(No Model.) 2 Sheets—Sheet 1.

A. LeG. PEIRCE.

AUTOGRAPHIC COPYING AND RECORDING APPARATUS.

No. 457,289. Patented Aug. 4, 1891.

Fig. 1.

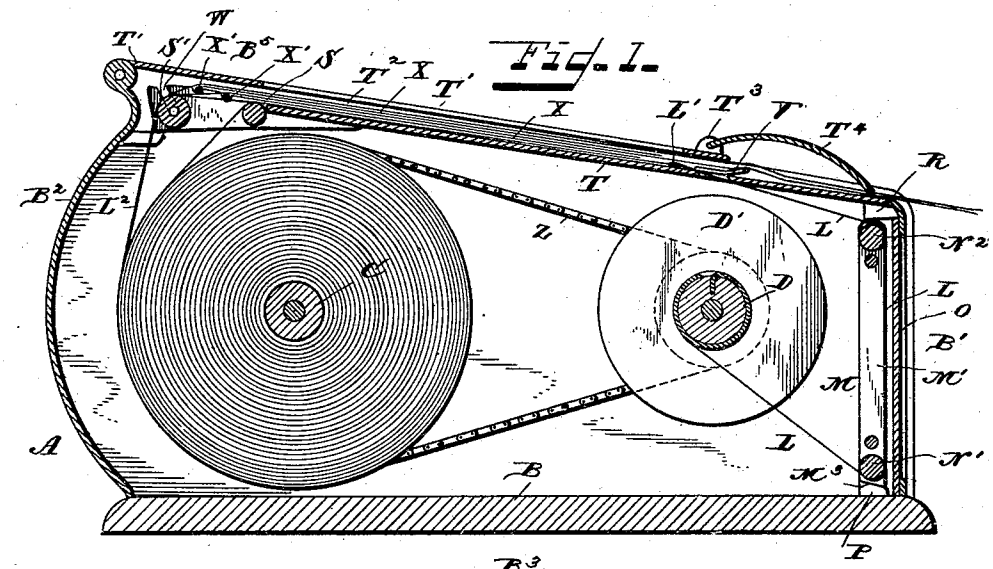


Fig. 2.

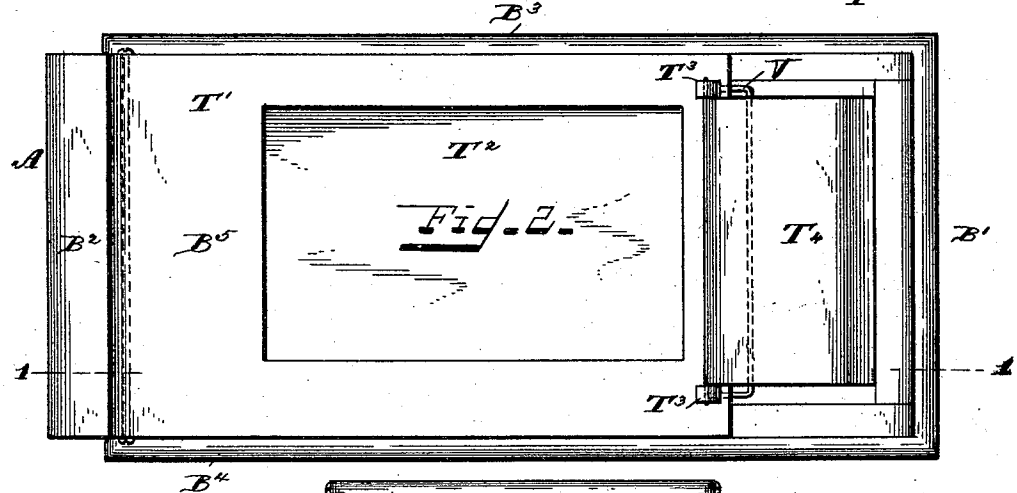
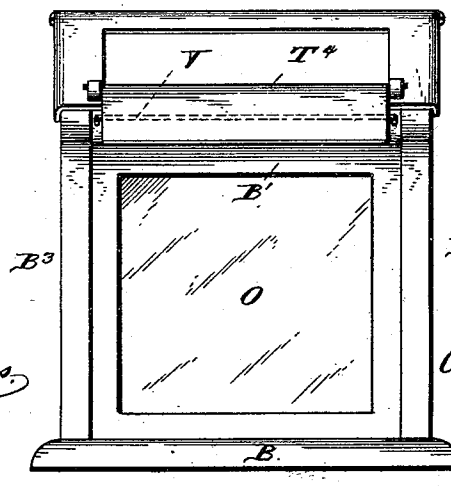


Fig. 3.



Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

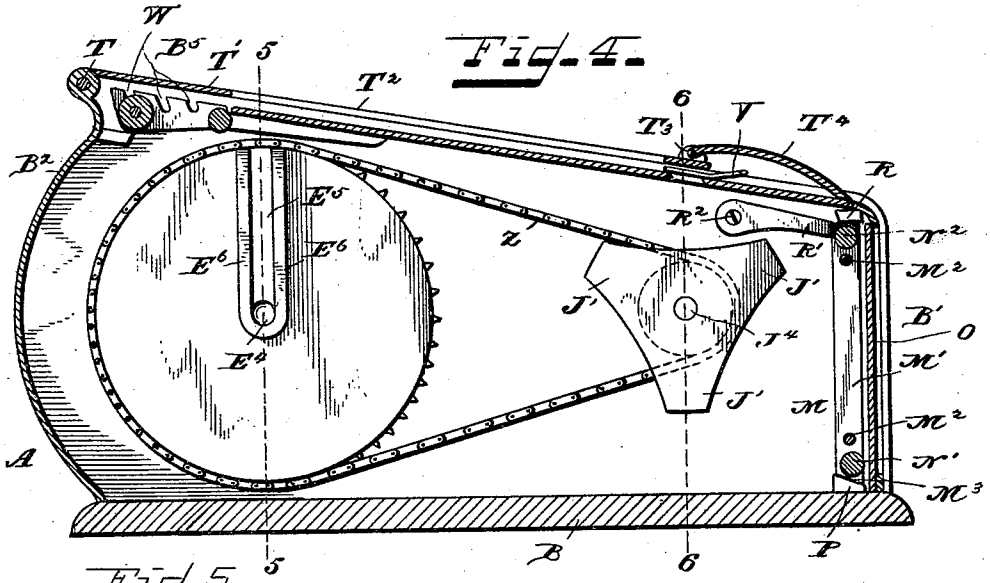


Fig. 5.

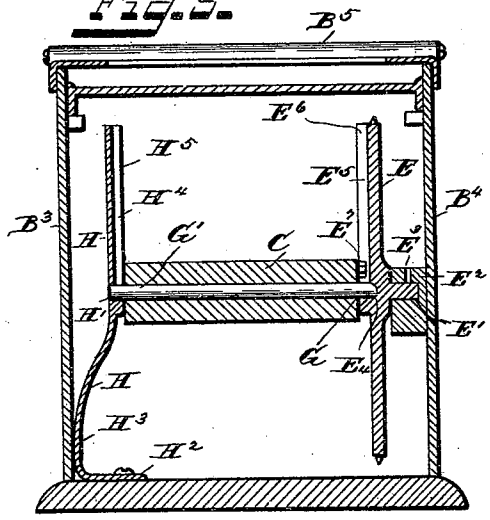


Fig. 6.

