A. KRAUTH.

MANIFOLDING DEVICE.

APPLICATION FILED MAR. 11, 1915.

1,189,263.

Patented July 4, 1916.

4 SHEETS—SHEET 1.

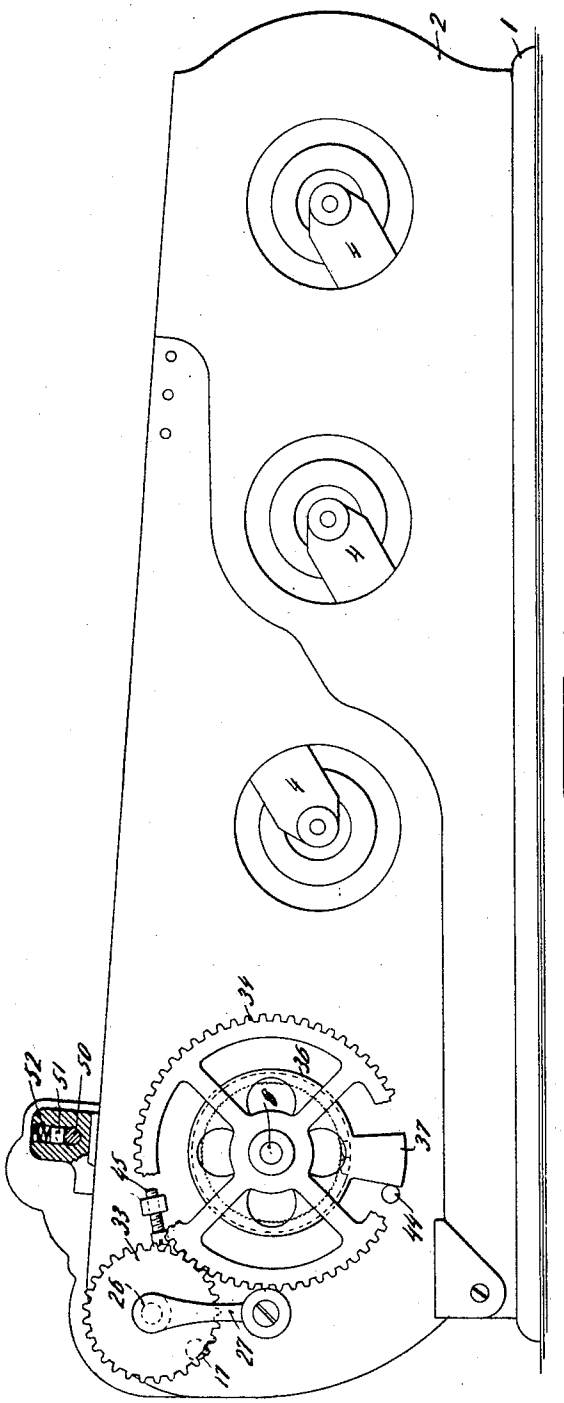

FIG. 1.

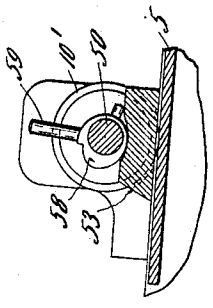

FIG. 3.

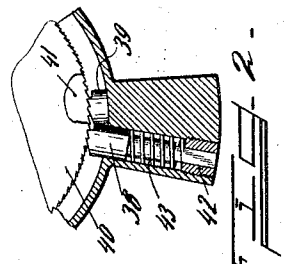

FIG. 2.

Witnesses

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4 SHEETS—SHEET 2.

