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STRIP ALIGNING APPARATUS FOR MANIFOLD RECORD MACHINES

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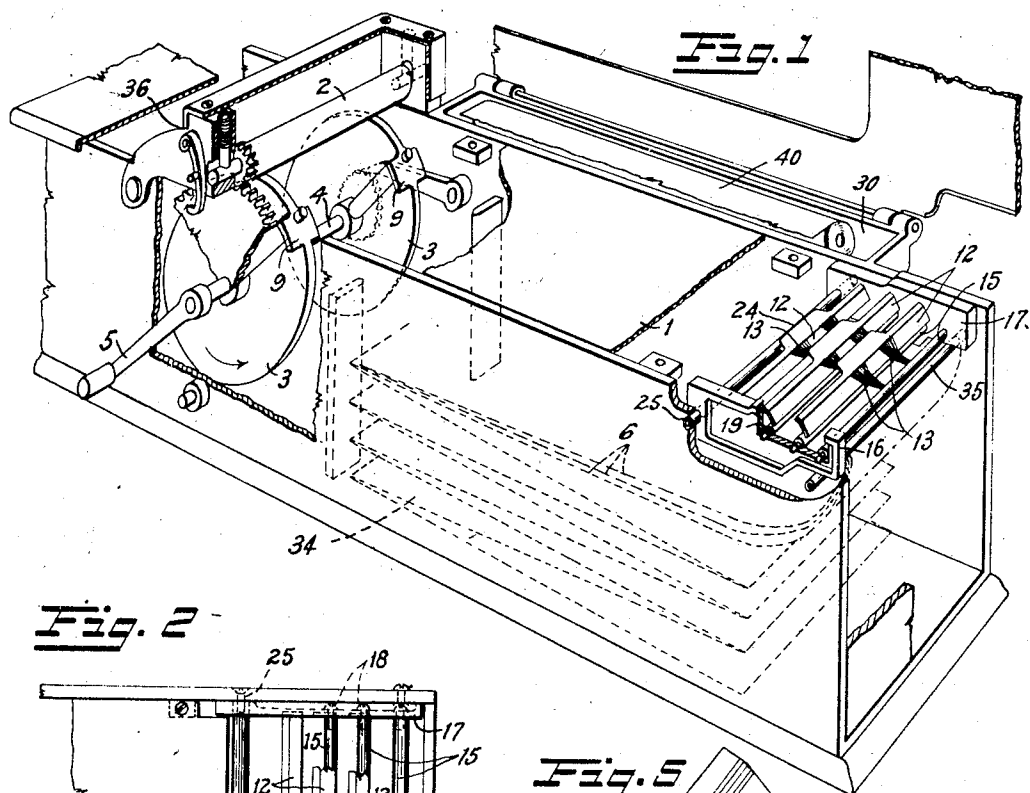


