June 27, 1950 L. F. HAGEMAN 2,513,093

STRIP FEEDING AND SEVERING MACHINE

Filed Nov. 7, 1945 5 Sheets-Sheet 1

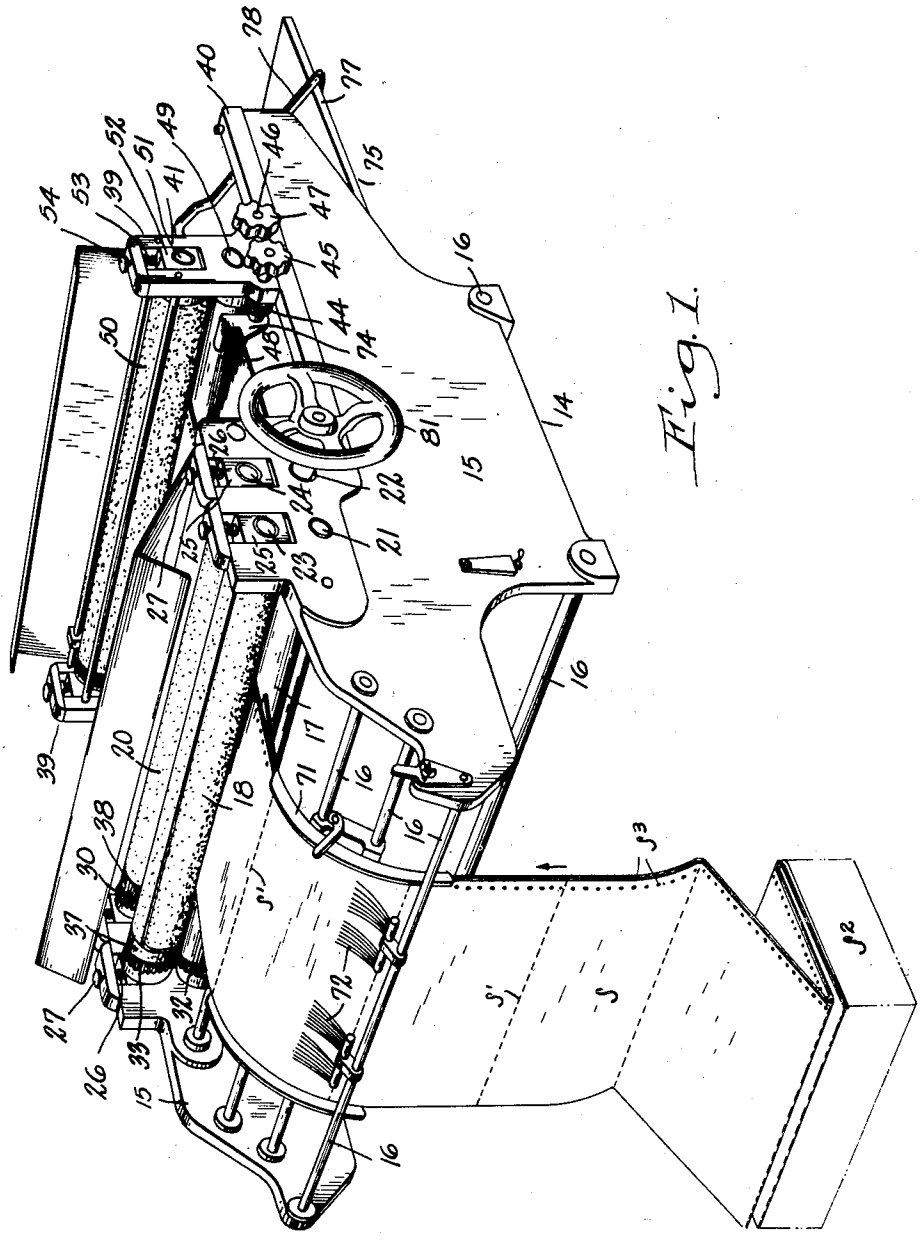

Fig. 1.

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Fig. 2.

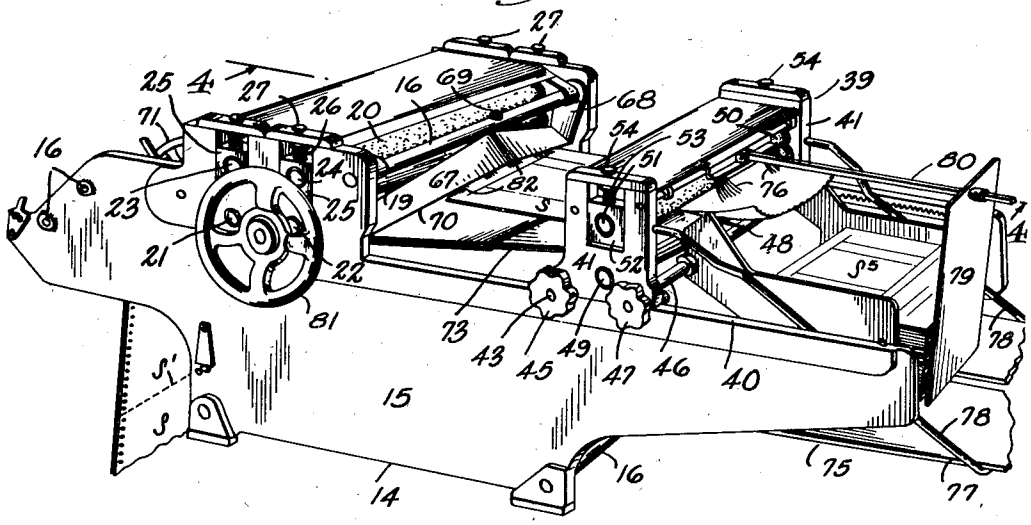
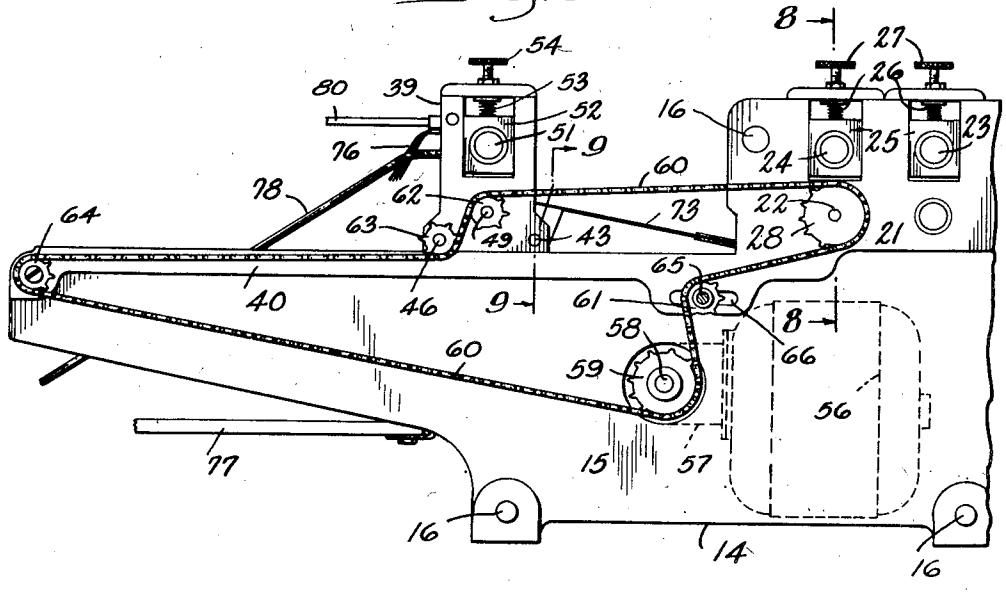


Fig. 3



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STRIP FEEDING AND SEVERING MACHINE

