

Aug. 19, 1941.

J. Q. SHERMAN ET AL

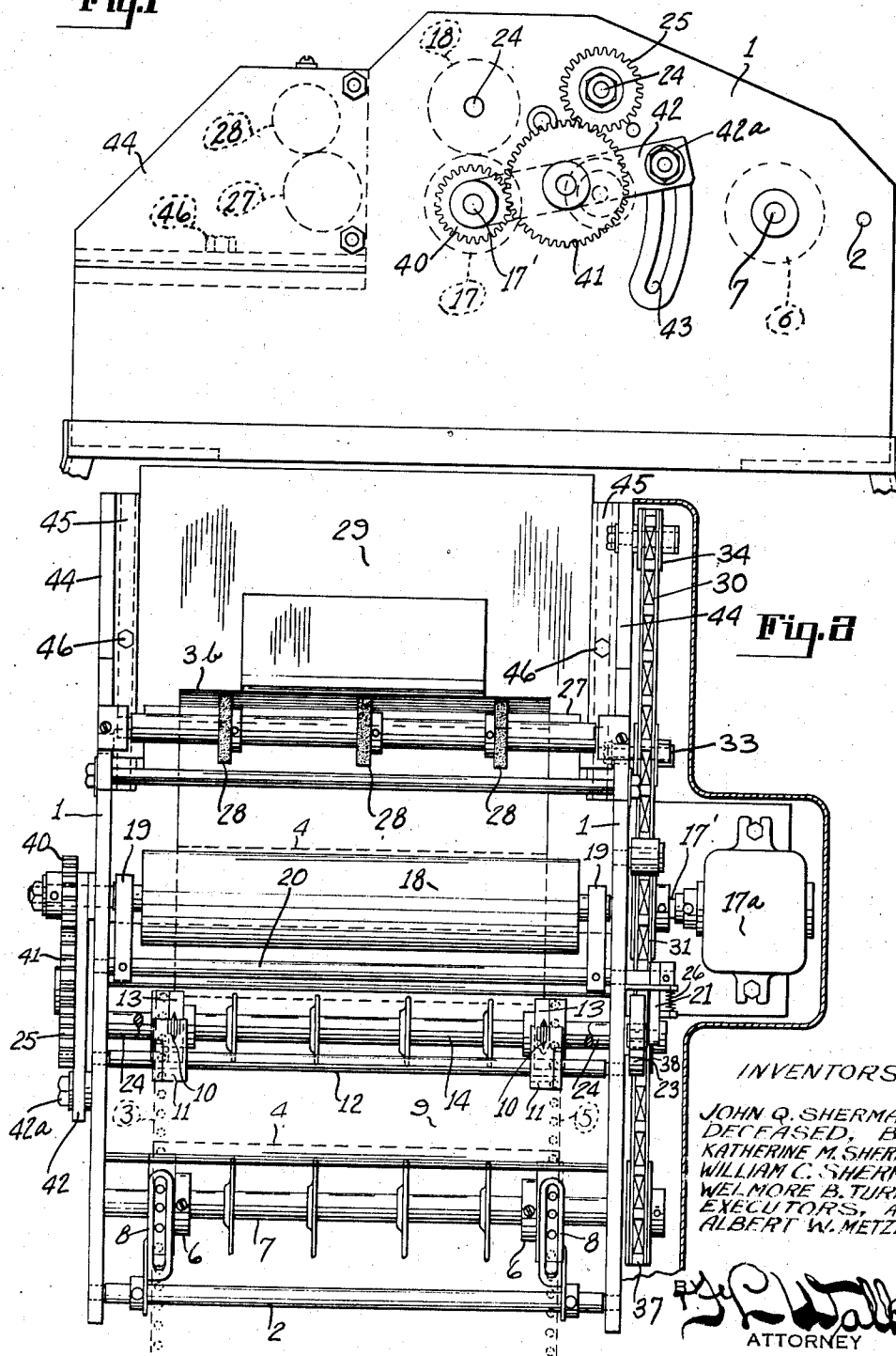
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STRIP FEEDING TRIMMER AND BURSTING MACHINE