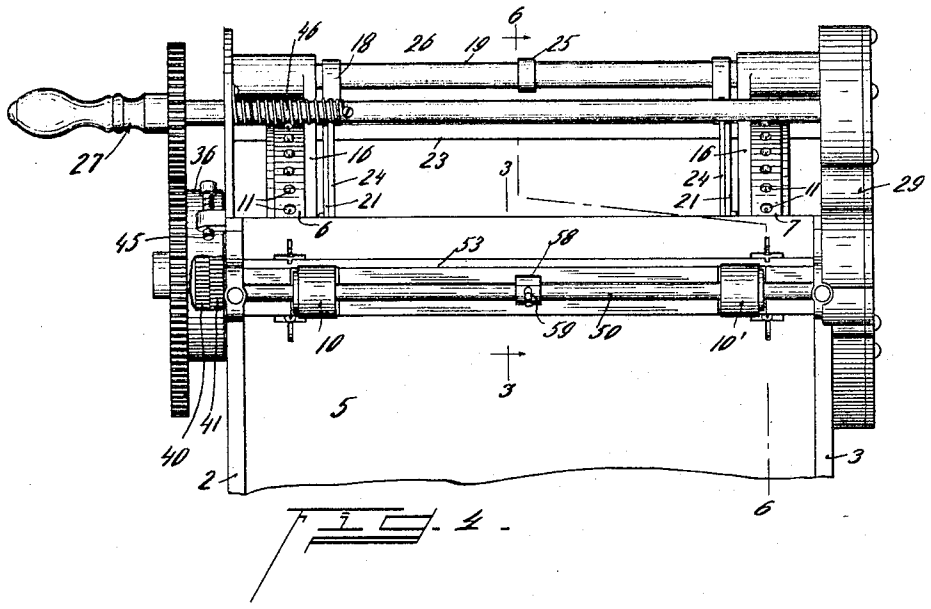

FIG. 4.

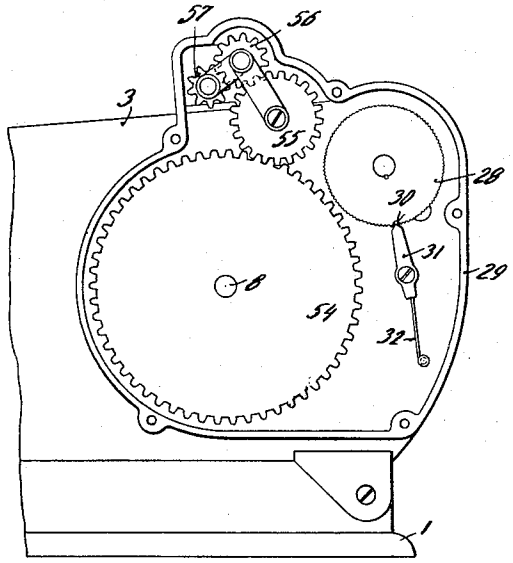

FIG. 5.

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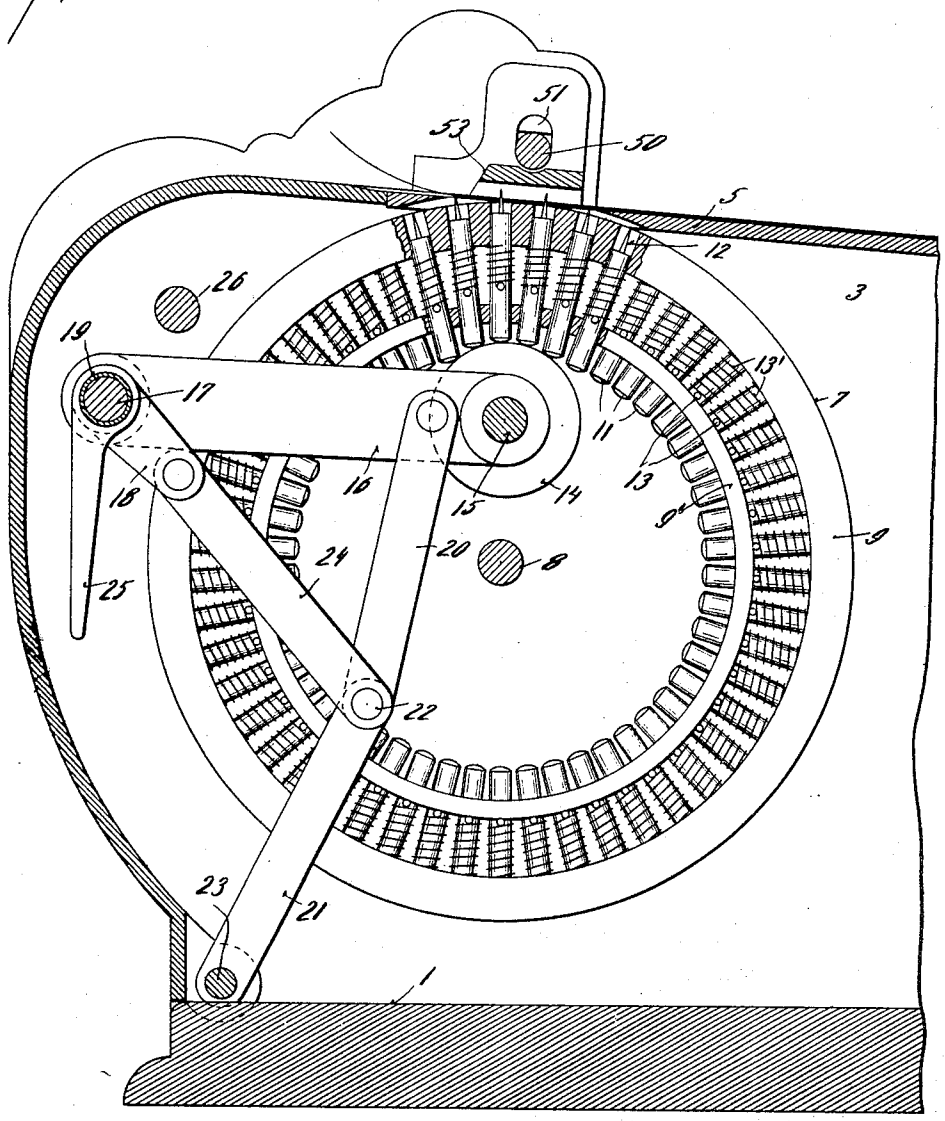
4 SHEETS—SHEET 3.