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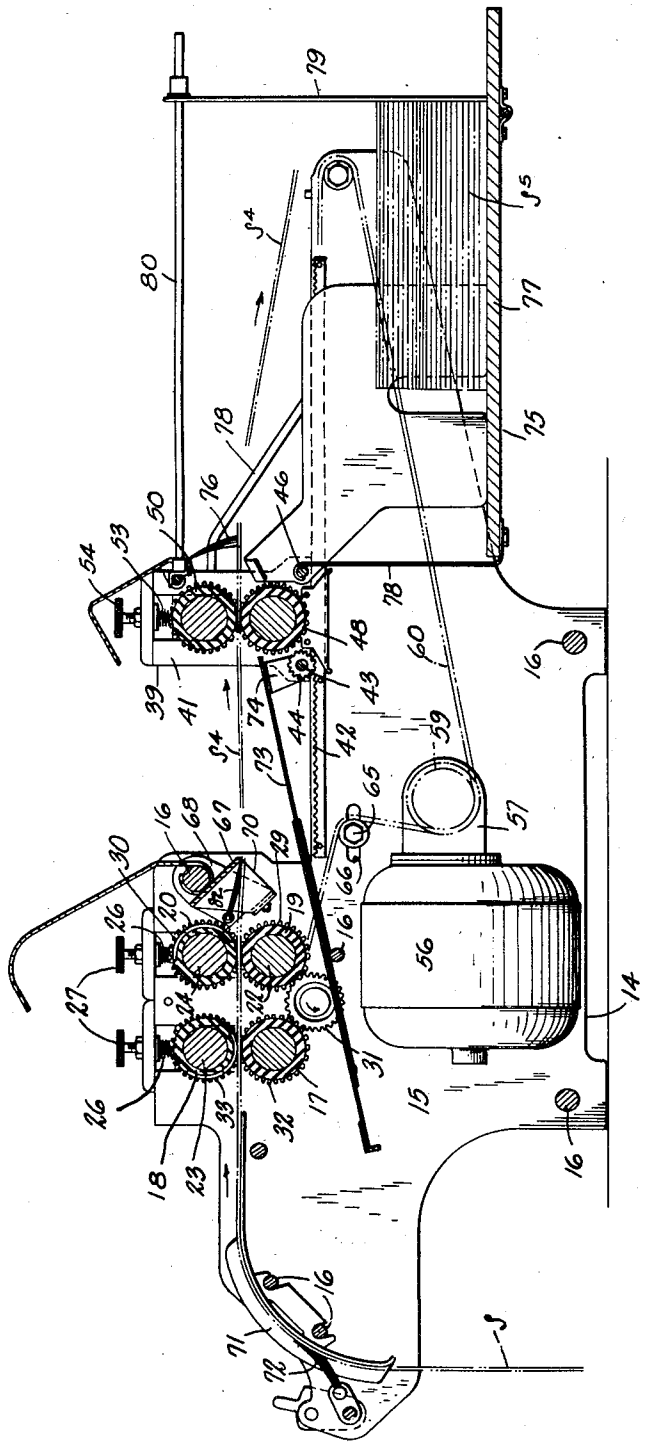

Fig. 4.

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STRIP FEEDING AND SEVERING MACHINE

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Fig. 5.

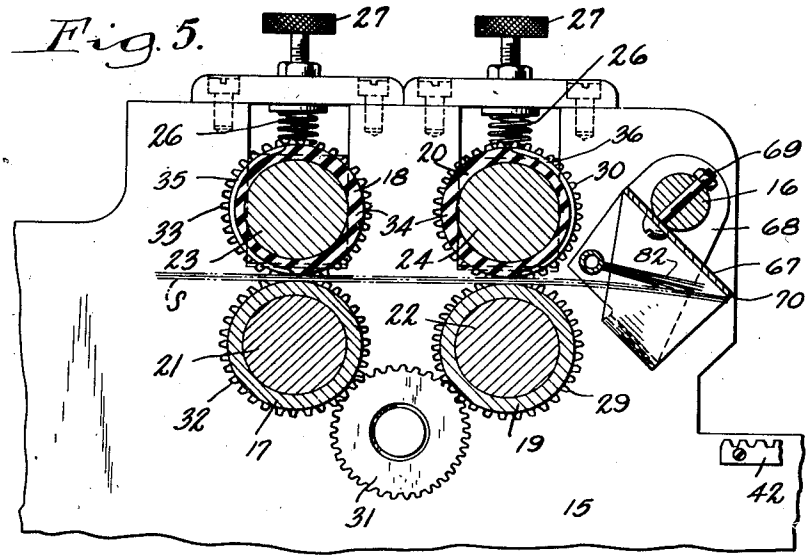


Fig. 7.

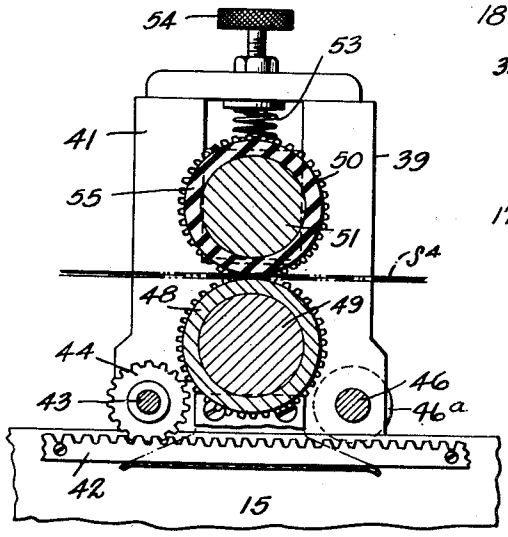
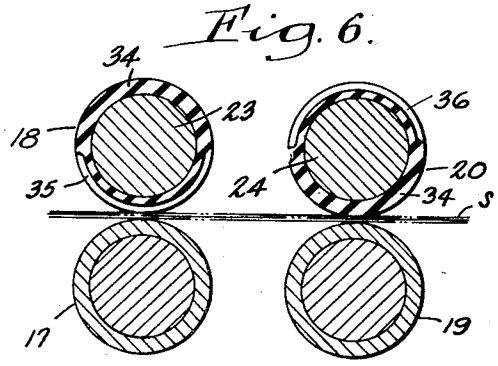


Fig. 6.



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STRIP FEEDING AND SEVERING MACHINE

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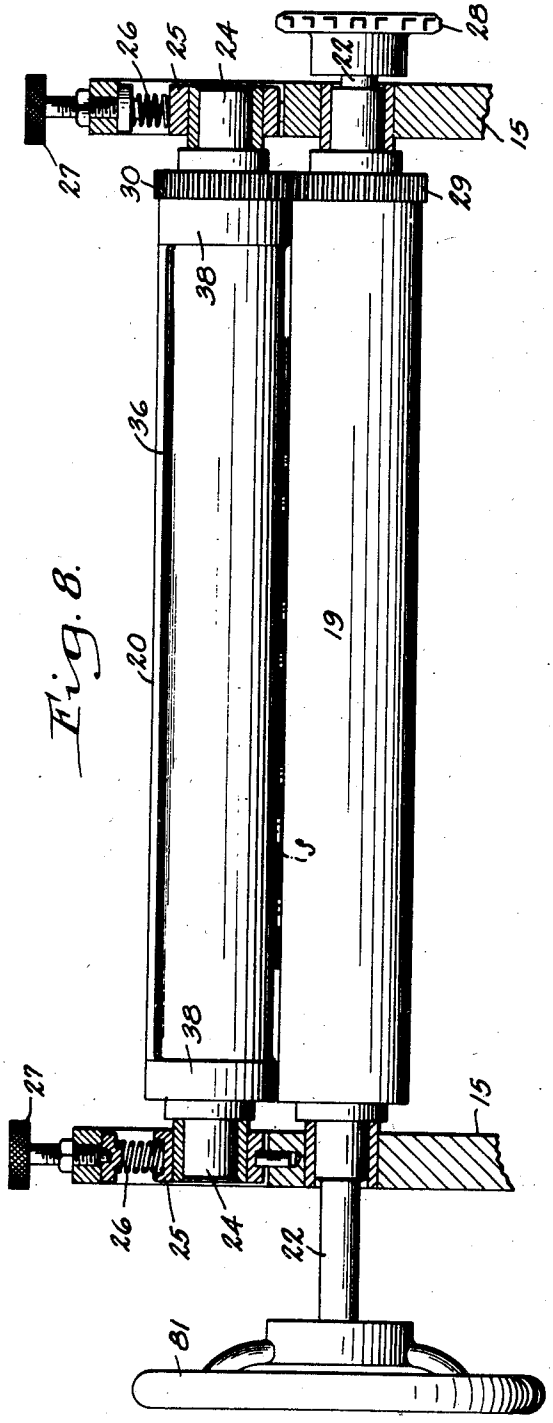

Fig. 8.

