The side sections of the slit are disposed at an angle to the general line

of the tongues and apertures on the strip. This arrangement provides the tongue with a free swinging end and flying from its integral attachment with the strip. The tongues thus formed are of the same size and shape as the apertures provided by the slits and the superposed apertures and tongues in all of the superposed strips are of substantially the same size and shape.

In the assembly constructed and arranged as described, the tongues are deflected from their original position and with reference to the general plane of the assembly into slightly inclined positions as shown in the various illustrative embodiments. When thus deflected the tongues occupy adjacent apertures, the exact location in the apertures being dependent upon the extent of the deflection and inclination of the tongues which may vary considerably in practice. Ordinarily the tongues, as shown in the drawings, will be deflected through a small acute angle so that said tongues, or those that are active in performing the strip retaining and aligning functions mentioned lie substantially within the upper and lower surfaces or bounding planes of the assembly. This arrangement thus provides an interlocking structure functioning to bind the strips together in the assembly and at the same time forming weakened severance lines by virtue of the spaced apertures formed by the slits, thus providing for the severance of the inscribed sets of form sheets from the long continuous manifolding assembly.

When assembled as described, the tongues occupy inclined positions in the respective apertures and they are also in edgewise relation in the apertures. In other words, the tongues occupy an inclined edgewise position in the apertures in which one end edge of each tongue is connected integrally with the respective strip, and its opposite end edge is positioned within the aperture in juxtaposition to the strip material at the end edge of the aperture. It is preferable that the tongues as shown extend throughout their lengths substantially longitudinally of the record assembly. With this arrangement, the tongues are very effective and well adapted to engage with the strip material at the aperture edges to prevent longitudinal and transverse relative movements between the superposed strips. At the same time the opposite lateral or side edges of the tongue are also positioned in the respective apertures in juxtaposition to the strip material at the lateral aperture edges. Due to the fact that the tongues are of substantially the same width as the apertures, said tongues engage closely in the apertures in frictional contact with the exposed strip edges at the apertures to provide a rather firm interlock holding the strips in collocated position and preventing relative lateral movements thereof. The end edges of the tongues will simultaneously cooperate in a similar manner with the strip material in the apertures to check undue relative longitudinal strip shift, and in the embodiments of Figs. 3 and 5, such relative longitudinal shift will be checked in opposite directions. Although this interlocking connection functions very satisfactorily to retain the strips in collocated position, due to the arrangement of the tongues in the apertures, minute relative longitudinal strip movements are permitted thus minimizing tearing and buckling tendencies when the assembly is folded or unfolded, and fraying and other damage are avoided. When the assembly is torn along the improved weakened severance line, the interlock is released to some extent so that the leaves of the severed set may be readily separated from each other; this is particularly true in the embodiment shown in Figs. 2 and 4, but the interlocking arrangement may be continued in the forms of Figs. 3 and 5 even after severance of a set of leaves from the assembly, so that the holding effect of the interlocking arrangement may be continued to some extent at least to hold the sheets of the severed sets together.

Since certain changes may be made in the above construction and different embodiments of the invention may be resorted to without departing from the scope of the invention, 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 thus fully described my invention, what I claim and desire to protect by Letters Patent is:

1. A manifolding record assembly of the character described having, in combination, a plurality of continuous record strips in superposed relation to each other, said record assembly having one or more transverse dividing lines along which it may be divided into a plurality of sets of record sheets, carbon sheets in interleaved transfer relation with the record sheets of said sets, the dividing lines in certain of said strips including a series of strip weakening perforations weakening the strips for severance along said dividing lines and having tongues integral with certain of the strips, said tongues deflected depthwise of the record assembly from one strip into engaging relation with the perforations in an adjacent strip, the lateral dimensions of said tongues being substantially the same as those of the respective receiving perforations, so that the tongues closely engage with the strip material at the perforation margins, thus to hold the strips and sheets in assembled manifolding relation, said tongues and perforations of said severance lines extending substantially to the opposite edges of the strips in which they are respectively located.

2. In a manifolding assembly, in combination, a plurality of relatively superposed record and transfer strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues being deflected away from their respective strips and lying in the respective apertures, the edges of said tongues being in close engagement with the strip material at the respective aperture margins so as to frictionally hold the strips detachably in assembled manifolding relation.

3. In a manifolding assembly, in combination, a plurality of relatively superposed strips including record and transfer strips positioned in manifolding transfer relation with each other, a plurality of said strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively

superposed record and transfer leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues being deflected away from their respective strips and engaging in inclined edgewise relation in the respective apertures and each having free end and side edges in juxtaposition to the respective edges of the apertures so as to abut thereagainst to detachably hold the strips together in superposed manifolding relation, and to restrain them against relative longitudinal and transverse movements.