Filed Sept. 20, 1939

2 Sheets-Sheet 1

Fig.1



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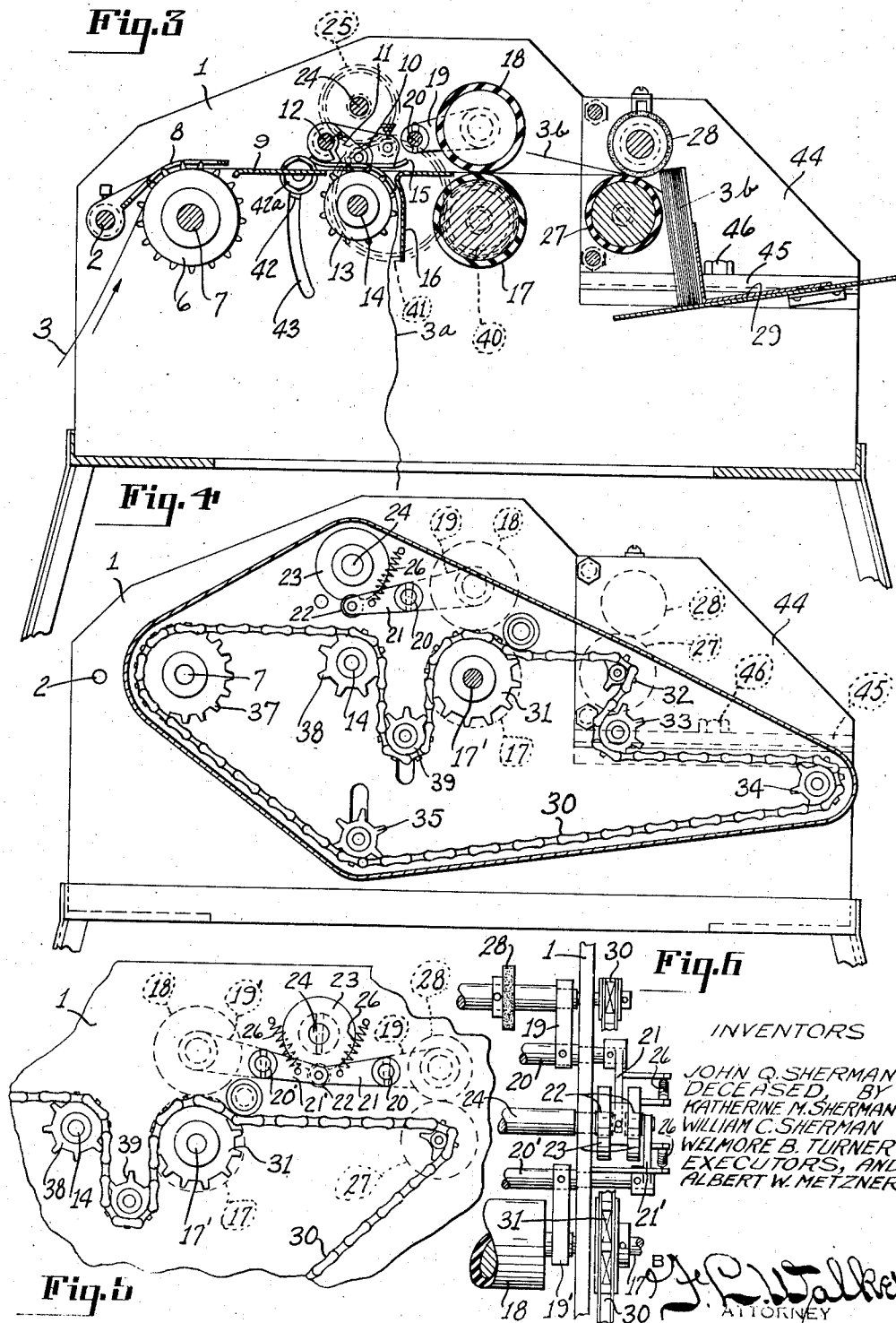
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UNITED STATES PATENT OFFICE

2,252,736

STRIP FEEDING TRIMMER AND BURSTING MACHINE

John Quirk Sherman, deceased, late of Dayton, Ohio, by Katherine M. Sherman, William C. Sherman, and Wellmore B. Turner, executors, Dayton, Ohio, and Albert W. Metzner, Dayton, Ohio; said Metzner assignor to the estate of John Quirk Sherman, deceased

Application September 20, 1939, Serial No. 295,814

26 Claims. (Cl. 164—84.5)

This invention pertains to strip feeding and severing apparatus, and more particularly to means for automatically separating a continuous strip of material into a succession of sheets of uniform size and stacking the severed sheets in an orderly manner.