Fig. 2

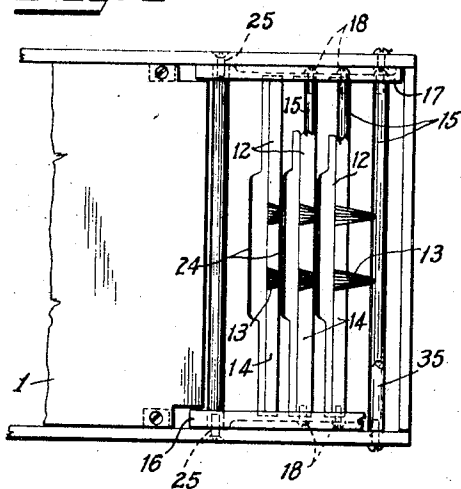


Fig. 5

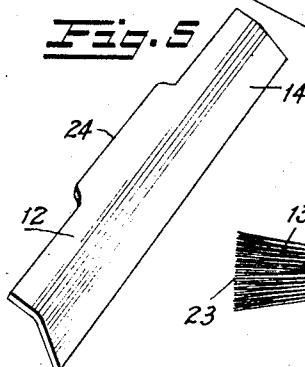


Fig. 4

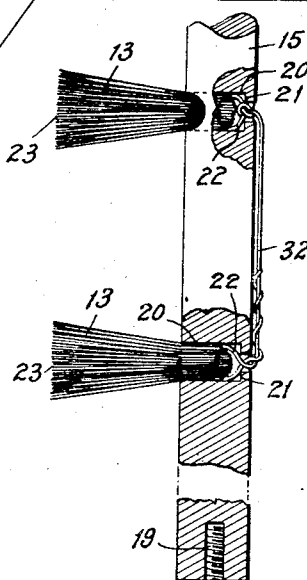


Fig. 3

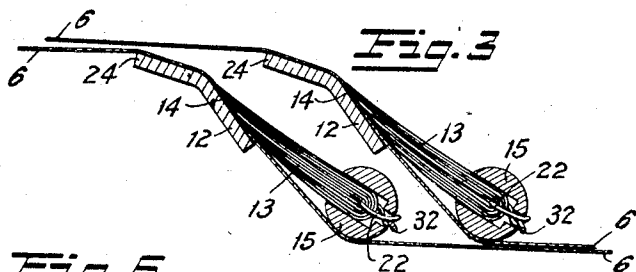
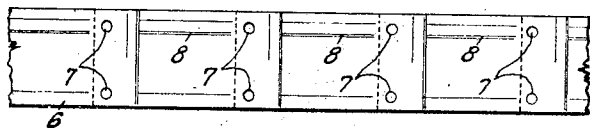


Fig. 6



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STRIP ALIGNING APPARATUS FOR MANIFOLD RECORD MACHINES

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This invention relates to devices for controlling record strips in an autographic register or other machine adapted for making manifold records, and with respect to more specific features to devices for controlling the feed, or advance movement, of a plurality of record strips adapted to be drawn into superposed registry relation above a tablet, or platen, preliminary to inscription.

One of the important objects of the invention is the provision of a simple and practical device for braking, or tensioning, the record strips as they are advanced, or fed, from a strip-supply packet into superposed position above the platen of an autographic register.

Another object of the invention is the provision of a simple device for obtaining the braking effect and one which will firmly, frictionally grip the strips and which may readily be set to obtain different gripping or braking effects, all without injury to the record strips.

Another object of the invention is the provision of a simple and efficient device whereby light but effective, independent, gripping of several paper record strips is obtained, and which acts promptly to arrest, or brake the strips as soon as the strip-advancing force ceases, but which permits ready advance of the strips under a relatively light advancing force and, with such force, participates in tensioning the strips and causing them to lie in smooth and unwrinkled condition suitable for accurate inscription.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the feature of construction, combinations 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 fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which

Fig. 1 is a perspective view, partly in sec-

tion, of an autographic register having the invention embodied therein.

Fig. 2 is a plan view, partly broken away, showing the braking, or gripping devices.

Fig. 3 is an enlarged transverse vertical section through two of the associated gripping devices of Fig. 2.

Fig. 4 is an enlarged detail, partly in section, of one of the gripper jaws.

Fig. 5 is a perspective view of one of the gripper jaws, and

Fig. 6 is a plan view of a section of one of the record strips which may be used.

Referring now more specifically to the drawings, the numeral 1 indicates a flat metal plate forming the platen of an autographic register. Near the front end of the plate 1 is the strip-feeding mechanism composed of an upper friction roller 2, and the two lower feed disks 3, each of the disks 3 being fast to a driving shaft 4 journaled in the side walls of the machine and having an operating crank and handle 5.

