

Aug. 10, 1937.

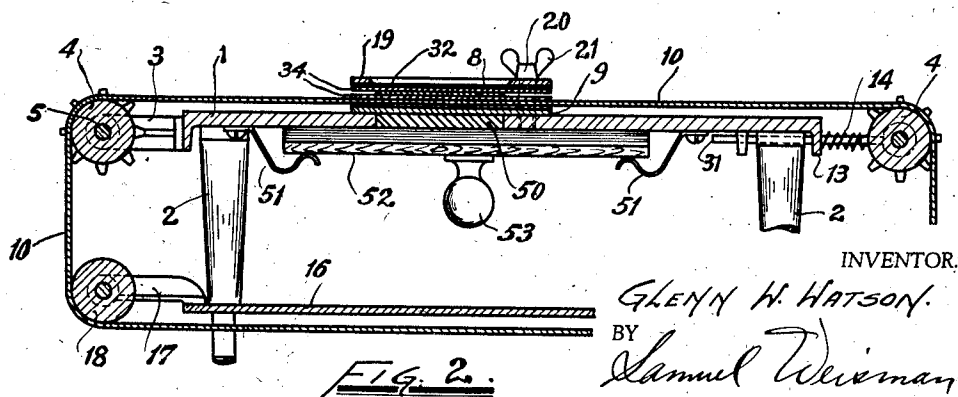
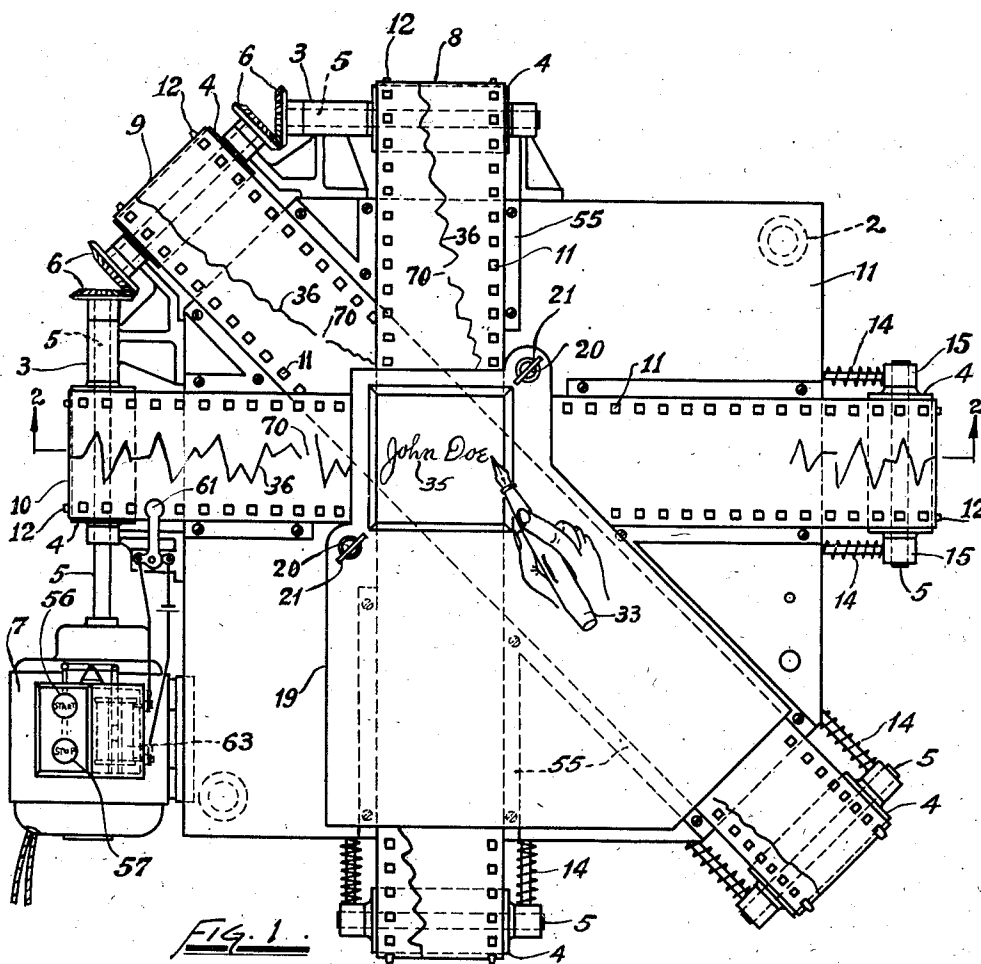
G. W. WATSON