In printing duplicate forms such as checks, utility bills, sales slips, invoices, and also in printing book signatures of smaller sizes, it is more economical to print successive impressions on continuous strips or webs of paper in longitudinally spaced series interconnected relation and subsequently sever the strips into intermediate succeeding impressions into individual sheets, slips, or forms.

To facilitate division of a strip or web into a succession of individual sheets, such printed web or strip may be transversely scored or weakened intermediate succeeding impressions simultaneously with the imprinting operation or subsequent thereto, as most convenient, preparatory to being separated on such transverse division line, or, in lieu of such preliminary scoring or weakening, the strips may be sheared or cut between succeeding forms without such preliminary weakening.

In the present invention there is contemplated severance of the strips transversely at predetermined spaced intervals into individual sheets. While it is contemplated that each strip or series of strips will be severed into individual sheets of uniform size, provision is made to accommodate the apparatus to variation of size of sheets into which the strips are divisible. In order that the strip and severing apparatus may be properly synchronized, the strip is preferably positively advanced to the strip severing means by pin type feeding devices operatively engageable in marginally punched holes in the strips, which punched marginal areas are progressively trimmed therefrom as the strips advance, after which the severed sheets are automatically stacked either one upon the other or one behind the other in orderly succession.

The present invention is a further development and amplification of the disclosures of co-pending applications Serial No. 226,760 and Serial No. 251,185, upon which, however, it is in no way dependent.

The object of the invention is to provide a strip feeding, severing and sheet stacking apparatus which may not only be economically constructed and operated, but which will be highly efficient in use, rapid and automatic in its action, uniform in operation, of relatively

simple construction having comparatively few operating parts, and unlikely to get out of repair.

A primary object of the invention is to provide automatic means for accurately dividing a printed strip into a succession of individual sheets at a rapid rate of operation.

A further important object of the invention is to provide means whereby the apparatus may be quickly and easily adapted to division of strips into uniform sheets of greater or less length.

A further object of the invention is to enable the advancement of the strips to be accurately synchronized with the strip severing device.

A further object of the invention is to provide for automatic stacking of the severed sheets in an orderly fashion without the necessity of turning or reversing the individual sheets.

A further object of the invention is to provide means for insuring the complete separation of successive portions of the stock strip, leaving clean edges thereon and on the severed sheet.

A further object of the invention is to provide an apparatus of the present character having means for removing from the ultimate sheets any evidence, marking or configuration incident to their passage through the machine and the effect of the strip feeding operation.

A further object of the invention is to provide a strip severing and sheet stacking apparatus embodying the advantageous structural features and inherent meritorious characteristics herein disclosed.

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

Referring to the accompanying drawings, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a side elevation, and Fig. 2 a top plan view of a strip feeding and severing machine embodying the present invention. Fig. 3 is a longitudinal sectional view thereof. Fig. 4 is a side elevation viewed from the side opposite that shown in Fig. 1 and disclosing certain driving connections. Figs. 5 and 6 are a fragmentary side elevation and fragmentary plan view illustrating a modification of the present invention.

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

The present apparatus is of small compact

form and is mounted for use upon a table or on supporting legs, and is driven by an electric motor. The operating parts are mounted in a frame comprising upright relatively spaced side plates 1—1 interconnected by transverse tie rods 2—2. The continuous strip 3 of material to be divided into individual sheets is scored, perforated or otherwise weakened on transverse division lines 4 at uniform longitudinally spaced intervals, upon which division is effected. The strip illustrated in the drawings is marginally punched at 5 for engagement of a positive pin type feeding device. The invention however is not dependent upon the method of feeding the strip, and unpunched strip material may be fed through the apparatus by conventional rotary frictional pressure rolls.

As illustrated, however, there is provided at the intake side of the machine a pair of axially spaced pin wheels 6 carried by a rotary driven shaft 7 journaled in the side plates 1 of the frame. The radially disposed feeding pins of the pin wheels progressively engage the marginal holes 5 in the strip 3 to uniformly and progressively advance the strip in timed relation with the succeeding operating parts. Cooperating with the pin wheels 6 are slotted strip guide fingers 8 mounted on a tie rod 2 and overlying the strip and pin wheel 6 to loosely retain the strip in engagement with the feeding pins.