The numerals 6 indicate several record strips, three being illustrated, each of which may be similar to the others. As illustrated in Fig. 5, each of the record strips 6 consists of a long relatively narrow strip of paper which is sufficiently thin and soft, so that an inscription made upon the topmost of such strips may be transferred to underlying superposed strips, through the interposition of carbon transfer sheets, as is well understood in the manifolding art. These transfer sheets may come from a roll 40 of such sheets lying in a side receptacle 30. Each of the strips 6 is provided with a longitudinal series of form-registering apertures 7 and a series of printed forms 8. In the strips illustrated, the form-registering apertures 7 are in duplicate, there being two form-registering apertures 7 adjacent each printed form 8. The form-registering apertures 7 are in the same relation to the respective forms, in each of the several superposed strips 6, so that when the form-registering apertures of different strips are in superposed registry with each other, the adjacent printed forms 8 are also in superposed registry with each other, so that an inscription

made upon the topmost printed form will be copied, in the same relative position, on the underlying printed form of the different strips. The two feed disks 3 are spaced from each other on the shaft 4 so that one is in longitudinal alignment with one longitudinal series of apertures 7, the other disk 3 being in longitudinal alignment with the other series of apertures 7. Furthermore, a large part of the periphery of each of the disks 3 is sufficiently narrow to engage within the apertures 7. At the side of each of the disks 3 is a lug or starter 9, which is adapted to engage the bottom record strip at the side of the apertures 7, and to cooperate with the upper feed roller 2 to grip all the strips therebetween, and advance the strips. The peripheral length of the disks 3 may be slightly greater than the longitudinal distance between successive apertures 7, whereas the peripheral length of the lugs 9 is sufficient to feed the strips until the edges of disks 3 emerge from the apertures 7. It will be seen that the feed mechanism is generally similar to that disclosed in Hagemann Patent No. 1,456,773, May 29, 1923, to which reference is made.

Assuming the three superposed strips to be engaged between the feed roller 2 and the disks 3, turning of the handle 5 will result in feeding or advancing all the record strips until the disks 3 engage an aperture 7 in the lowermost strip. Thereupon advance of the lowermost strip will cease, the disk 3 becoming idle for feeding the lowermost strip because of the failure of paper thereof at the gripping point, due to the presence of the aperture 7. But the edge of the disk 3 may enter the aperture in the lowermost strip and continue to advance the superposed strip until the aperture of the latter also engages the disk 3, whereupon its advance will cease, and so on. In this wise the apertures 7 corresponding to one set of superposed forms 8 will be registered with each other in superposed relation, with consequent registration of the superposed forms. In customary practice the feed roll 2 is geared to rotate with the disks 3 and is spring-pressed towards said disk 3 so as effectively to grip the strips therebetween, as illustrated.

In rear of the platen 1 is a longitudinal series of parallel strip-guide bars 12, providing gripper jaws, each of which cooperates with one or more filamental gripper jaws 13, to grip the record strips advanced or fed therebetween. In normal operation, when the strips are being advanced the jaws 12 are stationary. Each jaw 12 consists of a fairly stiff steel plate having a substantially flat, or plane, strip-gripping face 14, inclined to the horizontal, and of substantial area, the flat gripping face being relatively hard by reason of the metal of the guide-bar.

Each of the filamental gripper jaws 13 is provided by filaments, as animal bristles, the

lengths of which filaments extend generally longitudinally of the path of feed of the record strips. In the embodiment illustrated one gripper jaw includes two similar bundles of filaments, so that a description of one will suffice for each. The natural bristles should be treated to remove surface oil and other liquid matter, and to be dry so as to present exterior friction surfaces. In practice it is found that relatively stiff and resilient bristles are suitable for the purpose, when so treated. The friction bristles, or friction filaments, resulting from such treatment, are assembled in a bundle, and the bundle folded at the center and its folded end anchored to a rotatively adjustable member, gripper-jaw supporting rod, or carrier 15, parallel to the guide-bars 12. As illustrated, the carrier may be a rod journaled for rotative adjustment in the rigid side plates 16 and 17, which side plates also receive and relatively stationarily support the ends of the guide-bars 12. There are as many rods 15 as there are guide bars 12. For holding rods 15 in adjusted positions, the set screws 18 pass through the side plates 16 and 17 into threaded apertures 19, in the ends of the rods 15, and may be tightened or loosened at will.