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MEANS FOR REPRODUCING INSCRIPTIONS AND THE LIKE

Filed Aug. 28, 1936

2 Sheets-Sheet 1



INVENTOR.

GLENN H. WATSON.

BY

Samuel Weisman

ATTORNEY.

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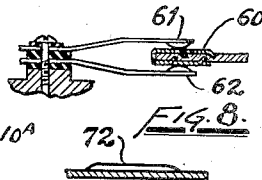
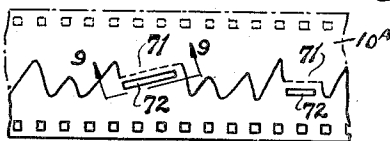
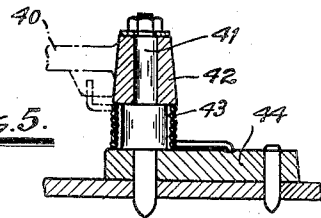
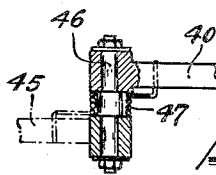
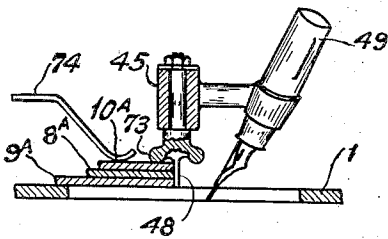
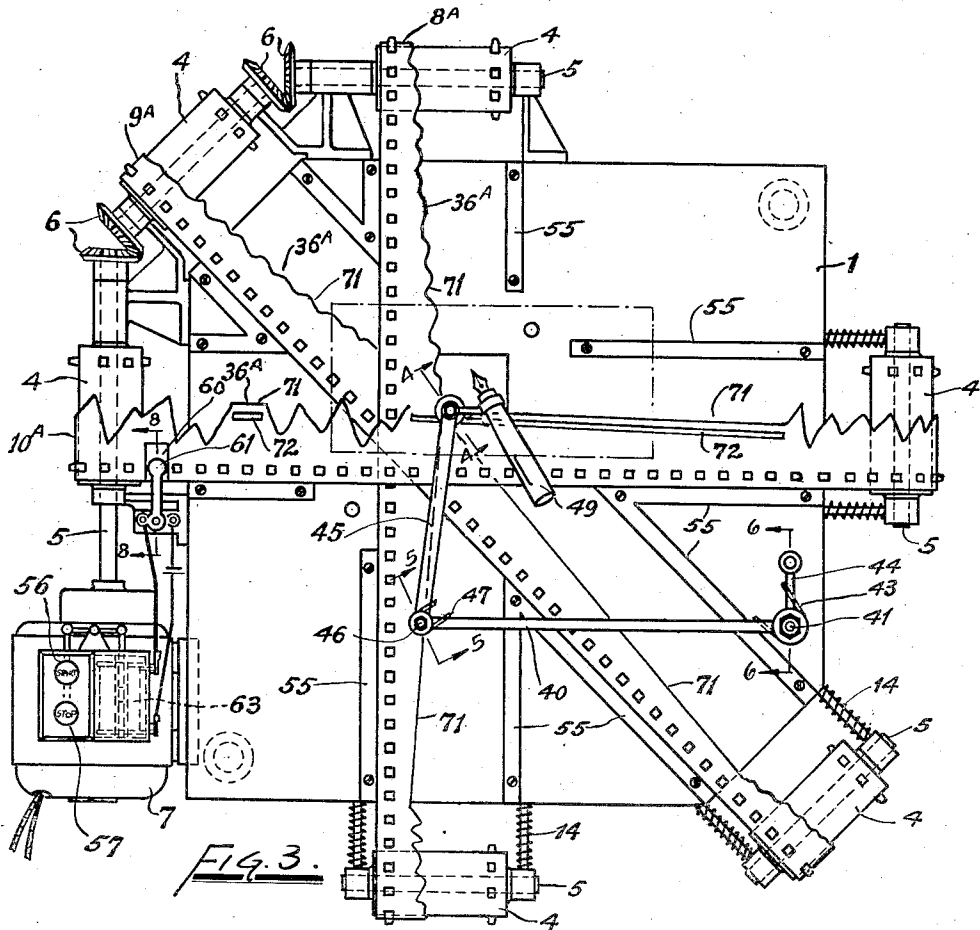
G. W. WATSON