Beyond the feeding device 6 the strip passes over table 9 and thence under trimmer discs 10 carried by arms 11 mounted on a transverse shaft 12. The trimmer discs 10 cooperate with rollers or wheels 13 mounted on a revolubly driven shaft 14. These rollers 13 may or may not be provided with feeding pins engageable in the holes of the marginal area, as it is detached from the strip. If such rollers 13 are provided with feeding pins, slotted strip guides 15 are positioned beside the trimmer discs 10 in overlying relation with the punched margin of the strip for loosely holding the strip against disengagement from the pins. The trimmer discs bear upon the peripheries of the rollers or wheels 13 at the inner side of the series of pins, if present, and as the strip is advanced they sever therefrom the marginal feeding area containing the feed holes. Such detached marginal portion 3a is deflected downwardly by a dependent guide finger 16. The trimmed remainder of the strip is advanced by the feeding device between a pair of coating rollers 17 and 18. The roller 17 is power driven at approximately the same rate of peripheral speed that the strip is being advanced by the feeding device. The coating roller 18 is an idler roller, mounted for vibratory motion into and out of cooperative relation with the driven roller 17 and engagement with the strip 3 being advanced therebetween. The roller 18 is journaled in rock arms 19 carried by a rock shaft 20 extending transversely of the machine and journaled in the side frames 1. On the outer side of one of the side frames the extension of the shaft 20 carries an oppositely extending rock arm 21, carrying a roller 22 which rides upon the periphery of a rotary notched cam disc 23. The cam disc 23 is mounted on one end of a transverse rotary shaft 24 journaled in the side plates 1, which at the opposite side of the machine carries a gear pinion 25, which is one of a train of gears and is interchangeable with other substitute gears of different size to effect rotation of the cam disc 23 in differently timed relation. As the cam disc 23 rotates, the roller 22 riding on

the periphery thereof holds the vibratory roller 18 in elevated relation until the roller 22 enters the notch in the disc, whereupon the roller 18 descends into operative engagement with the strip under influence of gravity supplemented by retraction of a spring 26. The engagement of the strip by the rollers 17—18 occurs coincident with or somewhat before the engagement of the strip terminal between a pair of friction pressure rollers 27—28 located in spaced relation with the rollers 17 and 18 and driven at an accelerated peripheral speed. These rollers have intermittent engagement with the succeeding ends of the strip as terminal portions of predetermined extent are detached therefrom.

The respective pair of rollers 17—18 and 27—28 are located sufficient distance apart that a transverse weakened division line 4 will be included in the portion of the strip intermediate said pairs of rollers. The rollers 27 and 28 operating at a peripheral speed greater than the travel of the strip will exert a strong pulling tension thereon with more or less of a snap or jerk. If the rollers 17—18 were not interposed between the rollers 27—28 and the feeding device, the pull or tension would be transmitted thereto and the feed holes would be torn, or, if friction feed is employed, the strip would be slipped relative to the feed rollers and so be thrown out of time with the succeeding operations. However, the engagement of the rollers 17—18 resists the pulling strain imposed by the fast rotating rollers 27—28 and so protects the feeding device against strain. The rollers 27—28 tending to advance the strip at accelerated rate and the rollers 17—18 resisting such increased accelerated advancement, causes the intermediate portion of the strip in which is included a transverse weakened line to be tensioned in excess of the tensile resistance of the weakened line. As result, the strip is bursted on such line, thereby detaching the terminal portion therefrom. The succeeding end of the strip is thus left free between the respective pairs of rollers, until advanced by the feeding device into engaging relation with the fast rotating rollers 27—28 preparatory to repetition of the tensioning and bursting operation. The detached terminal sheets or sections are deposited either in upright assembly or superposed one upon another upon a receiving table 29. To facilitate the delivery of the individual sheets 3b into which the strip 3 is divided, the final rollers 27—28 are preferably, although not necessarily, arranged with their axes disposed in a common plane inclined to the vertical and to the path of travel of the strip. This causes the rear end of the detached sheet to be tilted upwardly and its forward edge downwardly relative to the plane of advancement of the strip at the moment of severance therefrom.

The several parts of the apparatus are driven in synchronism by a traveling chain belt 30, which follows a circuitous path in which it successively engages with a plurality of sprockets.