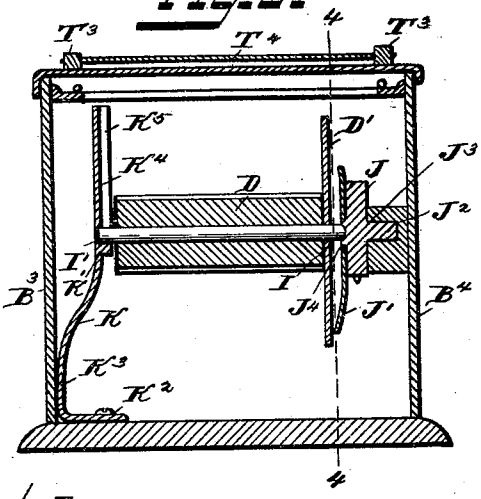
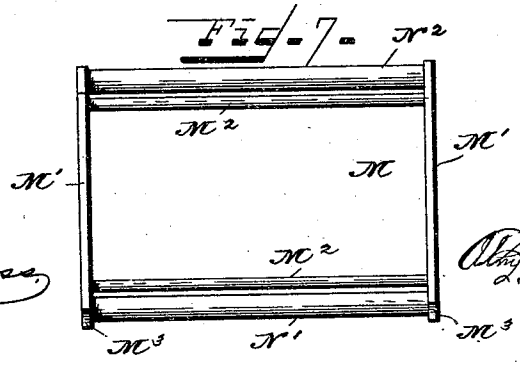


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALMY LE GRAND PEIRCE, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR OF TWO-THIRDS TO MANNIE H. BLOCK AND OTTO ARMLEDER, OF CINCINNATI, OHIO.

AUTOGRAPHIC COPYING AND RECORDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 457,289, dated August 4, 1891.

Application filed January 29, 1891. Serial No. 379,494. (No model.)

To all whom it may concern:

Be it known that I, ALMY LE GRAND PEIRCE, a citizen of the United States, and a resident of the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Autographic Copying and Recording Apparatus, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following specification and claims. In order to properly describe these features of my invention, I shall proceed to specify them as a part of an operative machine, and inasmuch as certain other features of this machine have been already described and claimed in application bearing the Serial No. 368,941 for United States Letters Patent, the latter features will not be dwelt upon or claimed herein.

In the accompanying drawings, forming a part of this specification, and to which reference is hereby made, Figure 1, Sheet 1, represents a vertical longitudinal section of a machine or apparatus embodying my invention, the paper employed therewith being shown in working position. This section is taken at the dotted line 1 1 of Fig. 2 and that side of the section being shown which faces toward the bottom of the sheet of drawings. Fig. 2, Sheet 1, is a top or plan view of said machine. Fig. 3, Sheet 1, is an elevation of that end of the machine which is on the right hand in Figs. 1 and 2. Fig. 4, Sheet 2, is a vertical longitudinal section of the machine, taken at the dotted line 4 4 of Fig. 6, that side of the said section being shown which faces toward the left hand in Fig. 6. Fig. 5 is a vertical transverse section of the machine, taken at the dotted line 5 5 of Fig. 4, that side of the section being shown which faces toward the right hand in said Fig. 4. Fig. 6 represents a vertical transverse section of the machine, taken in the plane of dotted line 6 6 of Fig. 4, that side of the section which faces toward the right-hand side of Fig. 4 being the one shown. Fig. 7 shows the rollers and an adjustable roller-frame of an improved construction. The novel and important functions performed by these devices will be fully hereinafter set forth. The view here taken is an elevation of that side of the roller-frame and rollers which is on the left hand in Fig. 4.

The exterior casing A is made in any suitable form to carry out the objects of my invention. The main requisites of the casing are strength and compactness.

A preferred form of casing for carrying out, in connection with the mechanism within the casing, the objects of my invention is shown in the drawings, and consists of a base B, a front end plate B′, a rear end plate B^2, a plate B^3 on one side, and a plate B^4 on the other side. The top is formed by a plate B^5 and inclines downward from rear to front. These several parts of the case are firmly and securely fastened together, or, when preferred, may be cast or otherwise formed in one piece. Within the case are two drums or spindles. One of these spindles—viz., C—is employed as the supply-spindle—that is to say, the paper to be used in the machine is wound upon this spindle. The function of the other of these spindles—viz., the spindle D—is to receive that strip or those strips of paper which, after being written upon, are to be stored away in readiness for examination by the accountant or other person, as hereinafter mentioned. The diameter of the receiving-spindle D is a little greater than that of the supply-spindle C, in order that the receiving-spindle may be more readily enabled to take up the slack in the paper received by it from the supply-spindle C.

