Feb. 7, 1933. L. F. HAGEMANN 1,896,078

STRIP REGISTERING AND TENSIONING DEVICE

Original Filed Nov. 12, 1925 2 Sheets-Sheet 1

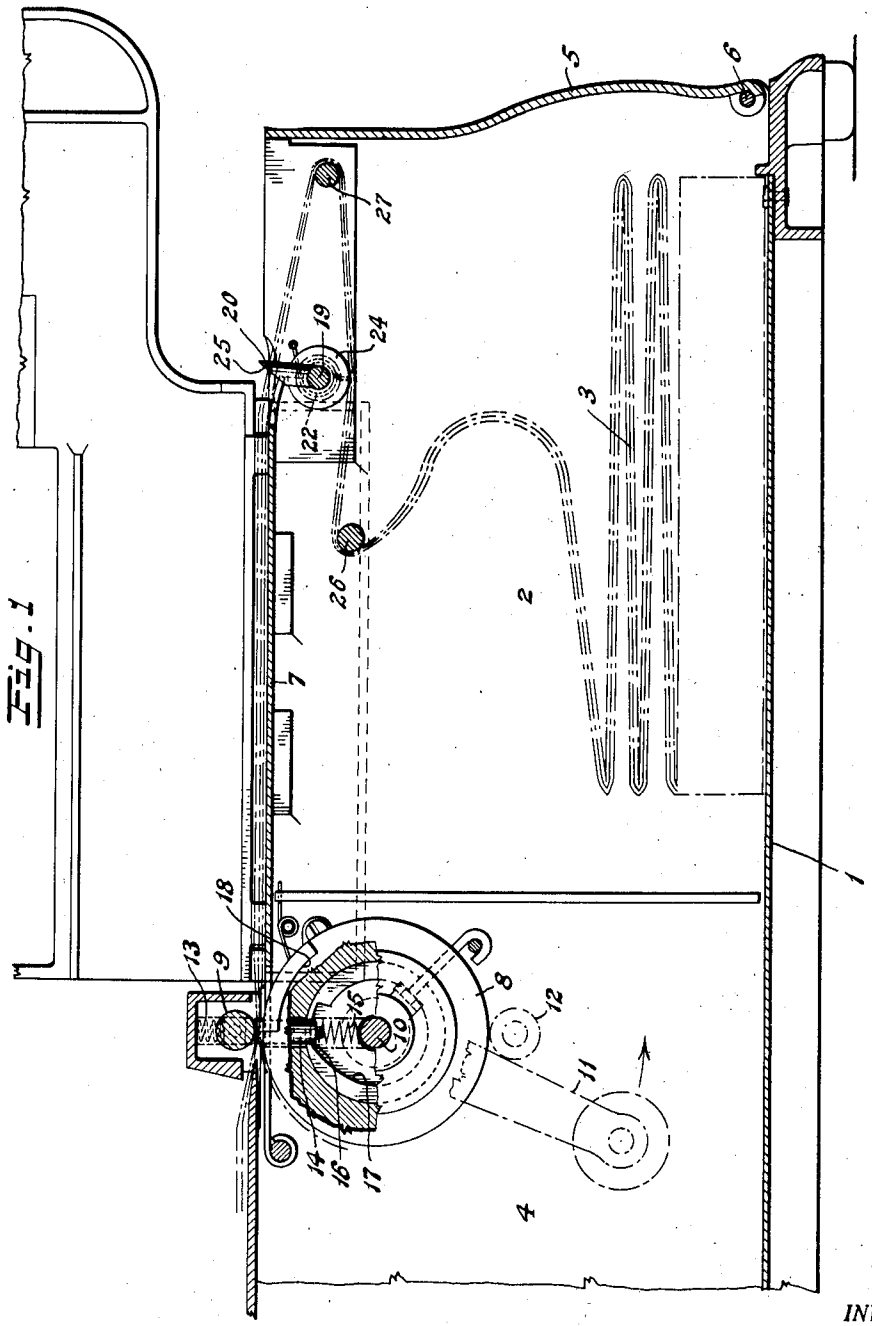


Fig. 1

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Fig. 2

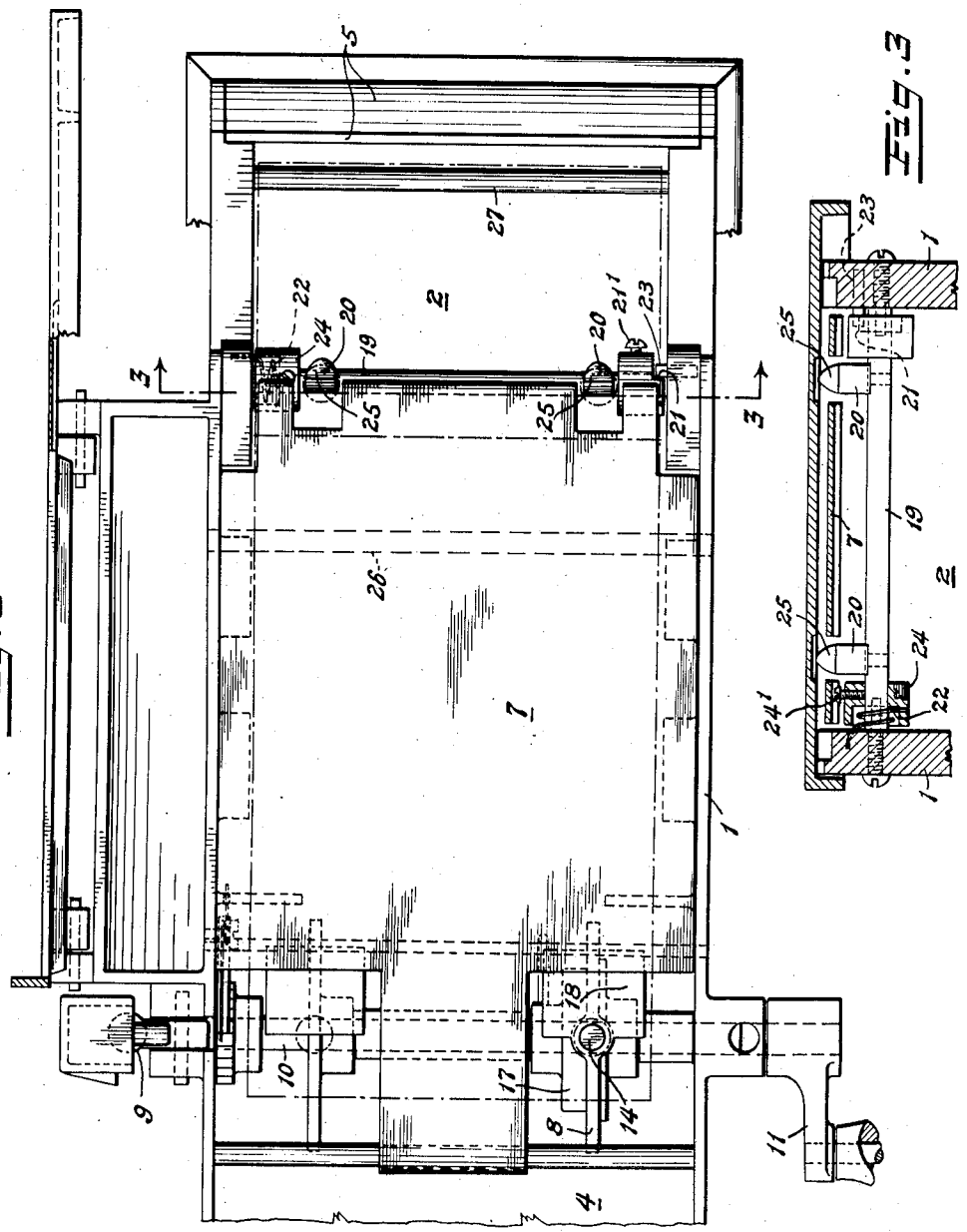


Fig. 3

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UNITED STATES PATENT OFFICE

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STRIP REGISTERING AND TENSIONING DEVICE

Application filed November 12, 1925, Serial No. 68,501. Renewed April 22, 1932.

This invention relates to autographic registers.

An object of this invention is to provide an autographic register by means of which, forms printed on superposed strips may be kept in registry as the strips are fed through the machine.

A further object is to produce a device of the character described in which the forms are brought into accurate registry just prior to the moment of inscription.

A further object is to produce a device of the character described, which will be simple in construction and efficient in operation.

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

The invention accordingly comprises the features 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:

Figure 1 is a fragmental vertical section through a register embodying this invention,

Fig. 2 is a fragmental top plan view of the same, and

Fig. 3 is a transverse fragmental section along the line III—III of Fig. 2.