The actuating power of the motor 17a is applied to the shaft 17' of the roller 17, preferably through a suitable speed reduction drive mechanism. The roller shaft 17' carries the driving sprocket 31, from which the drive chain passes about a sprocket 32 of smaller size on the shaft of the roller 27, to which rotation is given at increased peripheral speed. The chain passes under an idler 33, which directs the chain belt in its course. The chain belt 30 then passes in reverse direction about an idler sprocket 34, and thence

in reverse direction beneath an adjustable belt-tightening sprocket 35 to a sprocket 37 on the pin wheel feed shaft 7. The chain belt passes thence about a sprocket wheel 38 upon the shaft 14, which carries the trimmer rollers 13, and back to the driving sprocket, after passing about an idler sprocket 39, which insures traction engagement of the chain belt through sufficient peripheral segment of the respective sprockets 31 and 38 to afford the necessary driving power. The drive shaft 17' of the roller 17 carries at its opposite end a spur gear 40, meshing with an idler gear 41 mounted on an oscillatory arm 42 pivoted on the shaft 17' concentrically with the gear 40 and adapted to be secured in adjusted relation by a clamp bolt 42a engaging through a concentric slot 43 in the side plate 1. By to and fro oscillatory adjustment of the arm 42 (see Fig. 1), the idler gear 41 is made to mesh with interchangeable gear pinions 25 of different sizes on the cam shaft 24.

The continuous strip may comprise a succession of series-connected utility bills, checks, order or shipping forms, form letters, bills of lading or the like, which vary in size from a few inches of lineal extent to letter or legal size sheets, which are to be divided at corresponding intervals. To accommodate the apparatus to severance of the strip into uniform sheets of greater or less length, the speed of the feeding device may be increased or decreased by substituting for the sprocket 37 an interchangeable sprocket of larger or smaller size and adjusting the belt-tightening sprocket to take up or provide corresponding slack of the belt. This will accordingly advance the strip a greater or less distance between succeeding bursting operations. So long as the initial transverse weakened line upon which the strip is to be divided remains between the pairs of rollers 17-18 and 27-28 and is not passed through the latter rollers, it is immaterial whether at the moment of bursting it is closer to the former or latter rollers. In such event the second set of feed pins would be omitted from the roller 13, or in lieu thereof a sprocket of different size substituted also for the sprocket 38.

However, the preferable method of accommodating the apparatus to the division of sheets of different extent is to regulate the timing of the bursting operation, by either varying the spacing of the respective pairs of rollers 17-18 and 27-28 or by changing the timing of the vibratory roller 18, or by both methods.

The final higher speed rollers 27-28 and their drive sprocket 32 and the idler sprocket 34, together with the sheet receiver 29, are carried by an adjustable section 44 of the main frame mounted on ways 45 for to and fro sliding adjustment and secured by clamp bolts 46. By such adjustment the snatch rollers 27-28 may be advanced or retracted to afford greater or less space intermediate these rollers and the rollers 17-18. The necessary change in driving belt tension is compensated by adjustment of the belt-tightener sprocket 35 or 39. The other method of accommodating such change of size of the ultimate sheets is by changing the timing of the vibratory movement of the roller 18. This is effected by substituting a larger or smaller interchangeable gear pinion 25, which results in change of speed of rotation of the notched cam disc 23, thereby causing the roller 18 to impinge upon the traveling strip at greater or less time intervals. By this arrangement, the feeding motion of the strip is maintained uniform, regard-

less of the length of the sheet sections to be severed therefrom or the frequency of vibration of the roller 18.

In Figs. 5 and 6 is shown a modification wherein both the rollers 18 and 28 are vibratory and are operated in unison into and out of engagement with the strip material. In this assembly the cam disc 23 is common to both rollers. The rollers 18 and 28 are for oscillatory motion in duplicate reversely arranged assemblies of rock arms 19 and 19' and rock shafts 20 and 20' carrying outside the frame reversely disposed rock arms 21 and 21' having anti-friction rollers which simultaneously ride upon the periphery of the common notched disc 23. The chain drive and other operating features are substantially as before described. By making the arm 21' slightly longer than the arm 21, the latter will fall into the notch slightly in advance of the arm 21' and hence the roller 18 will engage the strip slightly in advance of the engagement of the roller 28, in ample time to resist the snap action as the snatch rollers 27-28 catch and strongly tension the terminal portion of the strip.

