Oct. 24, 1944. F. H. MOSHER 2,360,965

STRIP DECOLLATING MACHINE

Filed Aug. 1, 1940

Fig. 1.

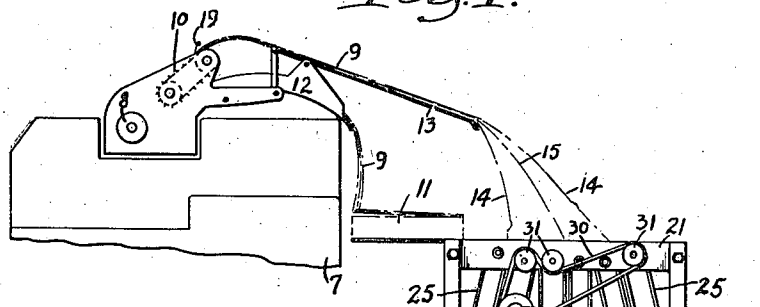


Fig. 2

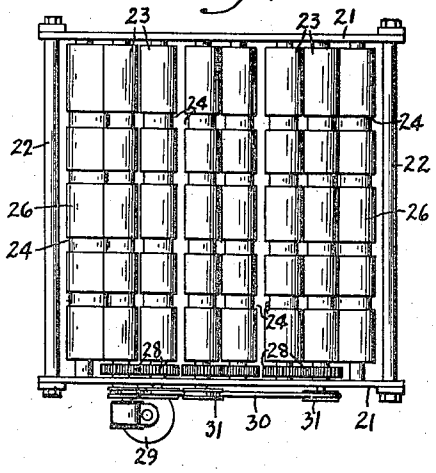


Fig. 3.

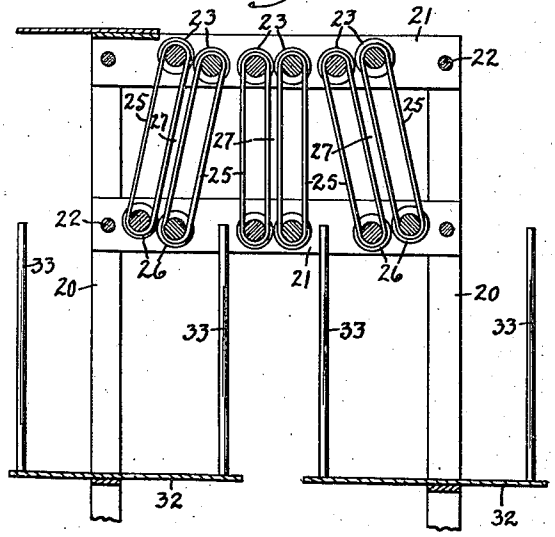


Fig. 4.

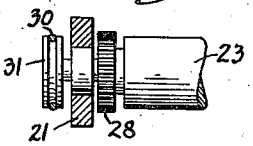
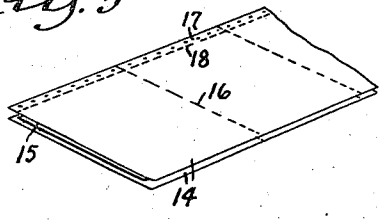


Fig. 5



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STRIP DECOLLATING MACHINE

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Application August 1, 1940, Serial No. 349,357

10 Claims. (Cl. 271—2.1)

This invention relates to improvements in machines or apparatus for effecting the separation or decollation of strips of sheet material such as paper and the like that have been assembled in relatively superposed relation. While the improved apparatus is adapted for the decollation of assembled strips of various natures, it has been designed and is herein disclosed for use in separating record strips of paper and the like that have been assembled in manifolding transfer relation with each other and with long continuous strips of carbon or transfer paper.

It is a general object of the invention to provide an improved strip decollating apparatus that is simple in construction and operation and yet is effective in separating the strips from each other and for disposing them in separate parts or zigzag folded packs. The improved apparatus is adapted for use in connection with writing machines, such as typewriters, billing machines, tabulators, autographic registers and the like in which manifolding assemblies of the long continuous traveller type embodying interleaved record and carbon strips are utilized.

A further object of the invention is to provide a strip decollating mechanism wherein the strips being separated are individually and lightly engaged by a novel and advantageous arrangement of travelling frictional means causing the strips to be separated and folded into separate individual packs, while at the same time, avoiding tearing or damage to the strips when feeding thereof is stopped by the writing machine.