In autographic registers where it is desirable to produce a large number of manifold copies on printed forms, difficulty has been experienced in bringing the forms into registry, and this difficulty is greater as the number of copies is increased. For this reason, although various mechanisms have been devised, machines which produce satisfactory alignment with three or four copies have not proven satisfactory where a large number of copies is employed.

Since there is considerable variation in the length of paper strips carrying the printed forms due to shrinkage of the paper, it is desirable to have the feed controlled by cooperation between the strip itself through the medium of control apertures, such strip being used with a feed mechanism comprising a roll and disc engaging each other in longitudinal alignment with the aperture. This form of strip and feed in itself is sufficient to align printed forms where only a few strips are employed, but for a large number of strips additional aligning means must be supplied.

Attempt has been made to effect this alignment by pins movable relative to the strip in a direction transverse to the plane of the strip. Such a pin, particularly if provided with an inclined face, has a tendency when entering one of the control apertures to force the control apertures and hence the printed forms into alignment with each other. This is not always satisfactory, however, since the pin sometimes damages the edge of the control aperture which not only does not cause the alignment, but it also tends to lock the sheets together in an unaligned position. Pins passing through the apertures transverse to the plane of the web are moreover, apt to damage the edge of the aperture, whether the strips be in alignment or not.

It is not always satisfactory, moreover, to attempt to feed the strips by the control apertures as this places a greater strain upon the control apertures than they will stand, even if two successive sets of control apertures be simultaneously engaged.

The numeral 1 designates a casing, having at one end a compartment 2 for the reception of a multiple strip web supply 3, and at the other end a compartment 4 adapted for the reception of one of the strips after recording. To facilitate insertion of the supply, the end wall 5 of the compartment 2 is pivoted as shown at 6.

Arranged above the compartment 2 is a tablet 7 over which the strips may be fed by a feeding mechanism, comprising discs 8 cooperating with roller 9 to grip the strips between them. The discs may be comparatively narrow and in alignment with feed control apertures in the strip, whereby the feeding of the strips by the discs ceases when the discs

come opposite the feed control apertures so as to engage therein. The discs are mounted upon a shaft 10 which is operated by a handle 11 which is in turn limited by a spring stop 12. The roller 9 is pressed downwardly toward the discs 8 by a spring 13. One or both of the discs 8 carries a pin 14 in a recess therein which is urged outwardly by a spring 15, but controlled in position by a projection 16 engages a cam 17. The construction of this cam is such as to release the pin for extension beyond the periphery of the disc 8 at the close of the feeding movement, but is withdrawn to or below the level of the periphery of the disc when the next feeding movement starts.

With the above construction, it will be obvious that the strips will be fed by cooperation of the discs 8 and the roller 9 until the point of contact between them has reached a control aperture, whereupon the feeding will cease. In order to initiate thereafter a new feeding movement, lugs 18 may be provided upon the discs in position to engage the strips at the side of the control apertures, and these lugs are so arranged relative to the stop 12 that they will engage the strips at the time the handle 11 is in contact with the stop.

The strips are preferably provided with forms bearing definite relation to the control apertures and for the purpose of bringing the forms into alignment upon the tablet, there is provided a special aligning mechanism as follows:

A shaft 19 pivoted in the sides of the frame for oscillatable movement, carries pins 20 which have a portion of their surface substantially the diameter of the control apertures and which are movable by the rotation of the shaft from a position substantially as shown in Figure 1 where the pins are in a position to engage the control apertures in the strips, to a position where the apertures are permitted to slide off the pins. To accomplish this result, the pins are carried rigidly by the shaft while the latter is controlled in its position by a stop 21 and a spring 22, the former limiting the movement of the pin contrary to the direction of feed by engaging a projection 23 upon the casing. The spring 22, which is connected at one end to the casing and at the other end to a collar 24, also detachably connected upon the shaft, urges such rotation of the shaft as to bring the stop in contact with the projection.

It is the purpose of this construction to cause the strips to ride over the top of the pins in their substantially upright position until a control aperture comes into registry, whereupon the pins enter a control aperture. Should, at this time, one of the strips be in advance of the others, the entire pressure of the pins will be exerted upon the advanced strip, against the movement of the feed, thus bringing all the strips into registry with each other. A further movement of the strip by the feeding mechanism brings the record sheets taut upon the tablet.