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MEANS FOR REPRODUCING INSCRIPTIONS AND THE LIKE

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2 Sheets-Sheet 2



INVENTOR.

GLENN W. WATSON.

BY

BY *Samuel Weisman*
ATTORNEY.

ATTORNEY.

UNITED STATES PATENT OFFICE

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MEANS FOR REPRODUCING INSCRIPTIONS
AND THE LIKE

Glenn W. Watson, Detroit, Mich.

Application August 28, 1936, Serial No. 98,373

12 Claims. (Cl. 33—18)

The present invention pertains to a novel device for reproducing an original writing or drawing. The device is intended primarily, although not so limited, for reproducing a signature on a document such as a check, bond, insurance policy, or the like, where a great number of duplications of the signature are required and where the possessor of the signature does not desire to spend the time that would be required for him to write his signature in each case.

The principal object of the invention is to provide a device of this character that reproduces the signature, writing or drawing from an original master made by the author. The reproductions can then be made mechanically by a clerk. Another object of the invention is to provide a means and method of reproduction or transcribing wherein any possible alteration of the original in the process is reduced to a minimum.

The outstanding conception of this invention is the effect of mirroring an exact reproduction of character of signature or handwriting by the act of writing the signature itself.

In the accomplishment of these objects, the writing or drawing is performed in the original on a fixed sheet beneath which are moved two or more strips at an angle to each other. A suitable medium, such as carbon paper, is provided between the strips and between the upper strip and the fixed sheet. The writing or drawing is thereby resolved into undulating and normally unintelligible components on the moving strips.

From these strips are produced matrices conforming to the undulating lines and also in strip form. To reproduce the original inscription, the matrix strips are run through the machine or one identical thereto. A writing instrument is guided by the intersection of the matrices and thereby reproduces the original inscription on a sheet placed beneath the instrument.

A third strip is preferably made during the inscription, and a matrix produced therefrom. Such a third matrix, during transcription, passes continuously through the point of intersection of the other two and continuously moves the writing instrument out of the angle of intersection, so that it cannot become wedged in that angle.

The invention lends itself to code writing inasmuch as the strips and matrices are individually unintelligible and cannot reproduce the original unless used in the original angular relation of the strips and at the same relative speed. Hence, this angular relation is an essential element in the decoding process.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings in which

Figure 1 is a plan view of the machine, showing the original scribing operation;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a plan view of the machine, illustrating the reproducing operation;

Figures 4, 5, and 6 are sections on the lines 4—4, 5—5, and 6—6 respectively of Figure 3, and