The supply-spindle C is provided with a journal concentric therewith, the journal at one end being indicated by G and that at the other end by G′. This spindle C is also connected to a large sprocket-wheel E, supported by and rotatable on a single journal E′, located on that side of the sprocket-wheel opposite where it is connected to the spindle C. The journal E′ of the sprocket-wheel E enters and turns in a journal-bearing E^2, suitably supported, preferably, by being fixed to the side B^4 of the casing, as shown. An oil-opening E^3 in the bearing enables the latter

and the said journal it carries to be well lubricated.

The retention of the spindle C in its journal-bearings and its removal therefrom and readjustment therein are very quickly and readily accomplished. The means for accomplishing these advantageous results constitute certain features of my invention and will now be described.

In the center of that side of the sprocket-wheel E which is next to the spindle C is a recess E^4 of a size to receive the free end of the journal-bearing G, the latter fitting closely therein. On the same side of the sprocket-wheel is affixed thereto or formed thereon a guideway E^5, extending from a point at the periphery or near it down in lines parallel to a radius of the wheel to a point on the opposite side of the recess E^4. At the latter place the guides E^5 E^5, curving toward each other, meet. Thus the recess E^4 is at the closed end of the guideway. The width of the guideway is not less than the diameter of the journal G. On that end of the spindle C where the journal G is located is fixed a projection or stud E^7 of the same diameter as said journal, the axes of the journal G and of the said stud being parallel. The bearing H′ for the reception of the free end of the journal G′ is of a yielding character. The preferable mode of supporting it is a spring plate or piece H, secured below by a foot H^2 to the base B, and curved outwardly at H^3 to allow the spring bearing-piece H, when passed away from the sprocket-wheel E, to have length sufficient to keep the bearing H′ in axial line with the bearing E′ of the sprocket-wheel. On that side of the bearing-piece H which is toward the spindle is fixed a guideway H^4, the guides H^5 thereof encircling the lower half of the adjacent edge of the bearing H′ and extending up to the upper end of the bearing-piece H.

To remove the spindle C from its bearings, the spring-piece H is bent back toward the side B^3 of the case. The end of journal G′ is thus withdrawn from the bearing H′, and room is also given to withdraw the journal G from its bearing E^4 in the sprocket-wheel. The spindle C is now readily lifted up out of place, the journal G′ sliding up in guideway H^4 and the journal G and projection E^7 sliding up in guideway E^5. The spindle C having been removed, the sprocket-wheel E may also now be removed, if necessary, for repair, &c. Ordinarily the sprocket-wheel will remain in position. On the spindle C is fastened the roll of strips of paper for use in the apparatus, this roll of paper being concentric with the spindle.

In replacing the spindle C and its roll the piece H is again bent toward the side B^3 of the apparatus, the journal G and stud E^7 are placed in guideway E^5 on the sprocket-wheel E, and the journal G′ in guideway H^4 of piece H. The spindle is now moved down until the journal G enters the recess-bearing E^4 and journal G′ enters the recess-bearing H′. The guideways direct the journals with certainty to their respective bearings, and the bottoms of the guideways prevent the journals from being carried past the bearings as the spindle is moved down. The spring-pressure of the piece H toward the sprocket-wheel E operates to keep the respective journals G and G′ in their respective bearings.

The function of the stud E^7 is to prevent the spindle C turning independently of the sprocket-wheel E. The spindle C and the sprocket-wheel E must turn together.

The receiving-spindle D is provided with concentric journals I I′. One of these journals I fits into a bearing J^4 in a sprocket-pinion J and the other journal I′ rests in a bearing to be hereinafter described.

The sprocket-pinion J has a journal J^2 on that side of it which is next to the adjacent side B^4 of the case, and this journal is received into a bearing J^3, preferably fixed to the side of the case, as shown. Thus when the spindle D has been removed, the sprocket-pinion can be readily removed from its bearing and reinserted therein. Radial spring-arms J′ J′ J′ are affixed to that side of the sprocket-pinion opposite where the bearing J^3 is located. These arms J′ curve from the center of the sprocket-pinion toward their free ends and outward away from the sprocket-pinion and toward the spindle D. When the spindle D is in position, the free ends of these arms J′ touch against the face of an enlarged end of said spindle—viz., D′—the said end being preferably a metallic disk.