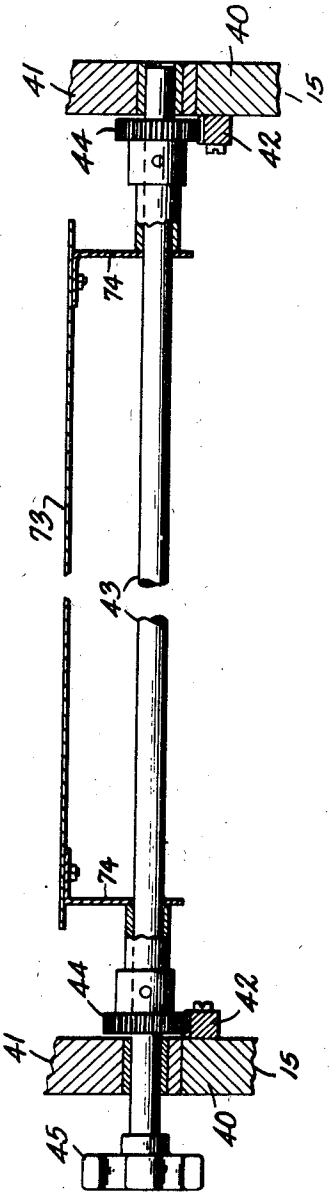

Fig. 9.

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2,513,093

UNITED STATES PATENT OFFICE

2,513,093

STRIP FEEDING AND SEVERING MACHINE

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Application November 7, 1945, Serial No. 627,191

42 Claims. (Cl. 164—84.5)

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This invention relates to improvements in strip feeding and severing machines, and more particularly to improvements in such machines adapted for feeding long continuous strips or assemblies of such strips arranged in superposed relation, and including an improved mechanism for severing such strips or assemblies along longitudinally spaced transverse lines thereof so as to divide the strips into a series of units or sheets. While the improved mechanism is herein disclosed in a machine, the principal function of which is to divide the strip or assembly into a series of units, it is not limited to such application but may be applied to various forms of machines where accurate feeding and aligning of the strips is required, such as typewriting machines, tabulators, autographic registers, and other forms of manifolding machines.

It is a general object of the invention to provide an improved arrangement of strip feeding mechanism adapted to create an intermittent tension on the strips or assemblies of strips during the feeding thereof such as to cause them to be severed serially along a longitudinal series of transverse severance lines which may be perforated or otherwise weakened to facilitate the severance.

A further object of the invention is to provide a feeding mechanism for an assembly of superposed strips such as paper record strips, each strip of which is provided with a longitudinal series of weakened transverse severance lines, and having an improved arrangement and cooperation of elements to maintain such weakened severance lines substantially in depthwise alignment in the strips in groups or sets whereby the severance along these lines is facilitated and clean, smooth, severed strip edges assured, and failures avoided.

Another object of the invention is to provide an improved form of tearing or severing blade for the strips, having oppositely disposed sections thereof forwardly and transversely inclined transversely of the path of strip feed, thus causing the tearing or severing action on the strips to be initiated at opposite longitudinal edges of the strip or assembly of strips.

Another and more particular object of the invention is to provide in a machine of the class mentioned, a strip feeding mechanism including an improved arrangement of two pairs of feed rolls arranged to grip the strips or assembly alternately in feeding relation at longitudinally spaced parts thereof, thus alternately exerting feeding effort on the strips and holding or restraining them during the strip severing operation which is effected by a fast-feeding pair of

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feed rolls arranged to feed the strips faster than the other feed rolls, thus preventing accumulations of wrinkles, bulges or other irregularities in the strip assembly such as may be caused by the feeding action of the gripping feed rolls.

Another specific object of the invention is to provide for machines of the class mentioned, an improved strip feeding mechanism including spaced pairs of strip gripping feed rolls, each pair of which is arranged to grip the strip in feeding relation at longitudinally spaced parts thereof in feeding relation therewith and to release the grips alternately so as to prevent or absorb wrinkles, bulges or other irregularities in the strips, and to avoid accumulations thereof such as would interfere with accurate feeding of the strips, while at the same time maintaining a constant feeding effort upon the strips.

According to a preferred embodiment of the invention, the intermittent strip feeding grip and release of the pairs of feed rolls is acomplished by an improved construction and arrangement of the feed rolls by cutting away or omitting a portion of the feeding periphery of at least one feed roll of each pair so that the strips being fed are released from feeding effort when such omitted roll portion is positioned opposite or in juxtaposition to the companion roll, while the grip and strip feeding effort is reestablished when the normal or unaltered strip gripping peripheries of both companion rolls come into cooperative strip gripping relation with each other.

Another object of the invention is to provide for machines of the class mentioned an improved strip feeding mechanism whereby feeding effort on the strips is effected continuously, first exclusively by strip feeding means and then exclusively by a companion strip feeding means in continuous alternation, whereby accumulations of bulges or other irregularities in the strips occasioned by the feeding action of the gripping feed rolls are effectively avoided and the accurate feeding and aligning of the strips thus effectively promoted.

Another object of the invention is to provide for machines of the class mentioned, an improved strip feeding, aligning and severing mechanism whereby the strips may be retarded or restrained by either one of two different feeding means, while they are fed or pulled forwardly by another feeding mechanism which feeds the strips faster than the first-mentioned feeding mechanism so as to create severing tension on the strips being fed.

Other objects of the invention will be in part pointed out in the following detailed disclosure of certain illustrative but preferred embodiments

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 disclosure of the illustrative embodiments thereof, and to the accompanying drawings, in which:

Fig. 1 is a perspective view of a strip feeding and severing machine embodying the improvements of the invention;

Fig. 2 is also a perspective view of the same machine viewed from a different angle;

Fig. 3 is a partial side elevation of the machine shown in Fig. 1 viewed from the opposite side thereof;

Fig. 4 is a vertical longitudinal section taken substantially on the line 4—4 of Fig. 2 looking in the direction indicated by the arrows;

Fig. 5 is a fragmentary enlarged vertical longitudinal section similar to that of Fig. 4;

Fig. 6 is a fragmentary sectional view similar to Fig. 5, being partially diagrammatic and showing the strip feeding rolls in a different position from those shown in Figs. 4 and 5;

Fig. 7 is an enlarged vertical longitudinal section of the forwardly disposed fast-feeding tear-off or snatch rolls;

Fig. 8 is an enlarged fragmentary vertical transverse section taken substantially on the line 8—8 of Fig. 3 looking in the direction of the arrows, and showing a pair of feed rolls in enlarged side elevation, and

Fig. 9 is a fragmentary transverse vertical section taken substantially of the line 9—9 of Fig. 3 looking in the direction of the arrows.

Referring to the drawing for a detailed description of the illustrative embodiment of the invention there shown, the strip feeding and severing mechanism is mounted in a suitable supporting frame 14 having metallic side frame members or plates 15 connected together by suitable transverse cross ties or rods 16, while the frame 14 may be supported during operation in any desired manner and herein shown as being of the type adapted to be supported upon a suitable table, bench or the like.

While the improved strip feeding and severing device is adapted for operation upon various forms of long continuous strips or assemblies of a plurality of such strips, it is herein disclosed for use in connection with a long continuous record strip or an assembly S of such record strips which are ordinarily constructed of paper and adapted to receive record inscriptions. As is common, these long continuous record strips may be provided with a longitudinal series of transverse weakened severance lines S^1 weakened to promote severance along such lines by perforating or by other forms of weakening well known in the art. The record assembly S or manifolding assembly herein shown for illustrative purposes includes three long continuous strips in interleaved or superposed manifolding relation with each other, but it will be understood that the assembly may include a larger number of strips or a smaller number. In manifolding assemblies of this type, record strips are commonly interleaved with long continuous carbon or transfer strips, the carbon and record strips being arranged in alternating

relation so that the records inscribed upon the top or original record strip are transferred by the interleaved transfer strips to the underlying or copy record strips. As shown, the record assembly S may be reversely folded on the transverse lines S^1 into a zigzag supply rack S^2. The strips of the assembly S may be free from attachment with each other as shown, for example, in Fig. 1, or in the prior patent to Brown, No. 1,641,620, issued September 6, 1927. Sometimes, however, the assembly strips may be connected together at spaced intervals along the assembly as shown, for example, in the Phillips and Allan Patent No. 2,306,900 issued December 29, 1942. Also, the assembly S may be provided with one or more longitudinal series of pin feed apertures S^3 for cooperation with pin feed mechanism. It will be understood that the improved feeding and severing mechanism of this invention is adapted to operate upon strips or assemblies of strips of the general nature herein referred to, whether or not record strips or transfer strips are included.