Figure 7 is a plan view of one of the strips with humps or risers applied thereto.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figures 1 and 2 the machine is illustrated as comprising a bed or table 1 standing on legs 2. The body of the machine carries, in any suitable manner, pairs of opposed brackets 3 and 3' carrying pairs of opposed and parallel rollers 4. The line of travel of any pair of rollers, that is, the line drawn between the rollers of a pair, is at an angle to the line of travel of every other pair of rollers. Moreover, the lines of travel of the several pairs of rollers intersect one another in the proximity of the center of the table 1. One roller of each pair has an extended shaft 5 carrying one or two gears 6, as required, for gearing the shafts together as illustrated in Figure 1. One of the shafts is driven by an electric motor 7 or other suitable driving means, whereby all the pairs of rollers are driven in synchronism.

Each pair of rollers is designed to carry and propel a strip which is preferably endless and passes over and beneath the bed 1 as shown in Figure 2. The strip may be also used as two rolls of photographic film for any length, dependent on its use. The several strips are designated by the numerals 8, 9, and 10 in Figure 1. They are preferably apertured at 11 along the edges to receive cogs 12 on the rollers for accurate feeding and propelling.

The brackets 3' are preferably slidably mounted in lugs 13 on the table and enclosed by springs 14 between the outer lugs and the ends of hubs 15 in which the corresponding rollers are journaled. These springs exert a slight outward pressure on the hubs 15 and thereby maintain the strips in a taut condition. The legs 2 preferably support also a base 16 carrying brackets 17 and idlers 18 mounted respectively beneath the rollers 4 for guiding the strips.

Because of the intersection of the lines of travel as stated above, the strips 8, 9, and 10

intersect one another over the bed 1. Over the area of intersection is provided an open clamping frame 19 located on studs 20 mounted on the bed 1 and not interfering with the several strips. The frame may be clamped down by wing heads 21 on the studs 20.

The lower surface of the frame is designed to carry a fixed sheet of paper 32. The several strips 8, 9, and 10 pass beneath the frame and beneath the sheet 32 at different levels but in close proximity to each other. An inscription made on the sheet 32 by a pen or other instrument 33 is transferred to the strips 8, 9, and 10 by a suitable transfer medium. Such a medium may be, for example, sheets 34 of carbon paper inserted between the strips and between the upper strip and the sheet 32. The carbon sheets as well as the sheet 32 may be so shaped and perforated as to receive the studs 20 and thereby be held in a fixed position beneath the frame 19.

The strips 8, 9, and 10 may consist of paper, celluloid film or any other suitable material adapted to take a transfer of the impression made by the instrument 33. Likewise, the transfer may be effected by any suitable means other than that disclosed, such as, for example, carbonizing the lower surface of the sheet 32 and of each strip.

The inscription 35 to be later reproduced is inscribed on the sheet 32 by the instrument 33 while the strips 8, 9 and 10 are in motion. The instrument is adapted to scan the open space within the frame 19 by touching any point therein, and in this sense the operation performed by the instrument is termed "scan-scribing". The inscription is usually, but not necessarily, in the form of a signature. Due to the movement of the sheets, the transfer of the inscription is separated into components 36 on the respective strips. These components are unintelligible unless treated, assembled and used in the manner presently to be described. As shown, they consist of undulations, or hills and valleys, similar to those forming the sound track of a phonograph record, and determined by the resultant of the direction of the instrument 33 with the direction of each strip.

For reproducing the inscription, the strips 8, 9, and 10 are converted into matrices 8A, 9A, and 10A following the lines 36 thereon. This may be done in numerous different ways. If the strips consist of heavy material, they can be cut along the lines 36; or the lines 36 may be grooved after inscription or during inscription by the addition of grooving instruments attached by arms to the pen 33 in such manner as to groove spaced-apart strips on either surface. If they consist of material not suitable for cutting, the lines may be transferred photographically to film which is then cut. Or, the strips may be given a protective coating at one side of the line and dissolved chemically at the other side of the line to leave an edge constituting a matrix conforming to the line. The matrix lines are designated by the numeral 36A in Figure 3.