The journal-bearing K′ is located in a support K, and the elastic pressure necessary for the retention of the journals of the spindle D in their respective bearings is preferably obtained by the elasticity of the piece K, made of spring metal, having a foot K^2 secured to the base B and a curved portion K^3. This curved piece K is similar in shape to the spring-piece H and performs similar functions with reference to the spindle D to what the said piece H performs for spindle C. The spring-piece K in pressing the spindle D toward the sprocket-pinion also performs the function of pressing the disk D′ of spindle D against the free ends of the arms J′ of the sprocket-pinion. The spring-piece K is provided with a guideway K^4, having guides K^5 of a shape similar to the guideway H^4 aforementioned and located on the said spring-piece K with reference to journal-bearing K′ in a manner similar to that in which spring-piece H is located with reference to its journal-bearing H′.

In removing the spindle D from its supporting-bearings the upper end of the spring-piece K is pressed back toward the side B^3 of the casing. The journal-bearings K′ and J^4 are now so widely separated that the spindle can be lifted out of said bearings and removed. In replacing the spindle the spring-piece K is bent back, as aforemen-

tioned, and the journal I inserted in bearing J^4 and the other journal I′ placed in the guideway and moved down therein by pressing down the adjacent end of the spindle until the journal I is in place in the bearing K′.

To the spindle D is affixed one end of a flexible strip L, of cloth or equivalent material, in any suitable manner. The width of the strip is preferably about the same as that of the paper strip to which it is to be connected. The other or free end of this strip is provided with catches L or equivalent mechanism for grasping the strip of paper to be drawn onto the receiving-spindle D. In the present illustrative instance these catches are merely teeth of flexible metal, which are first passed through said strip of paper and then bent down flat thereon. As such a means of fastening is well known and in universal use, it is unnecessary to present a more extended description thereof. A roller-frame M is present, provided with rollers N′ and N^2. This frame preferably consists of the side uprights M′ M′ and cross-connecting rods or pieces M^2 M^2. The roller N′ is journaled in the lower portion of the side uprights M′ M′, and the roller N^2 is journaled in the upper portion thereof. The frame M is adjustable, and to this end the lower ends of the uprights are beveled, the bevel M^3 extending from the side of the frame toward the spindle down to the other side.

At the lower portion of the case, near to the front plate or portion B′ of the case A, are beveled two studs or pillows P, one for each upright M′, the beveled portion M^3 of an upright resting on the beveled portion of its supporting-stud P. As the bevel of each of said pillows is in a reverse direction to that of the bevel M^3 in contact with it, the bevels of the pillows and those of the uprights M′ fit closely together. At the upper end of the casing and near each side is a projection R, projecting rearwardly from the front end of the casing. When the frame M is set on the pillows P and its upper end moved forward, each upright will come closely under its adjacent said projection R.

A pivoted catch R′, pivoted at R^2, is located on one of the sides of the case, and when dropped its free end passes against the upper portion of the front edge of one of the uprights M′ and serves to prevent the upper portion of the frame from coming out of its upright position, while the bevels on the lower ends of the frame, in conjunction with the bevels on the pillows P and the projections R which prevent the frame M from rising, serve to prevent the lower end of the frame from slipping rearward out of place.

When it is desired to remove the frame M, the catch R′ is lifted and the top end of the frame drawn out from under the projections R, after which the frame and its rollers can be lifted out of the case A. In replacing the frame M in the case the successive steps taken in the operation of withdrawing the frame from the case are repeated, but in a reverse order. The principal advantage of rendering the frame thus adjustable is as follows: After the desired amount of paper written upon has been wound upon the spindle D the top of the casing is removed, as more particularly specified, and the spindle D, with its load of paper, is removed. When a spindle D is again placed in position in the machine, it becomes necessary to attach its flexible strip L to the free end of the paper strip to be wound on the said spindle for the purpose of enabling the rotation of the spindle to wind the recording-strip of paper thereon. The flexible strip L passes from the spindle D down under the roller N′, thence in front of said roller up in front of the roller N^2, and thence over said roller rearward to the paper to which it is to be attached. It will now be obvious that by removing the frame M, attaching the free end of the strip to the recording-paper strip, then placing the frame on the rear side of the flexible strip, and then putting the frame in position in the case the difficulties which would arise in the passing of the flexible strip under the roller N′ and up in front of the frame M—viz., between the said frame and the front of the case, and then rearward over the roller N^2, in the event of the frame being stationary in the case A—are obviated by my making the frame removable, and especially is this the case where the means for such removing are of the kind I have invented—viz., those herein specified.