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

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

Having thus described our invention we claim:

1. In a strip severing apparatus, strip feeding means for progressively advancing into strip severing position a continuous strip of material having at longitudinally spaced intervals transverse weakened division lines, a pair of rollers intermittently engageable with the terminal portion of the strip in advance of the initial transverse weakened line thereof, means for driving said rollers at an accelerated speed, and a second pair of rollers having intermittent engagement with the strip beyond the initial transverse weakened line thereof simultaneously with the engagement therewith of the first pair of rollers, driving means actuating the second pair of rollers at a lesser rate of speed than the first mentioned rollers, and adjusting means for automatically raising and lowering one of the rollers of the second pair in timed sequence with the advancement of the strip.

2. In a strip severing apparatus, strip feeding means for progressively advancing into strip severing position a continuous strip of material having at longitudinally spaced intervals transverse weakened division lines, two pairs of rollers operating at different peripheral speeds intermittently engageable simultaneously with the strip at opposite sides of the initial transverse weakened line thereof in timed relation with the advancement of the strip to tension the intermediate portion thereof beyond the tensile strength

of such transverse weakened line, and means for relatively adjusting at least one pair of said rollers into and out of engagement with the strip in timed relation with the advancement thereof.

3. In a strip severing apparatus, strip feeding means for progressively advancing into strip severing position a continuous strip of material having at longitudinally spaced intervals transverse weakened division lines, strip tensioning means for subjecting a portion of the strip contiguous to a transverse weakened line thereof to a degree of tension beyond the tensile resistance of the strip coincident with such weakened line, including strip gripping rollers intermittently engageable simultaneously with the strip at opposite sides of a transverse weakened line thereof in timed relation with the advancement of the strip, driving means for actuating the rollers at opposite sides of the weakened division line at different peripheral speeds while in engagement with the strip, and means for bodily vibrating at least one of the rollers in to and out of strip engaging relation.

4. A strip feeding and dividing apparatus wherein a continuous strip of material having longitudinally spaced transverse weakened division lines is progressively advanced into strip severing position, a pair of rollers intermittently engageable with the strip in advance of the initial transverse weakened line thereof, a second pair of rollers intermittently engageable with the strip back of the initial transverse weakened line simultaneously with the engagement therewith of the first mentioned pair of rollers, at least one roller of at least one pair thereof being vibratory, and actuating means for moving the vibratory roller into and out of engagement with the strip in timed relation with the advancement thereof, and driving means for actuating the respective pairs of rollers at different peripheral speeds while in engagement with the strip.

5. In a strip feeding and severing apparatus, strip feeding means for progressively advancing into a strip severing position a continuous strip of material having at longitudinally spaced intervals transverse weakened division lines, a second strip feeding device engageable with the strip in advance of a selected transverse weakened division line for advancing the terminal portion of the strip at an accelerated rate of speed, and a vibratory roller having intermittent engagement with the strip back of the selected transverse weakened division line and actuated at a lesser rate of peripheral speed while in engagement therewith than said second strip feeding device, the construction and arrangement being such that the portion of the strip adjacent the selected transverse weakened division line is subjected to pulling tension in excess of the tensile resistance of the transverse weakened line thereof.

6. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened lines into a strip severing position, relatively spaced strip tensioning devices for tensioning a terminal portion of the strip beyond the tensile resistance of a transverse weakened line within such tensioned portion, and an adjustable mounting for varying the spacing between the strip tensioning devices longitudinally of the path of the strip.

7. In an apparatus for feeding and severing continuous strips of record material having

therein a succession of longitudinally spaced transverse weakened lines, a strip feeding device for advancing each of several different strips into strip severing position at a uniform rate of speed regardless of the relative spacing of the transverse weakened lines of the respective strips, strip tensioning means for tensioning a terminal portion of the strip beyond the tensile resistance of a transverse weakened line traversing such tensioned portion, and adjustable means enabling the operation of the tensioning means in differently timed relation with the advancement of the strip in accordance with the relative spacing of the transverse weakened lines of the particular strip being severed.

8. In an apparatus for feeding and severing continuous strips of record material having therein a succession of longitudinally spaced transverse weakened lines, a strip feeding device for advancing each of several different strips into strip severing position at a uniform rate of speed regardless of the relative spacing of the transverse weakened lines of the respective strips, strip severing means and means for varying the timing of operation of the strip severing means relative to the speed of operation of the strip feeding device in accordance with the relative spacing of the transverse weakened lines of particular strips to be severed.