As best shown in Figs. 4 and 5, the strips are fed by two pairs of strip gripping rotary feed rolls spaced apart a short distance longitudinally of the strip path and driven in timed relation to each other for conjointly feeding the strips forwardly into the machine. The forward pair of feed rolls includes a lower roll 17 and an upper roll 18, while the rearward pair includes the lower roll 19 and an upper roll 20. These feed rolls are suitably rotatably mounted in the side frames 15, the lower rolls 17 and 19 being supported by rotary shafts 21 and 22 rotating in bearings in the side frames 15 while the upper rolls are carried by shafts 23 and 24 rotatably mounted in bearings 25 mounted in guideways for vertical sliding adjustment. The adjustable bearings 25 are yieldingly urged into their normal operative position by means of compression springs 26, the tension of which may be adjusted by thumb screws 27 so as to vary the gripping tension of the pairs of feed rolls.

Each pair of feed rolls 17, 18 and 19, 20 (sometimes termed the feed-in rolls) is driven by a rotary toothed driving sprocket 28, keyed or otherwise firmly connected to the outer projecting extremity of the lower feed roll shaft 22 and driven by a small electric motor or other suitable power supply through a power transmission system later described. A toothed gear 29 is secured to the lower feed roll shaft 22 inside of the side frame member 15, meshing with a similar toothed gear 30 secured to the feed roll shaft 24 of the upper feed roll. Also the toothed gear 29 meshes with an idler toothed gear 31 rotatably mounted on the side frame member 15 and in turn meshing with a toothed gear 32 secured to lower feed roll shaft 21 inside of the side frame member 15. The gear 32 meshes with a similar toothed gear 33 secured to the upper feed roll shaft 23. Thus it will be seen that the two pairs of feed rolls 17, 18 and 19, 20 are driven in timed relation with each other. Since all of these feed rolls are of the same diameter and are driven at the same rotative speed, it will be seen that each pair of feed rolls will cooperate in feeding relation with the strips to feed the same at the same speed. In other words, both pairs of feed rolls cooperate to feed the strips at the same speed so that there is no tension created in the reach of strips between the two pairs of feed rolls, and similarly, no looseness of the strips occurs.

Resilient facings are preferably provided for

each of the feed rolls 18 and 20 providing for effective gripping of the strips in feeding relation therewith and also having a high coefficient of frictional engagement with the surfaces of the strips. As shown in the illustrative embodiment of the drawing, each feed roll 18 and 20 is provided with a peripheral facing 34 preferably of rubber or similar resilient material having high frictional engagement with the strips. While the lower rolls 17 and 19 may for some purposes be faced like the rolls 18 and 20 as shown in Fig. 4, they are preferably provided with knurled metal gripping faces as shown in Figs. 5, 6, 7 and 8. The outer strip engaging surfaces of all of the rolls are of the same circumference.

As best shown in Figs. 5 and 6, the two lower feed rolls have continuous uninterrupted strip gripping surfaces throughout, their entire circumference and are preferably knurled or roughened to increase the friction or feeding effort on the strips. But the strip gripping surfaces of the upper feed rolls 18 and 20 are interrupted by depressed or omitted parts of the rubber facing 34 as indicated at 35 in the roll 18 and at 36 in the roll 20. The depressed portions 35 and 36 are similar and may be formed by cutting away a portion of the surfaces of the facings or by molding the facings in this manner, and the depressed portions are substantially alike in both of the rolls. Both of the depressed portions extend through a circumferential portion of the roll slightly less than 180° or half the circumference of each roll. But the depressed surface portion 35 is positioned differently circumferentially of the roll 18 from the circumferential positioning of the depressed surface portion 36 of the roll 20 during normal operation. The length of the depressed portions 35 and 36 longitudinally or axially of the rolls will ordinarily be somewhat greater than the widths of the widest strips upon which the machine is intended to operate.

As best shown in Figs. 1 and 8 the lengths of the depressed roll peripheries 35 and 36 are somewhat less than the full length of the feed rolls so as to provide for metallic end rings or bands 37 and 38. These end rings 37 and 38 as shown may be substantially the same diameter as the outer periphery of the feed rolls, or in the other words the outer surfaces of these end rings form substantial continuations of the outer peripheries of the feed rolls. The peripheral surfaces of the end rings 37 and 38 as well as the entire peripheral surfaces of the upper feed rolls 18 and 20 (with the exception of the depressed or omitted parts thereof) are positioned for contacting relation respectively with the peripheral surfaces of the two lower feed rolls 17 and 19. The depth of the peripheral depressions 35 and 38 is sufficient to release the grip of the feed rolls upon the strips being fed when these depressed portions come next to the respective lower feed rolls.

Spaced some distance rearwardly of the two pairs of feed rolls 17, 18 and 19, 20 is a longitudinally adjustable supporting carriage 39 which can be adjusted forwardly and rearwardly of the strip path. This supporting carriage is mounted upon longitudinal supporting rails 40 on the side frame members 15. The end frames 41 of this adjustable carriage are connected by suitable cross tie rods and may be constructed to rest upon the supporting rails 40 and any desired antifriction supports may be utilized for this purpose.

Mounted on the inner surfaces of each of the

side frame members 15 are longitudinal toothed rack bars 42 firmly attached in position. A transverse shaft 43 is rotatably mounted in the end frames 41 carrying spaced toothed pinions 44 meshing respectively with the teeth of the rack bars 42. A handwheel or operating handle 45 is fixed to the outer projecting extremity of the shaft 43 whereby the shaft may be manually operated for adjusting the carriage forwardly or rearwardly longitudinally of the strip path. A transverse tie and locking rod 46 is mounted in the end frames 41 and provided with an external operating handwheel 47 threaded to outer extremity thereof. A locking device may be connected to the rod 46 for locking the carriage 39 in any of its longitudinally adjusted positions. As shown, this locking device includes a locking washer 46a anchored to the rod 46 and engaging in locking relation against the outer surface of the side frame member 15 when the handwheel 47 is tightened on the opposite threaded end of the rod 46. This rod slides through an opening in the end frame 41 and the handwheel 47 may frictionally engage in holding relation against the adjacent outer face of the side frame 15.

Additional feed rolls are rotatably mounted in the adjustable frame 39 including a lower feed roll 48 carried by shaft 49 rotatably mounted in bearings in the end frames 41 and an upper feed roll 50 mounted on a rotary supporting shaft 51 rotatably mounted in vertically adjustable bearings 52 mounted in vertical slideways in the end frames 41. The adjustable bearings 52 and the upper roll 50 carried thereby are urged into normal operative position by compression springs 53, the tension of which may be adjusted by thumb screws 54. Thus the tension of the feeding grip between the upper and lower feed rolls may be adjusted as desired. Since the pair of feed rolls 48, 50 are constructed and arranged to feed the strips somewhat faster than the feed-in rolls 17, 18 and 19, 20 so as to create strip severing tension in the strips, they may be referred to as severing rolls or snatch rolls.

One of the severing feed rolls such as the upper roll 50 is also preferably provided with a resilient facing 55 of rubber or the like whereby the strips are yieldingly gripped in feeding relation between the rolls and also a high degree of frictional effort is exerted upon the strips. Although it is preferred to provide the lower roll 48 with a knurled metallic gripping surface as shown in Figs. 1 and 7, for some purposes it may be faced with rubber like the roll 50, as shown in Fig. 4. These tear-of rolls as shown have continuous uninterrupted gripping surfaces so that continuous feeding effort is exerted upon the strips engaged thereby during rotation of the feed rolls. Although the tear-off feed rolls 48 and 50 are shown as being substantially of the same diameters as those of the feed-in rolls 17, 18, 19 and 20, these tear-off rolls are driven at a somewhat higher rotative speed than that of the other rolls so as to create the severing strip tension referred to, as later more fully described.