Fig. 6.



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4 SHEETS—SHEET 4.

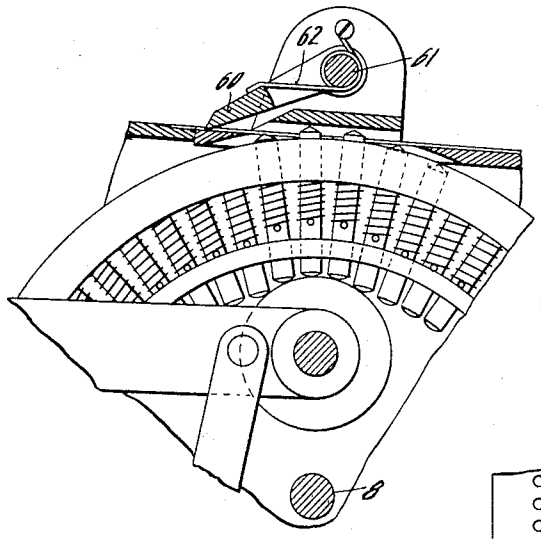

Fig. 7.

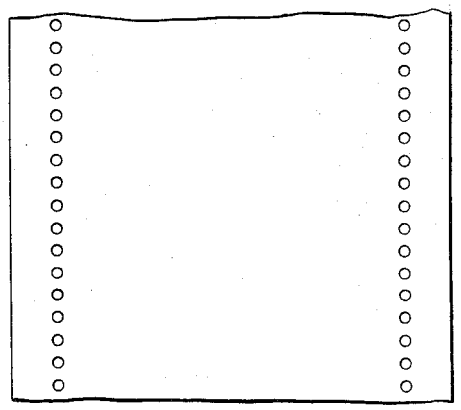

Fig. 9.

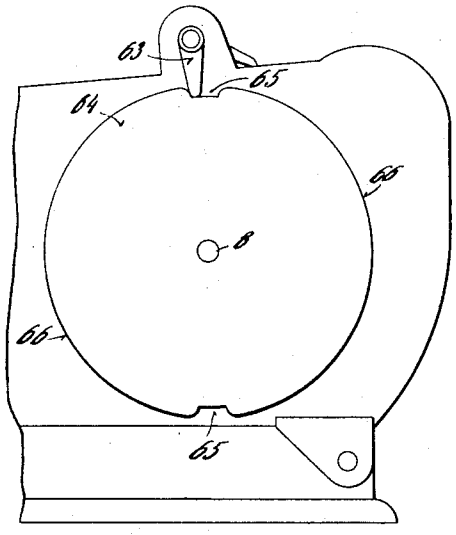

Fig. 8.

Witnesses

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MANIFOLDING DEVICE.

1,189,263. Specification of Letters Patent. Patented July 4, 1916.

Application filed March 11, 1915. Serial No. 13,789.