According to another feature of improvement of the invention the frictional strip engaging and separating members are in the form of constantly travelling belts arranged to lightly frictionally engage with the strips to cause separation and folding thereof, the belts being arranged to maintain the strips substantially straight transversely at the points of fold and to avoid longitudinal flutes, depressions or ridges such as might interfere with the free refolding of the strips.

Other objects of the invention will be in part pointed out in the following detailed description of an illustrative but preferred embodiment of the invention, and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

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

Fig. 1 is a fragmentary partially diagrammatic side elevation of the improved strip separating apparatus as used in connection with a tabulating machine of known construction.

Fig. 2 is a top plan view of the strip separating apparatus.

Fig. 3 is an enlarged longitudinal vertical section of the apparatus shown in Fig. 2.

Fig. 4 is a detailed section and elevation of one of the rotary supporting and driving members for the belts; and

Fig. 5 is a fragmentary perspective view of an assembly of record and transfer strips, such as used in the tabulating machine.

Referring to the drawing for a detailed description of the illustrative embodiment, the strip separating apparatus indicated generally at 6 is shown as being used in connection with a tabulating machine 7. The tabulating machine or similar writing machine may be of known existing design and is equipped with a cylindrical rotary platen 8 over which the record assembly 9 of record and transfer strips passes. Suitable writing mechanism including type characters is arranged to make inscriptions upon the record assembly supported upon the platen.

Assembly feeding mechanism 10 is mounted upon the tabulating machine for feeding the record strips from a zigzag folded supply pack 11 over a strip guide 12 and thence around the platen to the feeding mechanism. From the feeding mechanism the strip assembly passes over an upper guide 13 from which it passes to the strip separating mechanism. The feeding mechanism 10 may be of any well known type, that shown schematically including a series of feed pins mounted upon a flexible traveling chain member and adapted to enter feed apertures provided in the strips. A pin feed mechanism of the type disclosed in the Mabon Patent No. 2,171,003 issued August 29, 1939, is suitable for this purpose.

While the record assembly used may be variously formed, that shown is of the nature disclosed in the Mabon patent above referred to and, as shown in Fig. 5, it includes a plurality of long continuous record strips 14 and one or more long continuous carbon strips 15. The strips are formed at longitudinally spaced intervals with transverse weakened severance lines 16 upon which the assembly may be zigzag folded

into the supply pack. Longitudinal feed bands 17 are provided along one or both margins of the record strips, being separated therefrom by longitudinal weakened severance lines 18. The assembly strips may be secured together at the feed bands at intervals along the assembly.

Since it is desirable to separate the feed bands 17 from the strips prior to decollation of the assembly, a feed band slitting or separating device 19, shown diagrammatically in Fig. 1, may be utilized. Such a feed band separating device is disclosed in the Mabon Patent No. 2,208,994. The strip assembly is shown as having two record strips with an interleaved carbon strip, but it will be understood that as many record strips as desired may be used with the necessary number of carbon strips and the decollating apparatus can be made with a sufficient number of pairs of separating belts to accommodate the number of strips of the assembly.

The decollating apparatus has a suitable frame including upright frame members 20, longitudinal frame members 21 and transverse tie rods 22. Mounted in suitable bearings in the upper frame members 21 are a plurality of rotary supporting members that may be made of wood or equivalent material. These rotary supporting members 23 are arranged in pairs, the members of which are slightly spaced apart, and each member has a plurality of spaced grooves 24 forming seats for the strip separating belts 25. The bottoms of these grooves may be crowned slightly providing supporting and driving surfaces for the belts.

Mounted in appropriate bearings in the lower longitudinal frame members 21 are lower rotary supporting members 26 for the belts 25. The lower rotary members are also arranged in pairs similar to the upper rotary members 23 and are provided with belt grooves 24 similar to those in the upper supporting members. The belts 25 are all of similar construction and are preferably of material adapted to have light frictional action upon the assembly strips. These belts may be made of rubber, either in the nature of rubber bands without a textile fabric base whereby they are readily extensible, or with a fabric base covered or impregnated with rubber. The belts 25 have elongated reaches between the upper and lower rotary supporting members, and the inner elongated reaches of each pair run in the same direction and are spaced apart a short distance to form passageways 27 in which the respective assembly strips are received. These inner reaches of the belts are spaced apart slightly so as to receive the respective strips in free relation without gripping the strips, but the surfaces of the belts will run in light frictional engagement with the strips so as to urge them forwardly and downwardly through the passageways.