Upon the supply-spindle C is rolled a compound strip of paper consisting of as many strips of paper—one behind or next to the other—as are to be simultaneously employed upon the machine. The free end of this compound strip is drawn off the spindle, and the strip or strips L′ to be ultimately carried to the recording-spindle D is or are passed over the roller S at the rear portion of the top of the machine, thence over the lower plate T of the two top plates of the machine. This lower plate T constitutes the tablet proper. The free end of this recording strip or strips is fastened to the flexible strip L. The other strips L^2 of paper of the compound strip coming from the spindle C are passed over the larger roller S′, located at the rear of the said roller S, and then passed over the strip or strips L of paper aforementioned on the tablet and then out and up over a bar V, hereinafter described, and then on over the machine and off of the case A. The rollers S S′ are removable, and when in the machine their journals run in the grooves W in the upper edges of the sides of the machine. These grooves W are open at the top and allow the said rollers to be lifted out of them or replaced within them. The superincumbent paper aids in securely retaining them in position. Between each two adjacent strips of paper on the tablet lie what is familiarly known as "inking or "carbon" leaves X X, and the preferred mode of locating and holding

each of them is by means of cross-rods X′ X′—one for each leaf X—set into the top of the machine after the manner in which the rollers S S′ are secured therein. The cross-rod of each carbon leaf is secured to the head or upper rear end of its leaf, while the front or lower end of each leaf is free to follow the undulations of the paper next to which it lies.

The tablet T sets in the top plate B^5 of the machine. Outside of the tablet T, and above the combination of paper-strips and carbon leaves thereon, is located a lid T′, having a rectangular hole T^2, through which the person desiring to record the memorandums or charges to be made writes the same with pencil or stylus, and by the aid of the carbon leaves, directly upon all of the leaves on the tablet. The lid is pivoted at its rear end to the top plate B^5 at T′. The upper edge of the curved cutter-plate T^4 is pivoted at T^3 to the lid T′, and the free lower edge of the cutter-plate rests on the strip-paper to be cut off, one of which is, in the case of recorded sales, handed to the purchasers, while the recording strip or strips L′ pass under bar V and around rollers N^2 N′, and thence to spindle D, as hereinbefore specified, of flexible strip L. The bar V passes across the machine above the tablet and under the cutter-plate and operates to there keep the paper raised. Consequently when the operator has pressed down the cutter-plate and with the other hand has torn off thereby the paper he has drawn from the machine and has written upon the fresh paper presented in the opening T^2 and lifts up the cutter-plate to grasp the paper beneath it to pull forward the paper written upon and tear it off, the bar V holds up the free edges of said paper in a convenient position to be readily grasped.

The sprocket-wheel E and the sprocket-pinion J are connected to a suitable chain Z, and the diameter of this wheel in relation to this pinion is such that even when spindle D is empty and spindle C carries the largest roll of paper it can the spindle D shall rotate sufficiently fast to more than take off and roll on it the paper received by it from the large roll on spindle C. In this way the spindle D is sure to take up all slack record-paper between itself and the spindle C. When the spindle C has thus taken up all slack, it will, to the extent that it rolls up the recording-paper faster than it is unrolled from the spindle D, slip on the friction-arms J′, and the latter, with the sprocket-pinion, being positively driven by the large sprocket-wheel E, will revolve faster than the spindle D, but, owing to the friction between the arms J′ upon the friction-disk D′ of spindle D, will cause the latter to revolve and wind up the recording-paper as fast as it is delivered from the spindle C.