To all whom it may concern:

Be it known that I, ALBERT KRAUTH, a citizen of the United States, and residing at Hamilton, in the county of Butler and State of Ohio, have invented a new and useful Improvement in Manifolding Devices, of which the following specification is a full disclosure.

My invention relates to an improvement in autographic registers or manifolding machines, and primarily to the devices for feeding the paper to deliver from the machine measured lengths of paper.

An object of the invention is to provide propelling means carrying a series of movable paper intersecting elements arranged to progressively puncture or engage through prepared apertures in the paper to be fed and retreat therefrom with the paper delivery advance for positively and accurately delivering a measured length of paper with each feeding cycle of the propelling devices.

Another object of the invention is to provide manually actuated propelling devices for paper feeding means operating with regulatable confining limits whereby the transmitting ratio is determined and coördinated to the degree of feed for successively advancing or delivering a strip of paper in equal measured sheet lengths or divisions.

Other objects of the invention relate to control of the propelling and feeding devices, and in the means for severing the delivered sheet lengths from the continuous strip, as well as the conjunction of auxiliary feeding devices with positive feeding devices, either operating simultaneously or independently, together with other features and advantages all or more fully set forth in the description of the accompanying drawings, forming a part of this specification.

The drawings and disclosure herein embody the preferred aspect of the invention, and in the drawings and description thereof like characters of reference denote corresponding parts throughout the several views, in which:—

Figure 1 is a side elevation of a manifolding machine embodying my improvements with portions broken away to illustrate hidden parts. Fig. 2 is an enlarged detail section of the ratchet mechanism coupling the transmission devices with the paper feeding devices. Fig. 3 is an enlarged detail section taken centrally through the upper forward portion of the machine on line 3—3 Fig. 4, of the controlling means for the tension rollers. Fig. 4 is a top plan view of the forward portion of the machine. Fig. 5 is an elevation of the right side from that shown in Fig. 4 with a casing closure plate removed. Fig. 6 is an enlarged section on line 6—6 Fig. 4. Fig. 7 is an enlarged detail section similar to Fig. 6, illustrating a modified form of feeding means. Fig. 8 is a detail side elevation of the forward portion of the machine illustrating the means for controlling the movable tearing blade. Fig. 9 is a plan view of a portion of the marginally perforated strip fed in a machine embodying the mechanism illustrated in Fig. 7.

As the invention herein is directed to paper feeding devices for manifolding machines, manually operated for delivering primarily measured lengths of paper from the machine, the description will be accordingly confined to such preferred use. Certain features and parts, however, from a broader aspect advantageously adapt themselves to other uses non-analogous to the art of manifolding machines or paper feeding devices, with reference in particular to the paper intersecting plungers and their means of control.

The devices may be utilized in perforating machines as contained and made the subject-matter of a separate application filed September 10, 1915, Serial No. 49,958.

The feed of the paper is intermittent, due to the transmission control in cycles of operation, for successively feeding definite measured lengths of paper, although feeding devices operative for a continuous feed or delivering random lengths is within the concept of the invention.

As a manifolding machine or autographic register it comprises a base 1, supporting the side frames 2, 3, each carrying yielding web supporting devices 4 for revolubly supporting the supply webs of paper between the side frames. The strip of paper from each web being fed toward the delivery end of the machine over a writing table 5 connecting the upper portion of the side frames.

Paper feeding device.—The paper feeding devices shown in Figs. 4 and 6 comprise a pair of oppositely disposed disks or rotative carriers 6 and 7 fixed upon a shaft 8 journaled in the side frames 2, 3, the shaft

projecting beyond the side frames to receive the transmission device at the exterior sides of the frames to be hereinafter more fully described. The rotative carriers are preferably arranged adjacent the margins of the strip or strips to be fed, but their number and disposition relatively to the paper is optional, but in engaging the paper at its opposite longitudinal margins, more accurate linear travel of the paper is assured.

The carriers being the duplicate of each other, a detail description of one will be sufficient herein. Each carrier, see Fig. 6, is provided with the annular rim 9 and concentric flange 9′ with the periphery of the rim of the carrier approximately tangent with the upper surface of the writing table 5. The writing table being apertured and recessed to receive the rim. The periphery of the rim 9 is adapted to engage with the paper, and coöperates with a companion roll 10′ to frictionally engage the paper and assist in the paper feed, to be more fully described hereinafter.