9. In an apparatus for feeding and severing continuous strips of record material having therein a succession of longitudinally spaced transverse weakened lines, a strip feeding device for advancing each of several different strips into strip severing position at a uniform rate of speed regardless of the relative spacing of the transverse weakened lines of the respective strips, relatively spaced strip tensioning means engageable with the strip at longitudinally spaced points at opposite sides of a transverse weakened line for subjecting an intermediate portion of the strip to tension in excess of the tensile resistance of the transverse weakened line traversing such tensioned portion, and an adjustable mounting for at least a portion of the strip tensioning means, by adjustment of which the apparatus may be adapted for severance of strips on differently spaced transverse weakened lines.

10. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position, strip severing means including a pair of rollers operated at a peripheral speed greater than the advancement of the strip by the feeding device, intermittently engageable with a terminal portion of the strip in advance of the initial transverse weakened line, and a vibratory member intermittently engageable with the strip intermediate the strip feeding device and said rollers at a point back of the transverse weakened line and simultaneously with the engagement of the strip by the rollers, to tension the intermediate portion of the strip in excess of the tensile resistance of the transverse weakened line.

11. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position, strip severing means including a pair of rollers operated at a peripheral speed greater than the advancement of the strip by the feeding device, intermittently engageable with a terminal portion of the strip

in advance of the initial transverse weakened line, and a vibratory member intermittently engageable with the strip intermediate the strip feeding device and said rollers at a point back of the transverse weakened line and simultaneously with the engagement of the strip by the rollers, to tension the intermediate portion of the strip in excess of the tensile resistance of the transverse weakened line, and means for changing the timing of the vibratory member in relation to the advancement of the strip to adapt the apparatus to separation of the strips upon differently spaced transverse weakened lines.

12. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position, strip severing means including two relatively spaced differentially operable strip engaging devices intermittently engageable with the strip simultaneously at opposite sides of a transverse weakened line and operable to tension the intermediate portion of the strip in excess of the tensile resistance of the transverse weakened line, and variable means for changing the timing of at least one of said differentially operable strip engaging devices relative to the advancement of the strip to accommodate the apparatus to strips having differently spaced transverse weakened division lines.

13. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position, strip tensioning means engageable with the strip at relatively spaced points at opposite sides of a transverse weakened division line and operative to increase the tension resistance of the transverse weakened line, and variable means for effecting change of timing of the tensioning of the strip relative to the advancement thereof to accommodate strips having differently spaced transverse weakened division lines independently of change of operation of the strip feeding device.

14. In a strip feeding and severing apparatus, a strip feeding device for uniformly advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position regardless of the relative spacing of the transverse weakened lines, strip engaging means for intermittently tensioning a limited portion of the strip in which is included a transverse weakened division line, in excess of the tensile resistance of the included transverse division line, and variable means for changing the timing of the tensioning operation relative to the advancement of the strip by the strip feeding device to accommodate the apparatus to strips having differently spaced transverse division lines.

15. In a strip feeding and severing apparatus, a strip feeding device for uniformly advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into a strip severing position regardless of the relative spacing of the transverse weakened lines, strip engaging means for intermittently tensioning a limited portion of the strip in which is included a transverse weakened division line, including a vibratory member bodily movable into and out of engagement with the strip for inducing said tensioning effect, and variable means for changing the rate of vibration of the said vibrator member to accommodate the apparatus to

division of strips having differently spaced transverse weakened division lines.

16. In a strip feeding and severing apparatus, a strip feeding device for advancing a continuous strip of material having longitudinally spaced transverse division lines into a strip severing position, strip tensioning means intermittently engageable with the strip at opposite sides of a transverse weakened division line for tensioning the intermediate portion of the strip in excess of the tensile resistance of the included division line, actuating means for operating the tensioning means in timed relation with the strip feeding device, and an adjustable mounting for at least a part of the tensioning means by which the relation thereof to the advanced strip may be changed to accommodate the apparatus to strips having differently spaced transverse division lines.

17. In a strip feeding and severing apparatus, a strip feeding device for advancing a continuous strip of material having longitudinally spaced transverse division lines into a strip severing position, strip tensioning means intermittently engageable with the strip at opposite sides of a transverse weakened division line for tensioning the intermediate portion of the strip in excess of the tensile resistance of the included division line, actuating means for operating the tensioning means in timed relation with the strip feeding device, and variable means enabling the changing of the timing of the tensioning operation in relation to the advancement of the strip to accommodate the apparatus to strips having differently spaced transverse division lines.