A still further movement of the strips tilts the pins in the direction of feed against the resistance of the spring 22 until the inclination of the pins has become sufficient to permit the strips to slide off the top of the pins. To facilitate this tilting action, the forward side of the pins is cut off at an angle as shown at 25. The inclination of the pins during the feeding of the web may be adjusted by altering the position of the stop 21 by loosening the said screw 21′ while the strength of the spring against which the strip must operate after the pins have entered the aperture may be adjusted by limiting the position of the collar 24 through the medium of the set screw 24′.

A guide roller 26 is arranged to guide the multiple ply strip as it is fed over the tablet and the roller is so positioned as to cause the strip gently to bear down upon the points of the pins 20 during the feeding movement. A guide rod 27 may be provided, if desired, over which the strip may be fed, but ordinarily this will not be required.

The operation of the device is as follows: In placing the strip into the machine, it will be carried around the guide roller 26 and over the guide rod 27, if this rod be used, over the pins 20 and over the tablet 7, suitable transfer strips, of course, being interleaved, and through the feeding mechanism. A control aperture of each strip may be then threaded upon the pin 14 to bring the strips into registry. One of the strips will be diverted into the record compartment 4 and the other carried outward from the machine and the feed mechanism will then be closed.

The turning of the crank 11 operates to feed the combined strips over the tablet by reason first of the engagement of the lug 18 and subsequently by engagement of the discs 8 with the roll 9, which latter engagement continues the strip feed. This feeding action causes the pins 20 to tilt or rotate forwardly with the advancing strips by virtue of engagement in the feed controlling strip apertures. This movement of the pins not only retracts them from aperture engaging position tending thus to release the strips from the pins, but also moves the pins into forwardly inclined position whereby the positive engagement of the pins in the strip apertures is released, said apertures thus passing from their engaged position over the inclined pins as the strips are forwardly moved. As the next subsequent control aperture comes into registry with the discs 8, the pins 20 project upwardly into the next subsequent set of control apertures and serve to retard any strip which may have become advanced slightly beyond its fellows. At this time, the retarded strips will not have

reached quite to the point where they will be released by the feed mechanism, so that the retarded strips will continue to advance while the advance strip is held in stationary position by the pressure of the spring 22.

Just before, however, the handle 11 reaches the stop 12, the lugs 18 will move into a position to come in contact with the strips and the slight continued feeding movement caused thereby will exert sufficient tension upon the pins 20 to start rotation of the shaft 19. Thus it will be seen that at the close of the feeding movement, not only is the strip firmly gripped by the feed to insure that the tearing movement shall not disturb the registered position of the strips, but also the record forms for the tablet are firmly held under tension between the pins 20 and the feed.

It will be noted that by this construction, the multiple strip may be handled as a unit in threading the machine, excepting for the interleaving of the carbons, and thus one of the great inconveniences in using this type of machine is avoided.

Thus by the above construction are accomplished many others than the objects hereinbefore set forth.

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.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

1. A device of the character described including, in combination, a tablet over which superposed strips, each having a series of control apertures, are adapted to be fed, strip feeding means and strip aligning means spaced apart from each other longitudinally of the tablet, said feeding means including a strip gripping and feeding roller adapted to engage an aperture in the strip to relieve the feed grip on the strip, said aligning means including a strip aligning pin mounted to rotate forwardly under the pull thereon of the advancing strip and automatically biased to rotate backwardly to position to be engaged by another aperture in the strip advanced by said strip feeding means.

2. A device of the character described including, in combination, a tablet over which superposed strips, each having a series of control apertures, are adapted to be fed, strip feeding means and strip aligning means spaced apart from each other longitudinally of the tablet, said feeding means including a strip gripping and feeding roller adapted to engage an aperture in the strip to relieve the feed grip on the strip, said aligning means including a strip aligning pin mounted to rotate forwardly under the pull thereon of the advancing strip and automatically biased to rotate backwardly to position to be engaged by another aperture in the strip advanced by said strip feeding means, and adjustable means for limiting the extent of backward movement of said pin.

3. A device of the character described including, in combination, a casing, strip feeding means, and means adapted to cooperate with said feeding means to control the strip, said last mentioned means including a shaft mounted for oscillatory movement, an aligning pin fixed to said shaft, a stop adjustable in position around said shaft, a collar adjustable around said shaft, a spring connected to said collar and to said casing adapted to rotate said shaft to urge said pin rearwardly of the direction of advance of the strip, and means adapted to cooperate with said stop to arrest rotation of said shaft by said spring.