For anchoring the bundles to the rods 15, the latter are each provided with openings 20, therethrough, each opening having an interior shoulder 21. In each opening 20 is a wire loop 22, engaging the fold of the bundle of filaments in the opening, the wire passing out of the openings 20, and being drawn taut and secured in any efficient way, as by twisting one end of the wire around the length 32 which extends between the two openings 20. In this wise the filaments provide resilient arms, or bundle-arms, of the carrier 15, in which the lengths of the filaments are disposed generally longitudinally of the arms, and also of the paths of the record strips. The filaments extend from the carrier 15 in the general feed-wise direction of the strips, and are so disposed that their sides cooperate with the guide-bars 12 to grip the record strips, filaments of the bundle making direct contact with the paper record strips. The manner described for attaching the filaments or bristles in position enables the extending or active ends to lie quite loose and open with relation to each other and avoids a too compact bundle for effective cooperation in the smoothing and tensioning function upon the record strips. This form of attachment therefore accomplishes advantages for the particular purpose over other forms of attachment, such, for example, as gluing the bristles in position in an opening or wedging them therein tightly so as to hold them in position. By cooperating to grip opposite the substantially flat faces 14 of the gripper-jaws provided by the guide-bars 12, a considerable length of filament is made effective on

the record strip. To effect the gripping the filaments are stressed so that their sides cooperate with the other jaws resiliently to grip the strips. The stressing is readily produced by loosening the screws 18, and rotating the rods 15, so as to cause the filaments to press against the bar 12 with the pressure sought, the bending and stressing of the filaments following as a consequence.

In the illustrated embodiment, the supporting rods 15 are disposed closely adjacent and below the guide-bars 12, respectively, and the filament arms project from said rods 15 into strip-gripping relation with guide-bars in advance of the rods, respectively. Also in the embodiment illustrated, the tips 23 of the filaments are exposed and some of them may lie fairly close to the next adjacent record strip 6 thereabove. To avoid possible injury to the paper record strips the tips of the filaments are disposed inside the uppermost guide margin of the guide-bars 12, and said uppermost guide margin, as at 24, is in a plane above the tips, so that the next upper strip is guided past and close to the gripper jaws of the lower strip, but out of contact with the tips of the filaments at the free end of the arm gripping the lower strip. It will be understood that all the guide-bars 12, all the carrier rods 15, and all the friction filaments may be alike, as illustrated, and that one, two, or more filament arms 13 may be employed in each carrier rod 15, two being illustrated. Or a single bundle of filaments may be made wide enough to extend the full width of the strip.

The frame composed of the side plates 16 and 17, connected by the guide-bars 12 and the rods 15 may be pivoted at its front to the side frames of the register, as indicated at 25, so that the entire gripping and braking mechanism may be tilted into vertical position for more convenient threading of the record strips between the gripper jaws.

In the embodiment illustrated the three record strips come from a zigzag folded supply packet enclosed in the register beneath the platen as indicated at 34, Fig. 1. To thread these strips in the machine, the frame carrying the gripper jaws is lifted up on the pivot 25. Thereupon the ends of the three record strips 6 are passed around a guide bar 35 supported between the side frames of the register, and the ends of these strips are passed between the gripper jaws 12 and 13, one strip passing between one set of jaws and the other between the next set of jaws, as illustrated in Fig. 3. The ends of the strips are then interleaved with the carbon sheets over the platen 1, and are then passed between the feed disks 3 and the upper feed roller 2, the housing 36 carrying the upper feed roller being first lifted to permit easy passage of the strips at this point. Thereupon the housing 36 may be lowered and held down by any suit-