The matrix strips 8A, 9A, and 10A are then placed in the same machine in which the inscription is made or in an identical machine. If the same machine is used, the clamp frame 19 is removed and replaced by a properly supported pen.

For this purpose, a main arm 40 is pivotally mounted on a pin 41 inserted in the bed 1. The hub 42 of the arm around the pivotal axis is surrounded by a coil spring 43, one end of which

bears against the arm and the other end is anchored in a finger 44 also mounted in the bed. To the free end of the arm 40 is pivotally attached a link 45 by a pin 46. A spring 47 surrounds the pin and has its ends bearing respectively against the members 40 and 45. The free end of the link 45 carries a follower 48 adapted to lie at the common point of intersection of the several matrix edges 36A.

In this connection it will be understood that the original profile lines 36 emanated, at any given instant, from a common point while being formed by the instrument 33. Consequently, when the corresponding matrices are mounted in an identical machine in the original angular relation to each other and run at the same speed, they also will intersect at one point at any given instant. This point of intersection is followed by the follower 48 which therefore outlines the resultant of the several matrix components and hence outlines the original inscription. The transcription is, however, made by a suitable scribing instrument such as a fountain pen 49 carried by the follower as shown in Figure 4. In one embodiment of the invention, the sheet for taking the transcription may be directly upon the bed 1 and beneath the pen, follower and intersecting matrix strips.

In a preferred construction, however, a number of sheets to be similarly inscribed are fed upwardly to the bed 1. Accordingly, the bed has a removable section 50 directly beneath the pen 49 so that the pen may have access to the uppermost sheet. The sheets are successively presented to the pen by any suitable mechanism such as a number of leaf springs 51 secured to the underside of the bed 1 and supporting a follower plate 52 adapted to support the sheets. The lower surface of the plate carries a handle 53 by which the plate may be pulled down after the top sheet has been inscribed, whereupon this sheet may be withdrawn without smearing. On releasing of the handle, the next sheet is presented to the pen.

Guide strips 55 may be mounted on the bed 1 to engage the edges of the traveling strips and thereby confine them to an accurate, straight-line movement. The motor 7 is started, for either the scribing or the transcribing operation by a push button 56. It can be stopped at any time, as in an emergency, by another button 57, although an automatic stop is preferred.

This stop consists of a metal clip 60 applied to an edge of one of the strips and engaging both surfaces, in conjunction with a pair of fixed brushes 61 and 62 controlling the motor and between which the clip 60 is adapted to pass. The brushes are wired to a solenoid 63 operating the throw-out switch 57 on the motor.

In forming the original inscription 35 by hand with the instrument 33, the instrument will at times be lifted from the paper 32. The means for correspondingly lifting the pen 49 during transcription is illustrated in Figure 7. The numeral 70 represents the gaps formed in a line 36 during inscription. The ends of the gaps as well as the ends of the lines 36 are later connected manually by lines 71 (Figure 7) which are included in the matrices in order to make the latter continuous. On the uppermost matrix strip, these gaps are bridged by humped members 72 applied to the uppermost strip. In the transcribing operation, these members ride beneath a ring or projection 73 on the follower 48, as shown in Fig-

ure 4, and thereby lift the follower with the pen 49 from the paper.

Further, in the transcribing operation, the superimposed, intersecting matrix strips are pressed against the bed 1 by a leaf spring 74 (Figure 4) which may be fastened to one of the pins 20.

Within the scope of the invention, the shifting point of intersection of the strips may be used in other ways to make the transcription. For example, the lines 36 may be originally scratched on a coated surface that becomes, or is treated to become, transparent along the lines. The strips are then passed in proper relation before a light, whereby there is projected a point of light outlining the inscription. This point, projected on apparatus of the type used in sound films, can operate mechanism for actuating the transcribing instrument.