The rim 9 and flange 9′ are each provided with a circumferential series of radial alined apertures for slidingly supporting the radially moving series of plungers 11. The outer ends of the plungers each have a pin 12 projected therefrom which are adapted to be moved by the plungers protrudingly beyond the rim periphery, to progressively intercept or punch through the paper with the rotation of the carrier and thereby positively advance the paper, and each thereafter retreatingly disengage therefrom. Each plunger has a pin 13 providing a stop or abutment for the spring 13′ and to arrest the movement of its plunger in a normalizing direction, under the influence of the spring. The plungers are moved to progressively intercept the paper toward the point of tangency of carrier rim and writing-table and release from the paper rearwardly from such point so as not to impede or interfere with the paper advance. Such action of the pins also prevents drawing the paper downwardly or mutilating the paper further than the slight puncture of the pin diameter. The plungers in their rotative cycle with the carrier intervally engage upon a portion of the periphery of a guide or camming roller 14 journaled upon a rod 15 movable to support the roller 14 in plunger engaging and non-engaging stations. The rod 15 is extended to properly support and control simultaneously the camming rollers for each of the plunger carriers employed in the combination. The rod 15 is mounted upon a pair of spaced arms 16, 16, each respectively extended forward and loose on the rod 17 supported in the side frames 2, 3. The free ends of the arms 16, 16, are each braced by foldable link mechanism to insure the stability of the camming rollers against the strains of plunger movement in puncturing and engaging through the paper, and also for controlling the position of the rollers into and out of commission.

It is preferable to use separate bracing or roller controlling devices for each of the camming rollers operating in unity, all the duplicate of each other, consisting of an arm 18 fixed to a tubular rock shaft 19 concentrically journaled upon the rod 17. A pair of links 20, 21 hingedly connected at 22, with link 20 pivotally connected to the arm 16, and link 21 pivotally connected at 23 toward the base of the side frame. Links 20, 21, at their pivotal juncture are connected by a link 24 to the arm 18. The rock shaft 19 has a crank arm 25 fixed thereon for manually rocking the same. Swinging the crank arm 25 forwardly breaks the strut lock of the links, lowering the camming roller 14 sufficiently to clear the punch plungers 11. From Fig. 6 it will be observed that the links 20, 21 are moved slightly beyond an axially diametric plane or dead center which locks the links and lever mechanism in plunger commissioning position.

Plunger carrier transmission devices.— The transmission is manually operated and limited as to its movements coördinately to the measured length of paper to be delivered in an operating cycle, so that the intelligence of the operator need not be brought into account, nor is he required to observe the feed of the paper for a proper length of sheet delivery or registry of the successive sheets with the margin-frame of the machine. Such provision is recognized as a factor of speed and convenience in operating the machine. The transmission preferably comprises a shaft 26, extending across and journaled in the side frames 2, 3, upon one end of which is fixed a crank handle 27. The opposite end of said shaft 26, (see Fig. 5), has a ratchet wheel 28 fixed thereon, inclosed within the casing 29, projecting from the side frame. The teeth of the ratchet wheel 28 are such as to possess a ratchet function in alternate directions of rotation, to lock the shaft against reverse rotation at any point short of the required rotation in either direction. The periphery of the ratchet wheel 28 is provided with a pawl notch 30, into which the pawl 31, pivotally mounted upon the side frame 3, meshes, to change its position to alternate sides of a diametric line of the ratchet wheel, coördinately to the changed direction of ratchet wheel rotation, and thereby lock the parts against a reverse, from such selected direction of rotation until the prescribed rotative function has been completed. The pawl has a spring 32, engaged therewith, to yieldingly direct the pawl against the periphery of the ratchet wheel.

A gear 33 is fixed upon the shaft 26 adjacent the crank handle 27, in mesh with a gear 34, loose upon the shaft 8, extended across and journaled in the side frames 2, 3. A rotative pawl carrier 36 is fixed to the gear 34 and rotated therewith and is provided with a radially extending shank 37, as a bearing for a pair of detent pawls 38, 39, set relatively staggered, and each having its toothed end engaging respectively with the teeth of the ratchet wheels 40, 41, fixed upon shaft 8. The detent pawls 38, 39, are the duplicate of each other, each sliding within a respective bore in the carrier shank, and each having its end squared for non-rotatively sliding through the nut 42, screw threaded into the bore of the carrier shank. A spring 43 engages a shoulder of the pawl and nut 42 for urging the pawl against the periphery of the ratchet wall. The pawls are provided in the plural number and set relatively staggered, likewise the teeth of the ratchet wheels are relatively staggered to reduce lost motion between the pawls and ratchet wheels and in consequence the effective pitch.