able means, and the gripper jaw carrying frame restored to horizontal position, resting upon the stationary guide rod 35. By turning the handle 5 so as to rotate the disks 3 in the direction indicated by the arrow, all the record strips will be fed, being tensioned by the braking effect of the gripper jaws, which later coact resiliently to grip the strips and yet permit them to be moved forward by the feed mechanism. It will be noted that the filamental character of the gripper jaws 13 assures resilient gripping of the strips at a multiplicity of closely adjacent points widthwise of the strips, so that the effect is practically to assure gripping throughout the width of the bundle of filaments. Each threadlike filament in contact with the strip performs its gripping action in a manner more or less independent of the gripping action of another filament. Furthermore, notwithstanding that the filaments are very small in diameter, a very substantial length of stressed filament is caused to engage the strip, by reason of the generally flat surface 14 of the cooperative gripper jaw 12. It will, therefore, be seen that firm gripping is assured, even though it be resilient and light, and that the braking and tensioning effect is augmented by the highly frictional surface of the filaments. The coactive pressure of the gripper jaws on the strips may be regulated as desired and in a very simple manner, and so that the most effective gripping and braking effect may be obtained for different qualities of record strips. Once having registered the apertures of the superposed record strips at the feed mechanism, the regulatory effect of the braking and tensioning mechanism herein described contributes largely to retaining registration of the succeeding superposed apertures of the strips and preventing displacement from registered position.

With the arrangement of elements disclosed, each of the superposed strips is individually tensioned by its own bundle-arm gripper and each gripper may be independently adjusted to vary individually the tensioning on the several strips. When one of the strips, say the bottom strip, is stopped or checked by the aligning action of the feeding mechanism, the other or superposed strips will still continue to be fed, tensioned and smoothed by the action of the bundle-arm grippers without any substantial alteration in any one of these functions or actions. In other words, due to the independent tensioning arrangement mentioned, the feeding, tensioning and smoothing actions are substantially constant and unaltered, whether all the strips are feeding together at the same rate or whether one or more of them has been checked by the aligning action of the feeding mechanism. The result is that the tensioning and smoothing action on all of the strips is more uniform than in prior devices, and the

aligning action of the strips is more certain and effective.

This improved action is due, in part at least, to the independent bundle-arm for each strip, because with this arrangement there is very little frictional resistance between the adjacent strips, one of which may be moving faster than the companion contacting strip, the strips being separated to some extent by the individual grippers. There is an improved aligning action of the feed mechanism described when combined with the bristle or bundle-arm, as has been proved by experiment. This improved aligning action is probably due, at least in part, to the fact that the bundle arms cooperate more effectively with the strips to impose a smooth and steady tension. Thus, the aligner acts also more effectively to perform its strip aligning function, there being less tendency to slippage of the feed grip of the feed discs and less tendency to failure in the aligning and tensioning functions. This feature is of especial importance when one of the strips, as the bottom strip, has been first brought into its final aligned position because the feeding of the other strips is permitted to continue without any appreciable alteration in the resistance to advancement until all of the strips have been brought into alignment, with the blank forms thereon in superposed registry.

Thus by the above described construction are accomplished, among others, the objects hereinbefore referred to.

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 drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including friction filaments so disposed that their sides cooperate with the other jaw to grip said strip, and means adapted to cause said gripping with resilient effect.

2. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including resilient friction filaments disposed and stressed so that their sides cooperate with the other jaw resiliently to grip said strip.

3. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record

strip advancing therebetween, one of said jaws including an arm having resilient friction filaments disposed and stressed so that sides of the filaments cooperate with the other jaw resiliently to grip said strip, and means adapted to guide another record strip past and close to said gripper jaws out of contact with the tips of said filaments at the free end of said arm.

4. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including friction filaments so disposed that their sides cooperate with the other jaw to grip said strip, and means adapted to cause said gripping with resilient effect, the last mentioned jaw being substantially flat where it cooperates with said filaments to grip said strip.

5. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including resilient friction filaments disposed and stressed so that their sides cooperate with the other jaw resiliently to grip said strip, the last mentioned jaw being substantially flat where it cooperates with said filaments to grip said strip.

6. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including a feed-wise extending bundle-arm, composed of resilient friction bristles, the lengths of which are disposed generally longitudinally of said arm.

7. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, a member rotatively adjustable to increase or decrease the gripping effect between said jaws, one of said jaws including a bundle-arm composed of longitudinally extending, resilient, friction filaments adapted to contact said strip, one end of said arm being anchored to and rotative with said member.

8. In an apparatus of the character described, in combination, strip gripping means including a resilient strip-gripping arm composed of folded, resilient, friction filaments, a carrier having an opening there-through in which the folds of said filaments lie, and a strand engaging said folds in said opening.