There are preferably a plurality of belts 25 for each assembly strip, the pairs being spaced apart longitudinally of the rotary supporting members 23 and 26 so as to provide direct engagement with each strip at laterally spaced parts thereof. Also, the strip engaging reaches of the belts 25 are positioned directly opposite to each other at opposite sides of the passageways 27, so that the strips are engaged by these opposing reaches at points along the strips directly opposite each other and at opposite sides or surfaces of the strips. It will be noted further that the elongated reaches of the belts at opposite sides of the passageways 27 are respectively substantially in alignment transversely of the path of the strips. In this manner the strips are maintained in flat or straight condition transversely thereof as they move downwardly through the passageways 27. In other words, longitudinal bending of the strips to form longitudinal flutes, ridges, etc., is entirely avoided. This arrangement, as will be later seen, promotes the refolding of the separate strips in separate zigzag packs.

The upper rotary supporting members 23 of each pair are interconnected for rotation in unison by means of intermeshing toothed gears 28. Also, these upper rotary supporting members are connected for power drive to a small electric motor 29 by means of a driving belt 30 engaging groove driving pulleys 31 connected to the extending ends of one of the supporting shafts of each pair of rotary supporting members 23. Thus each pair of belt supporting and driving members is individually driven and the members of each pair are driven together in unison so as to drive the belts of each pair at the same speed.

Positioned beneath each of the passageways 27 for the record strips is a receiving compartment for such strips, including a bottom 32 and upright strip confining members 33. The respective passageways 27 are positioned intermediate the opposite sides of the receiving compartments.

When it is desired to separate the strips of an assembly, the record strips 14 are threaded downwardly into the outer passageways 27 while the carbon strip 15 is threaded into the intermediate passageway 27. The belts may be driven quite slowly by the motor 29 through a reduction gearing, the reaches thereof at opposite sides of the passageways 27 engaging the strips with a light frictional contact at the opposite surfaces thereof and tending to urge them downwardly toward the receiving compartments. As the writing on the strip assembly continues and the strips are fed forwardly they are urged downwardly through the passageways 27 due to the light yielding engagement of the belts upon the strips.

Since the passageways 27 are positioned intermediate the opposite sides of the receiving compartments for the record strips, said strips are caused to be refolded in zigzag packs 34. This refolding is accomplished by the joint action of the belts, by gravity, and by the transverse creases in the strips formed by the original folding thereof in the supply pack 11. Since there is only a light frictional engagement of the belts with the strips, the belts can continue their movement when the strips have been stopped by action of the feeding mechanism of the tabulator. But there is a constant urging of the strips forwardly by the light frictional sliding engagement of the belts, this being insufficient to cause any tearing or other damage to the strips.

Since the carbon strips ordinarily are of the one-time type, it is not necessary to refold them in zigzag packs as in the case of the record strips, and a receptacle or receptacles may be provided for them beneath the receiving compartment for the record strips. In case it is desired to refold the carbon strip this can be done in the same manner as described for the record strips.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing 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. In an apparatus of the character described,

in combination, a plurality of travelling flexible strip separating belts having elongated reaches positioned for frictional engagement with the opposite surfaces of a plurality of long continuous strips for separating and disposing said strips in separate parts, means for causing said traveling separating belts to have light yielding or sliding forwardly directed frictional engagement with the respective strips for yieldingly urging the latter forwardly, and means for driving said travelling belts in unison.

2. In an apparatus of the character described, in combination, a plurality of travelling flexible strip separating belts having elongated reaches positioned for frictional engagement with the opposite surfaces of a plurality of long continuous strips having transverse fold lines weakened to folding resistance for separating and disposing said strips in separate parts, said belts being arranged in pairs, the belts of which are positioned at opposite sides of the respective strips, and the pairs being spaced apart laterally of the strips with the said elongated reaches thereof respectively substantially aligned transversely of the strip path to facilitate strip folding, means for driving said travelling belts in unison, and strip receiving compartments respectively positioned below said pairs of belts into which the strips are respectively directed by said belts to be folded along said fold lines into zigzag folded condition.

3. In an apparatus for decollating long continuous assembled strips, in combination, a plurality of flexible travelling belts arranged in pairs, the belts of each pair having elongated reaches running side by side in the same direction and being spaced apart to form passageways in which the strips are respectively freely received for frictional engagement with the belts, and means for causing said pairs of traveling belts to have light yielding or sliding forwardly directed frictional engagement with the respective strips for yieldingly urging the latter forwardly.