4. In a manifolding assembly, in combination, a plurality of relatively superposed record and transfer strips in inscription transfer relation with each other, a plurality of said strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, and being substantially of the same size and shape so that the apertures closely receive the tongues, said tongues being deflected from their respective strips into engaging relation with the apertures so as to frictionally engage with the aperture edges to detachably hold the strips together and to retain them in aligning manifolding relation.

5. In a manifolding assembly, in combination, a plurality of relatively superposed manifolding record strips each having a longitudinal series of weakened severance lines dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues of each severance line being staggered with relation to each other and facing in opposite directions and being deflected in opposite directions away from their respective strips and engaging in the respective apertures, said tongues being substantially of the same width as the respective receiving apertures so that the opposite lateral edges of said tongues lie in close contact with the strip material at the respective aperture margins, thus to hold the strips in assembled manifolding relation, said tongues throughout their lengths extending longitudinally of the assembly.

6. In a manifolding assembly, in combination, a plurality of relatively superposed manifolding record strips each having a longitudinal series of weakened severance lines dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in series formation in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues of each severance line being arranged in two series facing toward each other and in opposite directions, and being deflected away from their respective strips and engaging in the respective apertures, said tongues being substantially of the same width as the respective receiving apertures so that the opposite lateral edges of said tongues lie in close contact with the strip material at the respective aperture margins, thus to hold the strips in assembled manifolding relation, said tongues and apertures of said severance lines extending substantially to the opposite edges of the strips in which they are respectively located.

7. In a manifolding assembly, in combination, a plurality of relatively superposed manifolding record strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in series formation in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues of each severance line being arranged in two series facing in opposite directions, and the tongues of one series being staggered with those of the other series, said tongues being deflected away from their respective strips and engaging in the respective apertures, said tongues being substantially of the same width as the respective receiving apertures so that the opposite lateral edges of said tongues lie in close contact with the strip material at the respective aperture margins, thus to hold the strips in assembled manifolding relation, the upper tongues of each of said weakened lines lying substantially within the bounds of the upper and lower assembly surfaces.

8. In a manifolding assembly, in combination, a plurality of relatively superposed manifolding record strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues of each severance line being arranged in two series facing in opposite directions, and the tongues of one series being in longitudinal alignment respectively with those of the other series and having their free ends disposed toward each other, said tongues being deflected away from their respective strips and engaging in the respective apertures so as to hold the strips in assembled manifolding relation.

9. In a manifolding assembly, in combination, a plurality of relatively superposed strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened severance lines including closely spaced slits in the strips, weakening them for tearing severance along the severance lines, said slits being arranged to provide a series of closely spaced apertures and integral tongues, said apertures and tongues being in respectively superposed relation in the superposed strips and the tongues being deflected into the respective aligned apertures and lying with their edges in close contact with the strip material at the aperture margins, thus to hold the strips in assembled manifolding relation, said apertures and tongues of each said severance line being arranged in a single series extending substantially to the opposite edges of the strip in which they are located.

10. In a manifolding assembly, in combination, a plurality of relatively superposed strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened severance lines including closely spaced slits in the strips, weakening them for tearing severance along the severance lines, said slits being arranged to provide a series of closely spaced apertures and integral tongues of substantially the same size and shape as the apertures, said apertures and tongues being in respectively superposed relation in the superposed strips, and the tongues being deflected into the aligned apertures and frictionally engaging with the margins thereof so as to detachably retain the strips in assembled relation.

11. In a manifolding assembly, in combination, a plurality of relatively superposed strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened severance lines including a series of closely spaced slits in the strips weakening them for tearing severance along the severance lines, each slit deviating to form a tongue and an aperture, each of said tongues having a free end and free side edges and being deflected into an adjacent said aperture and said end and side edges being positioned to cooperate in abutting relation with the strip edges at said apertures for detachably retaining the strips together and for restraining them against longitudinal and transverse relative movements out of aligned relation.

12. In a manifolding assembly, in combination, a plurality of relatively superposed record and transfer strips each having one or more weakened severance lines, said severance lines being arranged in group relation in the assembly, and dividing the assembly into sets of relatively superposed leaves, each of said weakened lines including a multiplicity of apertures closely spaced apart and arranged in a series in the respective strips so as to weaken said strips for tearing severance along the severance lines, said severance lines including also a multiplicity of tongues integral with the respective strips, said apertures and tongues being positioned respectively in alignment with each other depthwise of the assembly, said tongues being deflected away from their respective strips and lying in the respective apertures, the edges of said tongues being in close engagement with the strip material at the respective aperture margins so as to frictionally hold the strips detachably in assembled manifolding relation, said tongues throughout their lengths extending longitudinally of the assembly.

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