A two to one ratio is established between gears 33 and 34 with the rotation of gear 34 limited by the stops 44 and 45 projecting from the side frame 2. Stop 45 is adjustable within its bearing to delicately regulate the confining limits of gear rotation, determining the length of paper feed. These stops are engaged by the pawl carrier shank 37. Thus approximately one revolution of the crank handle 27, forwardly, determines the measured feed of the paper. The gear 34 has an oscillatory motion, moved positively forward and in a reverse or normalizing direction by the stored energy from the spring 46 fixed to the shaft 26 and side frame 2.

Auxiliary feeding devices.—To relieve the paper, as well as the punch plungers, of any pulling strains which would probably have a tendency to tear the paper at the punch engaging points, which might enlarge the punch apertures or disturb the accuracy of feed, I provide auxiliary feeding devices, which are also available and of advantage in loading the machines when the positive feeding devices are thrown out of commission. Such subsidiary result is obtained in providing a pair of yieldingly journaled friction rolls 10, 10′, fixed upon a shaft 50 journaled and transversely slidable in bearings in the side frames. Each bearing is provided with a bearing block 51, (see Fig. 1), engaging against the shaft 50, under the tension exerted by a spring 52 inclosed within a bore in said bearing. The rolls 10, 10′ respectively frictionally engage with the peripheries of the punch carriers 6, 7, and each project through apertures in the cross-bar 53 fixed to and spanning the side frames slightly above the writing-table. The paper passes between said rolls and punch carriers, and gripped thereby, advancing the paper with their rotation. The feed rolls 10, 10′, are positively rotated, being transmittingly connected with the punch carrier shaft 8 by a train of gears. The shaft 8 is provided with a gear 54 in mesh with an intermediate gear 55, said gear 55 being in mesh with a gear 56, which in turn is in mesh with a gear 57 fixed on the feed roll shaft 50. The gears 54 and 55 are movingly supported to accommodate for the radial movement of the feed rolls and their shaft toward and from the peripheries of the punch carriers. Means are provided for elevating the feed rolls from their operative paper engaging position, and for such purpose I provide a cam member 58, loose on the shaft 50, (see Fig. 3), engaging the cross-bar 53. The cam member is provided with pin 59 for manually rocking the same to control the elevation of the shaft and its feed rolls. The cross bar 53 has a knife edge at its forward end across which the paper is severed.

In Fig. 7, I have illustrated a modified form of paper engaging plungers. These comparatively with those heretofore described are provided with blunt ends adapted to engage serially through perforations prepared in the paper, as shown in Fig. 7, with the control of the plungers, substantially as heretofore described. For severing some grades of paper it may be desirable to have the knife clampingly engage the paper and with the cutting edge continuous, instead of mutilated as illustrated in the use of the cross-bar as a tearing-blade. In Fig. 7, I have shown a tearing-blade 60 mounted upon the shaft 61 with its cutting edge urged yieldingly against the writing table by a spring 62. The shaft at one end is provided with a lever arm 63, adapted to engage the periphery of a cam wheel 64, fixed upon the carrier shaft 8. This cam is provided with the notches 65, 65, into which the arm 63 meshes at the end of a paper feeding cycle to release the tearing-blade and engage the paper. The cam surface 66 adjacent the notches swinging the tearing-blade parts to elevate the tearing-blade and sustain the same in such position during a paper feeding period.

Having described my invention, I claim:—

1. A paper feeding device comprising an apertured table, paper feeding disks rotatably mounted in alinement with said apertures and provided with radially disposed pin plungers, and means for progressively elevating said plungers through the table apertures to engage and puncture the paper.

2. A paper feeding device comprising an apertured table, paper feeding disks projecting into said apertures and provided

with radially disposed pin plungers, and means for progressively elevating said plungers through the table apertures to engage and puncture the paper.