4. In an apparatus for decollating long continuous assembled strips, in combination, a plurality of flexible travelling belts arranged in pairs, the belts of each pair having elongated reaches running side by side in the same direction and being spaced apart to form passageways in which the strips are respectively freely received for frictional engagement with the belts, said reaches of the respective pairs of belts being positioned substantially opposite to each other at opposite sides of said passageways and the pairs being spaced apart laterally of the strips with the said elongated belt reaches at opposite sides of said passageways respectively substantially aligned transversely of the strip path to facilitate strip folding, means for driving said belts in unison, certain of said assembled strips having transverse fold lines weakened to folding resistance, and strip receiving compartments respectively positioned below said pairs of belts into which the strips are respectively directed by said belts to be folded along said fold lines into zigzag folded condition.

5. In an apparatus for decollating long continuous assembled strips, in combination, a plurality of flexible travelling belts arranged in pairs, the belts of each pair having elongated reaches running downwardly side by side and being spaced apart to form passageways in which the strips are respectively freely received for frictional engagement with the belts to effect strip advancement, certain of said assembled strips having transverse fold lines weakened to folding resistance, and strip receiving compartments positioned below said belts and the elongated reaches thereof in which the strips emerging from said passageways are respectively directed by said belts to be folded along said fold lines into zigzag folded condition.

6. In an apparatus of the character described, in combination, a plurality of flexible strip separating travelling belts arranged in pairs, the belts of each pair having elongated reaches running downwardly side by side and being spaced apart to form passageways in which strips having transverse fold lines weakened to folding resistance are respectively freely received for frictional engagement with the belts to effect strip advancement, said reaches of the respective pairs of belts being positioned substantially opposite to each other at opposite sides of said passageways and the pairs being spaced apart laterally of the strips with the said elongated reaches thereof respectively substantially aligned transversely of the strip path to facilitate strip folding, means for driving said belts in unison, and strip receiving compartments positioned below said belts and the elongated reaches thereof in which the strips emerging from said passageways are respectively directed by said belts to be folded along said fold lines into zigzag folded condition.

7. In an apparatus of the character described, in combination, a plurality of flexible strip separating travelling belts arranged in pairs, the belts of each pair having elongated reaches running side by side in the same direction and being spaced apart to form passageways in which the strips are respectively freely received for frictional engagement with the belts, said reaches of the respective pairs of belts being positioned substantially opposite to each other at opposite sides of said passageways and extending downwardly to conduct the strips in a downward course, rotary supporting and driving members for the belts of each said pair interconnected for rotation in unison, and rotary supports for the extremities of said belts opposite to said rotary driving members.

8. In an apparatus of the character described, in combination, a plurality of flexible travelling strip separating belts arranged in pairs, the belts of each said pair having elongated reaches running downwardly and having their strip engaging surfaces in opposing relation so as to form downwardly directed passageways in which the strips are respectively received for frictional engagement with said belts, there being a plurality of said pairs of belts for each strip spaced apart laterally of the strips, upper and lower rotary supporting members for said belts arranged in pairs for the respective pairs of belts for each strip, said rotary members of one pair for each strip being interconnected for rotation in unison and being driven to effect operation of the belts.

9. In an apparatus of the character described, in combination, a plurality of flexible travelling strip separating belts arranged in pairs, the belts of each said pair having elongated reaches running downwardly and having their strip engaging surfaces in opposing relation so as to form downwardly directed passageways in which the strips are respectively received for frictional engagement with said belts, there being a plurality of said pairs of belts for each strip spaced apart laterally of the strips, upper and lower rotary supporting members for said belts arranged in pairs for the respective pairs of belts for each

strip, said rotary members of one pair for each strip being interconnected for rotation in unison and being driven to effect operation of the belts, and strip receiving compartments respectively positioned below said pairs of rotary supporting members, the pairs of lower rotary supporting members being positioned intermediate the opposite sides of the respective receiving compartments whereby the emerging strips are caused to be folded in the compartments.

10. In an apparatus of the character described, in combination, a plurality of strip separating traveling frictional members positioned for frictional engagement respectively with a plurality of long continuous strips for separating and disposing said strips in separate parts, strip feeding mechanism for feeding an assembly of said long continuous strips with an intermittent or halting action and delivering them with a similar action to said traveling frictional members, said traveling frictional members having light forwardly directed frictional engagement with the respective strips so as to yieldingly urge them forwardly and to yieldingly slide forwardly over the strips during the halts in strip feed caused by said feeding mechanism, and means for driving said traveling frictional members.

FERDINAND H. MOSHER.