As shown in Fig. 4 of the drawing a protective guard plate may overlie the pairs of feed-in rolls being swingably mounted upon the tie rod 16, and a similar protective guard plate may be provided for the pair of snatch rolls being swingably mounted upon the supporting carriage 39.

Driving power for the three different pairs of feed rolls described above is transmitted through a suitable transmission system from a common source, such as the small electric motor 56 suit-

ably mounted on the frame 14. The driving motor may be provided with a suitable reduction gearing indicated diagrammatically at 57 an connected to a driving shaft 58 carrying a driving toothed sprocket 59. An endless sprocket chain 60 passes in driving relation over the driving sprocket 59 and thence over an adjusting idler sprocket 61 and over the driving sprocket 28 for the two pairs of feed rolls 17, 18 and 19, 20. The driving chain also passes in driving relation over the driving sprocket 62 connected to the outer extension of the driving shaft 49 for the lower feed roll 48 of the longitudinally adjustable pair of snatch rolls. This driving chain 60 then extends downwardly over the idler sprocket 63 mounted for independent rotation upon the outer extension of the transverse tie rod 46 of the longitudinally adjustable carriage 39. From this point the sprocket chain extends for a distance substantially parallel to the upper surface of the adjacent supporting rail 40 and over another idler sprocket 64 positioned near the rear end of the supporting frame 14, and thence back to the driving sprocket 59.

It will thus be seen that the driving sprocket chain 60 is connected for driving the three pairs of strip feeding rolls. It will be noted, as shown in Fig. 3, that the driving sprocket 62 for the longitudinally adjustable snatch rolls 48, 50 is of somewhat smaller diameter than that of the driving sprocket 28 for the two pairs of feed-in rolls 17, 18 and 19, 20. Therefore since the snatch rolls are substantially the same diameters at their feeding peripheries as the diameters of the other feed rolls, the snatch rolls function to feed the strips faster than do the feed-in rolls 17, 18 and 19, 20, the purpose of which is to create severing tension in the strips being fed as more fully described below. Due to the relative positioning of the driving sprocket 62 for the lower snatch roll 48 on the longitudinally adjustable supporting carriage 39 and of the idler sprockets 63 and 64, it will be seen that the sprocket chain 60 functions to drive the snatch rolls in any longitudinal adjustment of the carriage 39 along the supporting rails 40. The adjusting idler sprocket 61 is supported upon a shaft 65 mounted for longitudinal adjustment in an elongated slot 66 in the frame, whereby the sprocket chain 60 can be kept at the proper operative tension. Any well-known form of manually controlled locking means may be provided for locking the adjusting sprocket 61 in its different adjusted positions in the slot 66.

Positioned between the forward pairs of feed-in rolls 17, 18 and 19, 20 and the severing or snatch rolls 48, 50 mounted in the adjustable carriage 39, is a strip severing blade 67 extending transversely of the path of strip feed and preferably as shown mounted in operatively stationery position upon the side frames 15. This strip severing blade 67 is provided with terminal supporting lugs 68 connected to the transverse tie rod 16, and as shown is additionally supported near to its center of length by a bolt or fastening device 69 passing through the tie rod 16 and connected to the severing blade as best shown in Fig. 5. Thus it will be seen that the severing blade is firmly supported in stationary position adjacent to and just above the path of strip feed. The blade 67 is preferably forwardly and downwardly inclined from its rear edge to its severing edge 70 as best seen in Figs. 2, 4 and 5. The severing edge 70 inclines rearwardly transversely of the strip path from its opposite extremities adjacent to the opposite strip edges toward its center. This severing edge at its opposite extremities adjacent to the opposite longitudinal edges of the strips is positioned below the straight line between the grip of the feed rolls 19, 20 and the grip of the snatch rolls 48, 50, as best seen in Fig. 4. Consequently, when the strips are tensioned by the fast feeding action of the snatch rolls, said strips will assume an offset or downwardly deflected position from a straight line between the grips of the feed-in rolls and snatch rolls due to the positioning of the edge 70 of the severing blade 67. Due to this offset position the strips thus tensioned will be caused to be engaged with a tearing action against the strip severing edge, and the severing action will be initiated at opposite strip edges and will be progressively continued inwardly transversely of the strips; this severing action of the strips is more fully described below.

As best shown in Figs. 1 and 4, the strip assembly S is guided into the forward feed rolls from the supply pack S^2 by a strip guide 71 preferably, as shown, mounted for lateral adjustment upon the transverse tie rods 16, and the strips may be guided and smoothed by means of bristle brushes or guiding elements 72 mounted upon one of the transverse tie rods 16.

In order to assure that the forward edge of the strip assembly enters properly into the feeding grip of the snatch rolls 48, 50 after passing beyond the forward or feed-in rolls and the severing edge 70, a strip guiding plate 73 is mounted below the strip path between the forward feed rolls and the snatch rolls 48, 50. This strip guiding plate, as best seen in Figs. 2 and 4, extends between the two pairs of forward feed-in rolls and the longitudinally adjustable snatch rolls 48, 50, being supported by brackets 74 attached thereto adjacent its forward end and connected to the shaft 43 mounted on the adjustable carriage 39 and movable forwardly and rearwardly with the carriage during adjustments thereof. The guide plate 73 is additionally supported upon one of the transverse tie rods 16 being slidable thereon during the forward and rearward adjustments of the carriage 39. It will be seen that the forward end of the guide plate 73 moves forwardly or rearwardly with adjustments of the carriage 39 while the rearward part thereof slides over the supporting rod 16, thus maintaining the guiding plate in proper operative position irrespective of the longitudinal adjustment of the carriage 39.

As the strips are fed forwardly by the plurality of pairs of feed rolls described, they are severed serially along the transverse weakened lines by engagement with the severing edge 70 and divided into sheet lengths or units as indicated at S^4 in Fig. 4 and as later more fully described. These severed units S^4 are ejected one after another by action of the snatch rolls 48, 50 into a supporting magazine 75 in which they are accumulated in a stack S^5. As the severed sheet units are ejected, they may be guided into position in the receiving magazine by bristle brush guides 76 suitably supported upon the adjustable carriage 39. This receiving magazine may be of any desired structure and as shown, it has a bottom or supporting plate 77 upon which the sheet units are received and is supported in suspended position by means of suspension rods or members 78 suitably attached to the supporting frame of the machine. A longitudinally adjustable end plate or stop member 79 acts as an abutment against

which the sheet units S^4 are projected by the feeding mechanism, and is supported for longitudinal adjustment upon the supporting rod 80 while its lower edge rests upon the bottom plate 77.

From the foregoing detailed description of a preferred embodiment of the invention, the operation thereof will be fully understood by those skilled in the art and for convenience and clearness may be summarized as follows:

The forward end of the strips or strip assembly S may be led forwardly from the zigzag pack S^2 or other source over the strip guide 71 and introduced into the feeding grip of the forward pair of feed-in rolls 17, 18. The handwheel 81 is then turned to move the two pairs of feed rolls so as to feed the strips forward slowly, the forward ends thereof being thus introduced into the feeding grip of the second pair of feed-in rolls 19, 20. The forward ends of the strips are then deflected downwardly slightly in engagement with bristle brush guides 82 so as to pass beneath the severing edge 70 of the severing blade 67 and thence forwardly into the feeding grip of the snatch rolls 48, 50 which are also driven through the sprocket chain 60 from the handwheel 81. In this connection, it will be noted that a slip clutch or similar means (not shown) will be incorporated in the reduction gearing unit 57 of the driving motor, permitting the driving sprocket 58 to turn during the time that the feed rolls are being moved by the handwheel 81 during the strip threading operation. Since the longitudinal spacing of the transverse weakened severance lines S^1 of the strip assembly may vary in different assemblies to form different lengths of sheet units S^4, the adjustable roll carriage 39 will now be longitudinally adjusted through the handwheel 45 and adjusting pinions 44 to position the grip of the snatch rolls to take effect in gripping relation with the strips when the first severance lane, or a depthwise group of severance lines S^1, are in substantial alignment at opposite end portions thereof with the adjacent opposite end portions of the severing edge 70. When the strips are thus positioned, further forward rotation of the feed rolls will cause the strips to be tensioned across the severing edge 70 due to the fact that the snatch rolls feed the strips faster than do the two forward pairs of feed rolls. When the strips are thus positioned in the grips of all of the feed rolls and the carriage 39 properly adjusted as described, the driving motor 56 may be started whereupon the strips will be fed forwardly at a rapid rate and the strip assembly will be severed serially along the successive groups of weakened severance lines S^1.