3. A paper feeding device comprising an apertured table, intermittently rotated paper feeding disks projecting into said apertures and provided with radially disposed pin plungers, and means for progressively elevating said plungers through the table apertures to engage and puncture the paper.

4. A paper feeding device comprising an apertured table, positively driven tension feed rollers engaging therewith, positively driven paper feeding disks projecting into the table apertures and provided with radially disposed pin plungers, and means for progressively elevating said plungers through the table apertures to engage and puncture the paper.

5. A paper feeding device comprising an apertured table, paper feeding disks rotatably mounted in alinement with said apertures and provided with radially disposed plungers, and means for progressively elevating the plungers through the table apertures to engage the paper.

6. A paper feeding device comprising an apertured table, paper feeding disks rotatably mounted in alinement with said apertures and provided with radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage the paper, and an operating mechanism for intermittently rotating the disks.

7. A paper feeding device comprising an apertured table, paper feeding disks rotatably journaled in alinement with said apertures and provided with a plurality of radially disposed plungers, means for progressively elevating the plungers through the table apertures to engage the paper, tension feed rollers coöperating with the table, and means for intermittently rotating the disk and rollers at the same circumferential speed.

8. A paper feeding device comprising an apertured table, paper feeding disks rotatably journaled in alinement with said apertures and provided with a plurality of radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage the paper, means for intermittently rotating the disks, and means for regulating the degree of each intermittent rotation.

9. A paper feeding device comprising an apertured table, paper feeding disks rotatably journaled in alinement with the table apertures and provided with a series of radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage the paper, operating means for positively rotating the paper feeding disks to feed a predetermined length of paper, and tension means for restoring the operating means to normal position independently of the disks.

10. A paper feeding device comprising an apertured table, paper feeding disks rotatably journaled in alinement with the table apertures and provided with a series of radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage the paper, operating means for positively rotating the paper feeding disks to feed a predetermined length of paper, tension means for restoring the operating means to normal position independently of the disks, and a full stroke device for insuring a complete rotation of the operating means in both directions.

11. A paper feeding device comprising an apertured table, paper feeding disks rotatably journaled in alinement with the table apertures and provided with radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage the paper, an operating means for intermittently rotating the paper feeding disks, ratchet mechanism intermediate the operating means and the disks, tension means for normalizing the operating means, and a full stroke device for insuring a complete rotation of the operating means in both directions.

12. A paper feeding device comprising an apertured table, a frame supporting the table, paper feeding disks rotatably journaled in the frame in alinement with the table apertures and provided with radially disposed plungers, means for progressively elevating said plungers, through the table apertures to engage the paper, an operating shaft, operating means carried by said shaft for rotating the paper feeding disks, ratchet mechanism intermediate the operating means and the disks, a normalizing spring intermediate the operating shaft and the frame, and a full stroke device intermediate the operating shaft and the frame.

13. A paper feeding device comprising an apertured table, a frame supporting the table, paper feeding disks rotatably journaled in the frame in alinement with the table apertures and provided with rigidly disposed plungers, means for progressively elevating said plungers through the table apertures to engage and advance the paper, an operating shaft, operating means carried by said shaft for intermittently rotating the paper feeding disks, a ratchet wheel mounted integrally with the disks, coöperative ratchet plungers carried by the operating means, a normalizing spring intermediate the shaft and frame adapted to store energy during the positive rotation of the operating means and effective during the negative rotation thereof to normalize the operating means independently of the disks.

14. A paper feeding device comprising a frame, an apertured table carried thereby, an apertured tearing-blade mounted above the table to form a paper receiving channel, paper feeding disks rotatably journaled in alinement with the table apertures and provided with radially disposed plungers, means for progressively elevating said plungers through the table apertures to engage and advance the paper, a yieldingly mounted shaft journaled in the frame above the tearing-blade, tension feed rollers secured to said shaft and projecting through the tearing-blade apertures to engage the paper, manually operating means for rendering the plunger elevating means ineffective, and manually operated means for elevating the tension feed rollers, thereby insuring an unobstructed paper receiving channel to facilitate a threading of the device when replenishing the paper supply.

In witness whereof, I hereunto subscribe my name, as attested by the two subscribing witnesses.

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Witnesses:
EMMA SPENER,
L. A. BECK.