18. In a strip feeding and severing apparatus, a strip feeding device for advancing a continuous strip of material having longitudinally spaced transverse weakened lines into a strip severing position, a pair of relatively spaced vibratory members intermittently engageable with the strip at opposite sides of a transverse division line for tensioning an intermediate portion of the strip in excess of the tensile resistance of the included transverse weakened line, and actuating means for vibrating said members in timed relation with the advancement of the strip.

19. In a strip feeding and severing apparatus, a strip feeding device for advancing a continuous strip of material having longitudinally spaced transverse weakened lines into a strip severing position, two relatively spaced rollers mounted for vibratory motion into and out of engagement with the strip at opposite sides of a transverse division line, actuating means for driving the respective vibratory rollers at different peripheral speeds while in engagement with the strip to tension the intermediate portion of the strip in excess of the tensile resistance of the included transverse weakened division line, and operating means for vibrating the rollers in timed relation with the advancement of the strip.

20. In a strip feeding and severing apparatus, a strip feeding device for advancing a continuous strip of material having longitudinally spaced transverse weakened lines into a strip severing position, relatively spaced vibratory strip engaging members having intermittent simultaneous engagement with the strip at opposite sides of a transverse weakened division line thereof, and actuating means for differentially operating the vibratory strip engaging members while in engagement with the strip to tension the intermediate portion thereof in excess of the tensile resistance of the included transverse division line.

21. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into strip severing position, a strip tensioning device for tensioning succeeding terminal portions of the strip in excess of the tensile strength of a transverse weakened line included in the tensioned portion thereof, driving means for actuating the strip feeding and strip tensioning devices in timed sequence, and means for adapting the apparatus for severing different continuous strips having differently spaced transverse weakened division lines into uniform sheets of different size, including means for varying the speed of the strip feeding device whereby the strip is advanced at greater or less speed in relation with the sequence of operation of the strip tensioning device.

22. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into strip severing position, a strip tensioning device for tensioning succeeding terminal portions of the strip in excess of the tensile strength of a transverse weakened line included in the tensioned portion thereof, driving means for actuating the strip feeding and strip tensioning devices in timed sequence, and means for adapting the apparatus for severing different continuous strips having differently spaced transverse weakened division lines into uniform sheets of different size, including means for varying the timing of the operation of the strip tensioning device in relation with the operation of the strip feeding devices while maintaining the operation of the strip feeding device uniform for different strips.

23. In a strip feeding and severing apparatus, a strip feeding device for progressively advancing a continuous strip of material having longitudinally spaced transverse weakened division lines into strip severing position, a strip tensioning device for tensioning succeeding terminal portions of the strip in excess of the tensile strength of a transverse weakened line included in the tensioned portion thereof, driving means for actuating the strip feeding and strip tensioning devices in timed sequence, and means for adapting the apparatus for severing different continuous strips having differently spaced transverse weakened division lines into uniform sheets of different size, including adjustable means for varying the spacing of the strip tensioning device

in relation to the strip feeding device longitudinally of the path of travel of the strip.

24. The herein described method of dividing continuous strips of material having differently spaced transverse weakened division lines into successive sheets of predetermined size in accordance with the spacing of said lines, comprising advancing terminal portions of the different strips, each including a transverse weakened line, into strip severing positions, tensioning the advanced portions of the strips in excess of the tensile resistance of the included division lines, and varying the speed of advancement of different strips in relation with the timing of succeeding tensioning operations thereon in accordance with the relative spacing of the transverse weakened lines of the different strips.

25. The herein described method of dividing continuous strips of material having differently spaced transverse weakened division lines into successive sheets of predetermined size in accordance with the spacing of said lines, comprising feeding terminal portions of different strips, each including therein a transverse weakened division line, into strip severing positions at uniform rates of speed, tensioning the advanced portions of the strips in excess of the tensile resistance of the included transverse weakened division lines and changing the lineal distance between the feeding and tensioning points of the respective strips in accordance with the relative spacing of the transverse weakened lines of the different strips.

26. The herein described method of dividing continuous strips of material having differently spaced transverse weakened division lines into successive sheets of predetermined size in accordance with the spacing of said lines, comprising feeding terminal portions of different strips, each including therein a transverse weakened division line, into strip severing positions at uniform rates of speed, tensioning the advanced portions of the strips in excess of the tensile resistance of the included transverse weakened division lines, and changing the timing of succeeding tensioning operations upon the respective strips in relation to the speed of advancement thereof in accordance with the relative spacing of the transverse weakened lines of different strips.

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