During the feeding of the strips by the snatch rolls 48, 50 at a faster rate than the feeding action of the two pairs of forward feed-in rolls 17, 18 and 19, 20, it will be particularly noted that the strips or strip assembly is gripped either by the pair of feed rolls 17, 18 or by the pair of feed rolls 19, 20. Thus restraint upon the strips will be exerted either by the first pair of feed rolls 17, 18 or by the second pair of feed rolls 19, 20, thus creating strip severing tension on the reach of strips adjacent the severing edge 70 due to the faster feeding action of the snatch rolls. The strip feeding and strip restraining actions of the two forward pairs of feed-in rolls can best be observed from a consideration of Figs. 5 and 6 of the drawing.

Assuming the two forward pairs of feed rolls to be in the position shown in Fig. 6, the strips

will be gripped in feeding and restraining relation therewith by the pair of rolls 19, 20 because the depressed or omitted portion 36 of the periphery of roll 20 is away from juxtaposed relation with the roll 19, the result being that the strips are gripped between the normal gripping periphery of the roll 20 and the periphery of the roll 19. At the same moment the depressed or omitted part 35 of the periphery of feed roll 18 is positioned next to the periphery of the roll 17 whereby the feeding grip of this pair of rolls is released and there is no feeding or restraining action at this moment by this pair of feed rolls. Therefore, if the strip tensioning and severing action occurs during the interval that the depressed portion 35 of the roll 18 is passing by the adjacent portion of the roll 17, the restraining action on the strips during the severing action of the snatch rolls will be exerted solely by the grip of the pair of feed rolls 19, 20. Similarly, during the period that the depressed portion 36 of the feed roll 20 is passing by the strips at points thereof engaging the lower feed roll 19, the depressed portion 35 of the roll 18 will have passed beyond the adjacent portion of the lower feed roll 17 whereupon the strips will be fed and restrained solely by the feeding grip between the feed rolls 17, 18. Thus it will be seen that the restraint upon the strips during the severing operation will be exerted sometimes by the pair of feed rolls 17, 18 and sometimes by the feed rolls 19, 20, dependent upon the longitudinal spacing of the severance lines S^1, and to other variable factors.

It will be noted that the depressed portions 35 and 36 are not only positioned differently in the feed rolls 18 and 20 for the purpose described, but the circumferential extent of each of these depressed portions is somewhat less than half the circumferential extent of the feed rolls, that is, somewhat less than 180°. For this reason, as best seen in Fig. 5, it will be noted that the two pairs of feed rolls acting conjointly, exert continuous strip feeding and restraining effort upon the strips. In other words, the feeding grip of one pair of feed rolls is not discontinued until the feeding grip of the other pair is established. This can be clearly seen in Fig. 5 when both pairs of feed rolls are positioned to exert concurrent feeding grip upon the strips for a brief period. In this position the feeding grip of the feed rolls 19, 20 is just beginning to take effect, whereas the feeding grip of the feed rolls 17, 18 is still effective but will be released upon further rotation of the rolls a short distance due to the fact that the depressed portion 35 will immediately move into juxtaposition with the feeding periphery of roll 17.

There is another important function accomplished by the two pairs of feeding rolls 17, 18 and 19, 20 constructed and arranged as herein described. This relates to the accurate feeding of the strips or strip assembly and the avoiding of longitudinal disalignment of the superposed strips of an assembly and of the transverse weakened severance lines thereof. For satisfactory feeding effects, it is essential that the superposed strips, when fed in tabulating or other writing machines, be kept in correct longitudinal alignment with each other so that inscriptions made upon blank forms of the original record strip will be transferred by suitable transfer media to the proper spaces of the blank forms of the underlying record strips. Also for satisfactory severing of the strips along the transverse weakened severance lines thereof, it is essential that these severance

lines, which are arranged in all of the superposed strips, be kept in substantial depthwise alignment in groups along the assembly, in order that all of the severance lines of each group may be substantially aligned with the severing edge 70 when the severing action takes place.

These important functions are believed to be accomplished by this improved feeding mechanism substantially in the following manner: When assemblies of superposed strips are fed by strip gripping feeding mechanism such as by strip gripping feed rolls, there is a tendency to cause wrinkles, bulges, creases, or other irregularities in the different superposed strips, and a tendency for some of the strips, particularly those next to the gripping surfaces, to move slightly ahead of the other strips. These strip irregularities tend to accumulate at the strip feeding grip to such an extent that correct feeding of the strips is impaired or interrupted. This accumulation of irregularities in the strips is effectively avoided by this improved feeding mechanism and correct feeding of the strips is promoted.

Due to the fact that the strips are intermittently gripped in feeding relation therewith by each pair of feed rolls and intermittently released by action of the omitted or depressed portions 35, 36, the accumulations of the strip irregularities referred to are avoided. Thus when a strip irregularity is caused in the strips at the strip feeding grip thereon, such irregularity is absorbed or adjusted as soon as the grip is released by the action of the depressed portions 35 or 36 in the feed roll peripheries. At the instant the feeding grip is thus released, the bulges or other irregularities in the strips are absorbed due to the natural resiliency of the paper and the tendency thereof to assume the normal flat condition at the moment of grip release. Both pairs of feed rolls 17, 18 and 19, 20 function in this manner to avoid undue accumulations of strip irregularities, thus promoting accuracy of strip feed, while at the same time there is a constant feeding effort upon the strips due to the combined or conjoint action of the two pairs of feed rolls. Also there is a constant restraining effort upon the strips opposed to the action of the snatch rolls 48, 50 because the strips are continuously gripped by the conjoint action of the two pairs of feed rolls 17, 18 and 19, 20.

At the moment of strip severance across the strip severing edge 70, it will be noted that the strips during initiation of the severance, are deflected downwardly from the direct straight course between the forward or feed-in rolls and the snatch rolls 48, 50 and that the strips initially engage the severing edge at opposite longitudinal strip edges near the opposite outer extremities of the severing edge. Thus as the tension on the strips increases due to the fast feeding action of the snatch rolls, strip severance is initiated at the opposite strip edges and continues progressively transversely of the strips and inwardly thereof. The final severing action occurs near the central portion of the severing edge or the apex thereof where the two oppositely inclined portions meet. Thus the strips are severed with a tearing action, the tear of which progresses transversely of the strips thus severing the strips in a most effective manner.

Just after a severing action of the strips occurs, the severed sheet section S^4 continues to be fed forwardly by the snatch rolls while the strips continue to be fed forwardly by action of the two pairs of feed-in rolls 17, 18 and 19, 20. Thus the forward ends of the strips being thus fed will be deflected downwardly by gravity into engagement with the guiding plate 73 and will be guided thereby into the grip of the snatch rolls, whereupon strip severance is immediately effected along the next successive group of weakened severance lines S^1.

As each sheet unit S^4 is thus detached and is fed forwardly by the snatch rolls, it is projected or guided into stacked position in the receiving supporting magazine 75.

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.

The invention having thus been fully described, the following is claimed:

1. In a machine of the character described, in combination, strip feeding means, a plurality of strip restraining devices, and means for controlling said restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance.

2. In a machine of the character described, in combination, strip feeding means, a plurality of strip restraining devices, means for controlling said restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip engaging member positioned between said feeding means and said restraining devices and cooperating with the strips during the tensioning thereof to promote strip severance.

3. In a machine of the character described, in combination, strip feeding means, a plurality of strip restraining devices, means for controlling said restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip severing blade extending transversely of the strip path and positioned between said feeding means and said restraining devices and across which the strips are engaged by the tensioning action of said strip feeding means to promote strip severance.

4. In a machine of the character described, in combination, strip feeding means, a plurality of strip restraining devices, means for controlling said restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip severing edge extending transversely of the strip path and positioned between said feeding means and said restraining devices and across which the strips are engaged by the tensioning action of said strip feeding means to promote strip severance, said severing edge being forwardly inclined transversely to the longitudinal path of strip feed.