9. In an apparatus of the character described, in combination, strip gripping means including a resilient strip-gripping arm composed of folded, resilient, friction filaments, a rotatively adjustable rod having an opening therethrough in which the folds of said filaments lie, a strand engaging said

folds in said opening, and means for holding said rod in different adjusted positions.

10. In an apparatus of the character described, in combination, a plurality of parallel strip-guide bars, a plurality of rotatively adjustable, gripper-jaw supporting rods, said rods being closely adjacent and parallel to said bars, respectively, and in rear of said bars relative to the direction of advance of the record strips, each of said rods having a bundle-arm of resilient, friction filaments anchored thereto and projecting therefrom in the direction of advance of the record strip and into strip-gripping relation with a guide-bar in advance of its closely adjacent guide-bar.

11. In an apparatus of the character described, in combination, a plurality of parallel strip-guide bars, a plurality of rotatively adjustable, gripper-jaw supporting rods, said rod being closely adjacent and parallel to said bars, respectively, and in rear of said bars relative to the direction of advance of the record strips, each of said rods having a bundle-arm of resilient, friction filaments anchored thereto and projecting therefrom in the direction of advance of the record strip and into strip-gripping relation with a guide-bar in advance of its closely adjacent guide-bar; the tips of the filaments of said arms being within the uppermost guide margins of said guide-bars, respectively.

12. In an apparatus of the character described, in combination, a plurality of parallel strip-guide bars, a plurality of rotatively adjustable, gripper-jaw supporting rods, said rods being closely adjacent and parallel to said bars, respectively, and in rear of said bars relative to the direction of advance of the record strips, each of said rods having a bundle-arm of resilient, friction filaments anchored thereto and projecting therefrom in the direction of advance of the record strip and into strip-gripping relation with a guide-bar in advance of its closely adjacent guide-bar, the tips of the filaments of said arms being within the uppermost guide margins of said guide-bars, respectively, the sides of said filaments being disposed to contact the strips, and the faces of said guide-bars being of substantial area and substantially flat, opposite the strip contacting sides of said filaments.

13. In an apparatus of the character described, in combination, a pair of gripper jaws adapted to cooperate to grip a record strip advancing therebetween, one of said jaws including resilient friction filaments disposed and stressed so that their sides cooperate with the other jaw resiliently to grip said strip, the gripping face of said other jaw being hard and flat.

14. In an apparatus of the character described, in combination, mechanism adapted to feed a plurality of superposed record

strips, each of said strips having a longitudinal series of registering apertures, said mechanism including a rotary feed disk adapted to cooperate to grip and feed the strips, the edge of said disk having a narrow portion adapted to engage an aperture and thereby become idle to feed the strip having such aperture, and means for braking the feed movement of said strips comprising a plurality of sets of resilient friction bristles, one for each of said strips, the length of which bristles lie substantially longitudinal to the path of the strips, said bristles so disposed that their sides contact with the strips, and stiff and hard gripper jaws cooperative with said bristles to yieldingly grip the strips.

15. In an apparatus of the character described, in combination, strip gripping means including a bundle-arm for each of a plurality of superposed record strips having a longitudinal series of feed apertures therein and adapted for feeding movement, means whereby each of said bundle-arms cooperates to grip a separate strip, and strip feed mechanism including a rotary feed disk cooperating to grip and feed the strips, and having an edge portion adapted to enter said strip apertures so as to check strip feed and to effect strip alignment.

16. In an apparatus of the character described, in combination, mechanism adapted to feed a plurality of superposed record strips, each of said strips having a longitudinal series of registering apertures, said mechanism including a rotary feed disk adapted to cooperate to grip and feed the strips, the edge of said disk having a narrow portion adapted to engage an aperture and thereby become idle to feed the strip having such aperture, and means for braking the feed movement of said strips comprising a plurality of sets of resilient friction bristles, one for each of said strips, and stiff and hard gripper jaws cooperative with said bristles to yieldingly grip the strips.

In testimony whereof I affix my signature.

LOUIS F. HAGEMANN.

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