Instead of sprocket gear and chain, other suitable descriptions of gear may be employed to enable the rotation of the spindle C to rotate the spindle D; but sprocket-wheels and a chain connection are preferable, because, as it is desirable that the spindles C and D be located at some distance from each other, the chain connection is a simple and inexpensive one and works better and with less friction than intervening gear-wheels are likely to do.

It is obvious that a pull on the paper strips L^2 turns the spindle C, so that as the said strips L^2 are drawn forward over the top of the machine the strip L′ is also, by the rotation of the spindle C, drawn forward with said strips L^2 over the tablet and subsequently wound upon the said spindle C.

A glass window O, placed in the front end of the machine, will enable the operator to see a duplicate of the record just previously torn off from the strips L^2.

While the various features of my invention are preferably employed together one or more of them may be employed without the remainder, and in so far as applicable one or more of said features may be employed in conjunction with other mechanism for performing the function of self-writing or of recording, or of both of these.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of the sprocket-wheel having the journal E′ received into bearing E^2 and carrying on its other side the bearing E^4 and the guideway E^5 thereto, and the paper-supply spindle C, having journals G and G′, and the elastic spring-piece H, having bearing H′, receiving the journal G′ and having the guideway H^4 to said bearing, the journal G being received in the bearing E^4, and the spindle C carrying a stud E^7, received into said guideway E^5, substantially as and for the purposes specified.

2. The combination of the sprocket-wheel having the journal E′ supported in a bearing of the casing and itself having a bearing for the reception of one journal of the spindle C, the sprocket-wheel being provided with a guideway to its said bearing and the spindle having journals and projection E^7, the latter and one of the journals of the spindles being in the guideway, and bearing for supporting the other journal, and mechanism, substantially as and for the purposes specified, for pressing the spindle C toward the sprocket-wheel, substantially as and for the purposes specified.

3. The combination of the spindle D, having journals and disk D′ and sprocket-wheel or pinion J, carrying the friction-arms J′ and bearings J^4, and spring mechanism for pressing the spindle D and disk D′ in contact with the free ends of the friction-arms and the journal I in bearing J^4, substantially as and for the purposes specified.

4. The combination of the spindle D, having journals and disk D′ and sprocket-wheel or pinion J, carrying the friction-arms J′ and bearings J^4, provided on and concentric

with the sprocket-wheel, and elastic spring-piece K, provided with bearing K′, in which the journal I′ is received, the spring-piece K retaining the spindle in the bearings J^4 and K′ and the disk D′ against the free ends of the arms J′, substantially as and for the purposes specified.

5. The combination of the spindle D, having journals and disk D′ and sprocket-wheel or pinion J, carrying the friction-arms J′ and bearings J^4, provided on and concentric with the sprocket-wheel, and elastic spring-piece K, provided with bearings K′, in which the journal I′ is received, the spring-piece K retaining the spindle in the bearings J^4 and K′, the spring-piece K being provided with guide-way K^4, leading to the bearing K′, and the disk D′ against the free ends of the arms J′, substantially as and for the purposes specified.

6. The combination of the supply-spindle C and receiving-spindle D and a removable frame located within the casing A and at or near the front end of the same and provided with rollers N′ N^2, the paper to be wound on the said receiving-spindle entering the case and passing over roller N^2, thence down around roller N′, and thence to and around spindle D, substantially as and for the purposes specified.

7. The combination of a supply-spindle and a receiving-spindle and a frame M, all located within a casing, the casing having a beveled projection or pillows P and a projection R and latch R′ and the lower ends of the frame M having beveled feet M^3 interfitting with the beveled projection or pillows P and projection R and held from lateral deflection at the upper edge by the latch, substantially as and for the purposes specified.

8. The combination of a supply-spindle and a receiving-spindle and tablet having the raised rod V, over which latter the paper to be torn off passes, while the paper to be transmitted to the receiving-spindle passes under said rod, and the cutter-flap or piece T^4, extended over said rod and pivoted in rear of the said flap, the cutting-edge of the flap resting on the paper to be cut in front of the cutter, substantially as and for the purposes specified.

ALMY LE GRAND PEIRCE.

Attest:
F. W. BROWNE,
K. SMITH.