5. In a machine of the character described, in combination, strip feeding means, a plurality of strip restraining devices, means for controlling said restraining devices to exert strip restraint thereby, sometimes by one and sometimes by

another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip severing edge extending transversely of the strip path and positioned between said feeding means and said restraining devices and across which the strips are engaged by the tensioning action of said strip feeding means to promote strip severance, said severing edge being inclined inwardly and forwardly to the longitudinal path of strip feed from points adjacent to the opposite edges of the strips so as to initiate strip severance at opposite strip edges.

6. In a machine of the character described, in combination, strip feeding means, a plurality of strip feeding and restraining devices, means for controlling said feeding and restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip severing edge extending transversely of the strip path and positioned between said feeding means and said feeding and restraining devices and across which the strips are engaged by the tensioning action of said strip feeding means to promote strip severance, said severing edge being forwardly inclined transversely to the longitudinal path of strip feed, said severing edge at a point thereof adjacent to a lateral strip edge being positioned to one side of a straight line between the points of strip engagement by said feeding means and said feeding and restraining devices and inclining toward said straight line, whereby strip severance is initiated substantially at the strip edge and is continued progressively therefrom.

7. In a machine of the character described, in combination, strip feeding means, a plurality of strip feeding and restraining devices, means for controlling said feeding and restraining devices to exert strip restraint thereby, sometimes by one and sometimes by another thereof, during strip feed by said feeding means so as to create strip tension to effect transverse strip severance, and a strip severing edge extending transversely of the strip path and positioned between said feeding means and said feeding and restraining devices and across which the strips are engaged by the tensioning action of said strip feeding means to promote strip severance, said severing edge being inclined inwardly and forwardly to the longitudinal path of strip feed from points adjacent to the opposite edges of the strips and said severing edge at points thereof respectively adjacent to opposite lateral strip edges being positioned to one side of a straight line between the points of strip engagement by said feeding means and said feeding and restraining devices and inclining thence toward said straight line, whereby strip severance is initiated substantially at opposite strip edges and is continued progressively therefrom.

8. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension the strip reach between said feeding means and said restraining means due to the feeding action of said feeding means, and a stationary strip severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tension feeding action of said strip feeding means to effect transverse strip severance.

9. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension by feeding action of said feeding means the strip reach between said feeding means and said restraining means, and a strip severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said severing edge being forwardly inclined transversely to the longitudinal path of strip feed.

10. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension the strip reach between said feeding means and said restraining means by feeding action of said feeding means, and a strip severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said severance edge being inclined inwardly and forwardly to the longitudinal path of strip feed from points adjacent to opposite edges of the strips so as to initiate severance substantially at opposite strip edges.

11. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension the strip reach between said feeding means and said restraining means by feeding action of said feeding means, and a strip severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said severing edge being inclined inwardly and forwardly to the longitudinal path of strip feed from a point thereof adjacent to an edge of the strips so as to initiate severance substantially at said strip edge, said adjacent point of the severing edge being positioned in spaced relation to one side of a straight path between the points of strip engagement by said feeding means and said restraining means and inclining toward said straight path whereby strip severance initiated at the strip edge is continued progressively therefrom transversely of the strip.

12. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension by feeding action the strip reach between said feeding means and said restraining means, and a strip severing blade having a severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said transverse severing edge being inclined forwardly to the longitudinal path of strip feed from points adjacent to opposite edges of the strips so as to initiate severance at opposite strip edges, said severing edge at spaced points thereof respectively adjacent to opposite lateral strip edges being positioned in spaced relation to one side of a straight path between the points of strip engagement by said feeding means and said restraining devices and inclining thence toward said straight path whereby strip severance initiated at opposite longitudinal strip edges is con-

tinued progressively therefrom transversely of the strip.

13. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension by feeding action the strip reach between said feeding means and said restraining means, and a strip severing blade extending transversely of the strip path and having a severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said severing blade being forwardly inclined from its rear or base edge toward its severing edge and toward the strip path.

14. In a machine of the character described, in combination, strip feeding means, strip restraining means longitudinally spaced from said feeding means so as to tension by feeding action the strip reach between said feeding means and said restraining means, and a strip severing blade extending transversely of the strip path and having a severing edge extending transversely of and adjacent to the strip path, the strips being caused to be engaged in severing relation against said severing edge by said strip tensioning feeding action to effect transverse strip severance, said severing blade being forwardly inclined from its rear or base edge toward its severing edge and toward the strip path and having its transverse severing edge forwardly inclined to the longitudinal path of the strip feed.

15. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, and means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation.

16. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, and means for jointly exerting continuous feeding effort on the strips by said feeding means.

17. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path and each exerting intermittent feeding grip on the strips, and means whereby one of said feeding means grips the strips in feeding relation therewith while the feeding grip of a second of said feeding means is released.

18. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path and each exerting intermittent feeding grip on the strips, means whereby one of said feeding means grips the strips in feeding relation therewith while the feeding grip of a second of said feeding means is released, and means whereby said second feeding means grips the strips in feeding relation therewith while the feeding grip of said one feeding means is released.

19. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path and each exerting intermittent feeding grip on the strips, means whereby one of said feeding means grips the strips in feeding relation therewith while the feeding grip of a second of said feeding means is released, means whereby said second feeding means grips the strips in feeding relation therewith while the feeding grip of said one feeding means is released, and means whereby said plurality of feeding means conjointly exert continuous strip feeding effort.

20. In a device of the character described, in combination, a plurality of strip feeding means including a plurality of pairs of feed rolls each pair of which exerts intermittent feeding grip on the strips, and means whereby one of said pairs of feed rolls grips the strips in feeding relation therewith while the feeding grip of a second pair of feed rolls is released.

21. In a device of the character described, in combination, a plurality of strip feeding means including a plurality of pairs of feed rolls each pair of which exerts intermittent feeding grip on the strips, means whereby one of said pairs of feed rolls grips the strips in feeding relation therewith while the feeding grip of a second pair of feed rolls is released, and means whereby said second pair of feed rolls grips the strips in feeding relation therewith while the feeding grip of said one pair of feed rolls is released.

22. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means whereby one of said feeding means grips the strips in feeding relation therewith, while the feeding grip of a second of said feeding means is released, and means whereby said plurality of feeding means conjointly exert continuous strip feeding effort.

23. In a machine of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means whereby one of said feeding means grips the strips in feeding relation therewith while the feeding grip of a second of said feeding means is released, means whereby said second feeding means grips the strips in feeding relation therewith while the feeding grip of said one feeding means is released, and means whereby said plurality of feeding means conjointly exert continuous strip feeding effort.

24. In a device of the character described, in combination, a plurality of strip feeding means including a plurality of pairs of feed rolls driven in timed relation, means whereby one of said pairs of feed rolls grips the strips in feeding relation therewith while the feeding grip of a second pair of feed rolls is released, means whereby said second pair of feed rolls grips the strips in feeding relation therewith while the feeding grip of said one pair of feed rolls is released, and means whereby said plurality of pairs of feed rolls conjointly exert continuous strip feeding effort.

25. In a device of the character described, in combination, a plurality of strip feeding means including a plurality of pairs of feed rolls driven in timed relation, one feed roll of each of said pairs of feed rolls having a part of its periphery depressed or omitted so as to exert intermittent strip feeding grip, said omitted portions of the feed rolls being positioned differently in the different pairs of rolls whereby one pair of each of said pairs of feed rolls grips the strips in feeding relation therewith while the strips are released from the feeding grip of another of said pairs of feed rolls.

26. In a device of the character described, in combination, a plurality of strip feeding means including a plurality of pairs of feed rolls driven in timed relation, one feed roll of each of said

pairs of feed rolls having a part of its periphery depressed or omitted so as to exert intermittent strip feeding grip, said depressed or omitted portions of the feed rolls being positioned differently in the different pairs of rolls whereby one pair of each of said pairs of feed rolls grips the strips in feeding relation therewith while the strips are released from the feeding grip of another of said pairs of feed rolls, said depressed or omitted portions of the roll peripheries being relatively positioned so the plurality of pairs of feed rolls conjointly exert continuous feeding effort on the strips.

27. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, and an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means, thus to cause strip tension on the strip reach between said first mentioned feeding means and said additional feeding means.

28. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, means whereby said plurality of feeding means jointly exert continuous feeding effort on the strips, and an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means thus to cause strip severing tension on the strip reach between said first mentioned feeding means and said additional feeding means.

29. In a device of the character described, in combination, a plurality of strip gripping feeding means spaced apart longitudinally of the strip path and driven in timed relation, means for exerting strip gripping feeding effort on the strips by one of said feeding means while the feeding grip of a second of said feeding means is released, means for exerting strip gripping effort on the strips by said second feeding means while the feeding grip on said one feeding means is released, and an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means when the strips are gripped in feeding relation sometimes by one of said first mentioned feeding means and sometimes by another thereof, thus to cause strip severing tension on the strip reach between said strip gripping feeding means and said additional feeding means.

30. In a device of the character described, in combination, a plurality of strip gripping feeding means spaced apart longitudinally of the strip path, means for exerting strip gripping feeding effort on the strips by one of said feeding means while the feeding grip of a second of said feeding means is released, means for exerting strip gripping effort on the strips by said second feeding means while the feeding grip on said one feeding means is released, means whereby said plurality of strip gripping feeding means conjointly exert continuous strip feeding effort, and an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means when the strips are gripped in feeding relation sometimes by one of said first mentioned feeding means and sometimes by another thereof, thus to cause strip severing tension on the strip reach between said strip gripping feeding means and said additional feeding means.

31. In a device of the character described, in combination, a plurality of pairs of strip gripping feed rolls spaced apart longitudinally of the strip path, one feed roll of each said pair having a part of its periphery omitted or depressed so as to exert intermittent strip feeding grip, said omitted or depressed portions being positioned differently in the feed rolls of the different pairs whereby one pair of each of said pairs of feed rolls in alternation grips the strips in feeding relation therewith while the strips are released from the feeding grip of another of said pairs of feed rolls, and an additional strip feeding means spaced from said pairs of feed rolls and exerting strip feed faster than said feed rolls, thus to cause strip severing tension on the strip reach between said feed rolls and said additional feeding means.

32. In a device of the character described, in combination, a plurality of pairs of strip gripping feed rolls spaced apart longitudinally of the strip path, one feed roll of each said pair having a part of its periphery omitted or depressed so as to exert intermittent strip feeding grip, said omitted or depressed portions being positioned differently in the feed rolls of the different pairs whereby one pair of each of said pairs of feed rolls in alternation grips the strips in feeding relation therewith while the strips are released from the feeding grip of another of said pairs of feed rolls, and an additional strip feeding means spaced from said pairs of feed rolls and exerting strip feed faster than said feed rolls, thus to cause strip severing tension on the strip reach between said feed rolls and said additional feeding means, said depressed portions of the feed rolls being relatively positioned on the different rolls so as to exert continuous strip feeding effort conjointly by said pairs of feed rolls.

33. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means, thus to cause strip tension on the strip reach between said first mentioned feeding means and said additional feeding means, and a severing edge extending transversely of the strip path between said first mentioned strip feeding means and said additional strip feeding means against which the strips are engaged and severed by the strip tensioning action of the feeding means.

34. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means, thus to cause strip tension on the strip reach between said first mentioned

feeding means and said additional feeding means, and a severing edge extending transversely of the strip path between said first mentioned strip feeding means and said additional strip feeding means against which the strips are engaged and severed by the strip tensioning action of the feeding means, said severing edge being forwardly inclined transversely of the longitudinal path of strip feed.

35. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means, thus to cause strip tension on the strip reach between said first mentioned feeding means and said additional feeding means, and a severing edge extending transversely of the strip path between said first mentioned strip feeding means and said additional strip feeding means against which the strips are engaged and severed by the strip tensioning action of the feeding means, said severing edge being inclined inwardly and forwardly to the longitudinal path of strip feed from points adjacent to opposite edges of the strips so as to initiate severance at the opposite strip edges.

36. In a device of the character described, in combination, a plurality of strip feeding means spaced apart longitudinally of the strip path, means for exerting feeding effort on the strips being fed first by one of said feeding means and then by another thereof in alternation, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means, thus to cause strip tension on the strip reach between said first mentioned feeding means and said additional feeding means, and a severing edge extending transversely of the strip path between said first mentioned strip feeding means and said additional strip feeding means against which the strips are engaged and severed by the strip tensioning action of the feeding means, said severing edge at a point thereof adjacent to a lateral strip edge being spaced at one side of a straight path between the points of strip engagement by said first mentioned feeding means and said additional strip feeding means, and inclining thence toward said straight path whereby strip severance is initiated at an edge portion of the strips and is continued progressively therefrom transversely of the strips.

37. In a device of the character described, in combination, a plurality of strip gripping feeding means spaced apart longitudinally of the strip path, means for exerting strip gripping feeding effort on the strips by one of said feeding means while the feeding grip of a second of said feeding means is released, means for exerting strip gripping effort on the strips by said second feeding means while the feeding grip on said one feeding means is released, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means when the strips are gripped in feeding relation sometimes by one of said first mentioned feeding means and sometimes by another thereof, thus to cause strip tension on the strip reach between said strip gripping feeding means and said additional feeding means, and a severing edge forwardly inclined transversely of the longitudinal path of strip feed across which the strips are severed by said strip tension.

38. In a device of the character described, in combination, a plurality of strip gripping feeding means spaced apart longitudinally of the strip path, means for exerting strip gripping feeding effort on the strips by one of said feeding means while the feeding grip of a second of said feeding means is released, means for exerting strip gripping feeding effort on the strips by said second feeding means while the feeding grip on said one feeding means is released, an additional strip feeding means spaced from said first mentioned feeding means and operating to exert strip feed faster than said first mentioned feeding means when the strips are gripped in feeding relation, sometimes by one of said first mentioned feeding means and sometimes by another thereof, thus to cause strip tension on the strip reach between said strip gripping feeding means and said additional feeding means, and a severing edge across which the strips are severed by said strip tension and being inclined inwardly and forwardly to the longitudinal path of strip feed from points adjacent to opposite edges of the strips so as to initiate severance substantially at the opposite strip edges.

39. In a device of the character described, in combination, a plurality of pairs of strip gripping feed rolls spaced apart longitudinally of the strip path, one feed roll of each said pair having a part of its periphery omitted or depressed so as to exert intermittent strip feeding grip, said omitted or depressed portions being positioned differently in the feed rolls of the different pairs whereby one pair of each of said pairs of feed rolls in alternation grips the strips in feeding relation therewith while the strips are released from the feeding grip of another of said pairs of feed rolls, an additional strip feeding means spaced from said pairs of feed rolls and exerting strip faster than said feed rolls, thus to cause strip tension on the strip reach between said feed rolls and said additional feeding means, and a severing edge across which the strips are severed by said strip tension, said severing edge at a point thereof adjacent to a lateral strip edge being spaced at one side of a straight strip path between the points of strip engagement by said first mentioned feeding means and said additional strip feeding means and inclining thence toward said straight path whereby strip severance is initiated at an edge portion of the strips and is continued progressively therefrom transversely of the strips.

40. In a strip feeding device of the character described, in combination, a plurality of pairs of strip feeding feed-in rolls, a pair of strip tear-off or snatch rolls feeding faster than said feed-in rolls, and means whereby said pairs of feed-in rolls exert alternate intermittent feeding action on the strips being fed.

41. In a device of the character described, in combination, a plurality of pairs of feed-in rolls, a pair of tear-off or snatch rolls feeding faster than said feed-in rolls, means whereby said pairs of feed-in rolls exert alternate intermittent feeding action on the strips being fed, and means whereby said pairs of feed-in rolls conjointly exert continuous feeding action upon the strips.

42. In a strip feeding and severing device, in combination, a plurality of pairs of feed-in rolls, a pair of tear-off or snatch rolls feeding the

strips faster than said feed-in rolls so as to tension the strip reach between said feed-in rolls and said snatch rolls, means whereby said pairs of feed-in rolls exert alternate intermittent strip gripping feeding action on the strips being fed, and a strip severing edge extending transversely of the strip path and engageable in severing relation with the tensioned part of the strip between said feed-in rolls and said snatch rolls.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,331,351	Seeley	Oct. 12, 1943
2,344,720	O'Connell	Mar. 21, 1944
2,355,690	Zent	Aug. 15, 1944
2,380,949	Davidson	Aug. 7, 1945