4. A device of the character described including, in combination, feeding means for one or a plurality of relatively superposed strips, each having a longitudinal series of feed control apertures, strip aligning means spaced apart from said feeding means longitudinally of a writing tablet, said aligning means including a strip aligning pin mounted for forward movement in a path at an angle to the path of the strips, means whereby feed pull on the strips causes said pin to move forwardly in its path to automatically retract the pin from strip engaging and holding position in the aperture, and means biasing said pin against said forward movement thereof and for rearward movement into position to be engaged in another strip aperture.

5. A device of the character described including, in combination, feeding means for one or a plurality of relatively superposed strips each having a longitudinal series of feed control apertures, strip aligning means spaced apart from said feeding means longitudinally of a writing tablet, said aligning means including a strip aligning pin mounted for yieldingly resisted forward movement under forward strip feeding movement to tension and align the strips, and automatic means controlled by strip feed causing the engagement of said pin in the aperture to be discontinued.

6. A device of the character described including, in combination, feeding means for one or a plurality of relatively superposed strips each having a longitudinal series of

feed control apertures, strip aligning means spaced apart from said feeding means longitudinally of a writing tablet, said aligning means including a strip aligning pin, and means for mounting said pin for yieldingly resisting forward tilting movement into forwardly inclined position with reference to the strip path so as to release strip engagement thereof automatically as the pin tilts and the strip moves forwardly.

7. A device of the character described including, in combination, means near a writing tablet for holding one or a plurality of relatively superposed forwardly movable strips, each having a longitudinal series of feed control apertures, a strip aligning pin spaced longitudinally of said tablet from said holding means for engaging in said strip apertures, means for mounting said pin for forward movement in a path at an angle to the strip path, means whereby forward pull upon the strip causes said pin to move forwardly in its angularly disposed path to automatically retract the pin from strip engaging and holding position, and means biasing said pin against forward movement to exert tension on the strip disposed between the pin and said holding means, and to move the pin rearwardly into position to be engaged in a succeeding aperture.

8. A device of the character described including, in combination, means near a writing tablet for holding one or a plurality of relatively superposed forwardly moveable strips, each having a longitudinal series of feed control apertures, a strip aligning pin spaced forwardly of said tablet for engaging in said strip apertures, and means for mounting said pin for yieldingly resisted forward tilting movement into forwardly inclined position with reference to the strip path so as to release strip engagement thereof automatically as the pin tilts and the strip moves forwardly.

9. A machine of the character described, including, in combination, means for feeding one or a plurality of relatively superposed strips, means acting during continuation of said feeding means to arrest strip feed, a strip aperture engaging, strip adjusting pin spaced longitudinally of the strip path from said feeding means for yieldingly resisted forward movement of said pin under pull exerted on the strip by the feeding means, and gripping means adjacent to and controlled by said feeding means exerting gripping action on the strips to hold them in opposition to said yielding means when said pin has been moved forwardly by the feeding means.

10. A machine of the character described, including, in combination, means for feeding one or a plurality of relatively superposed strips, means acting during continuation of said feeding means to arrest strip feed, a strip aperture engaging, strip adjusting pin spaced longitudinally of the strip path from said feeding means for yieldingly resisted forward movement of said pin under pull exerted on the strip by the feeding means, gripping means adjacent to and controlled by said feeding means exerting gripping action on the strips to hold them in opposition to said yielding means when said pin has been moved forwardly by the feeding means, and automatic means controlled by strip feed causing the engagement of said pin in the aperture to be discontinued by the next succeeding feeding operation.

11. A machine of the character described, including, in combination, means for feeding one or a plurality of relatively superposed strips, means acting during continuation of said feeding means to arrest strip feed, a strip aperture engaging, strip adjusting pin spaced longitudinally of the strip path from said feeding means for yieldingly resisted forward movement of said pin under pull exerted on the strip by the feeding means, and gripping means adjacent to and controlled by said feeding means exerting gripping action on the strips to hold them in opposition to said yielding means when said pin has been moved forwardly by the feeding means, said pin being mounted adjacent the strip path for forward tilting movement from strip holding position into forwardly inclined position with reference to the strip path so as to release the strip engagement thereof automatically as the pin tilts and the strip moves forwardly.

In testimony whereof I affix my signature.

LOUIS F. HAGEMANN.