Inasmuch as the travel of the follower and transcribing pen is determined by the intersection of moving lines, only two such lines are necessary for determining the shifting point of intersection. Only two matrices might, however, occasionally form a sharp angle that binds and locks the follower. This contingency is avoided by the third matrix that constantly moves through the intersection of the first two matrices and thereby applies to the follower an independent force constantly moving the follower out of the angle formed by the first two matrices.

The number of components formed from the original inscription may be increased beyond three, if desired, in which case the matrices would be similarly increased and the difficulty of transcribing, in secret communication, would likewise be increased.

In the use of the invention, the inscription is originally made by the hand of the writer, and the matrices are outlined in the same manual operation. It is one of the important characteristics of the invention that the medium controlling transcription, namely the matrices, is produced with a minimum of manual intervention with the original manual inscription.

The inscription strips 8, 9 and 10 may be run through the machine at various relative speeds and angles with respect to each other, and the same relations must be preserved in the transcribing machine. Thus, these relations are essential elements, without the knowledge of which facsimile transcription is impossible. This condition is very desirable in the use of the invention as a means for transmitting messages in code by transmitting the intelligence of the respective component strips at different times by various agencies, in which case the transmitted matrices have no significance for facsimile transcription of messages unless their angular relation and relative speeds be known to the receiver, in order that the latter may properly assemble the strips.

After the matrices have served their purpose in transcribing a message or a signature, they may be destroyed or preserved in a safe. A code message would of course be of no future value, and it is quite expedient to destroy matrices for signatures rather than keep them on file, since new strips can be easily made according to the invention by the means described herein. In the case of tax receipts and the like, where future reference may be necessary, the matrices may of course be preserved.

Although the strips are herein shown as physically crossing each other, the matrices may be prepared and transcribed without physically

crossing each other, but placed at an angle to each other as previously described. In such case, the matrices would be inscribed by the use of multiple pens and transcribed by the use of extension arms from the respective matrices to the transcribing pen, or a group of transcribing pens, if desired, for simultaneously reproducing the original inscription on several surfaces.

The words "inscribe" and "inscription" are here employed in the sense defined in the New Century Dictionary (copyright 1933-1934) and including further the delineation, by any means, of any writing, drawing, picture, character, symbol, design, and in fact, any matter that is subject to delineation for representation on a surface.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claims.

What I claim is:

1. The method of forming matrices for reproducing an inscription consisting in moving a plurality of strips across each other at an angle to each other, forming the original inscription on a fixed sheet, and transferring said inscription to said strips, whereby said inscription is separated into component lines on the respective strips, and defining said lines to adapt them for guiding a follower.

2. The method of forming matrices for reproducing an inscription consisting in moving a plurality of strips across each other at an angle to each other, forming the original inscription on a fixed sheet, transferring said inscription to said strips, whereby said inscription is separated into component lines on the respective strips, and severing said strips on said lines.

3. The method of reproducing an inscription consisting in moving of a plurality of strips across each other at an angle to each other, forming the original inscription on a fixed sheet, transferring said inscription to said strips, whereby said inscription is separated into component lines on the respective strips, and defining said lines to adapt them for guiding a follower, again moving said strips across each other in the former relation to each other, and causing a scribing instrument to be guided on a sheet by said lines.

4. The method of reproducing an inscription consisting in moving a plurality of strips across each other at an angle to each other, forming the original inscription on a fixed sheet, transferring said inscription to said strips, whereby said inscription is separated into component lines on the respective strips, and defining said lines to adapt them for guiding a follower, again moving said strips across each other in the former relation to each other, and causing a scribing instrument to be guided on a sheet by said lines.

5. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, a clamping frame mounted over the intersection of said lines, said frame having means for passage therethrough of strips carried by said pairs of rollers, and means to accommodate a fixed sheet above said strips and transfer sheets between said fixed sheet and said strips.

6. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, a removable

- clamping frame mounted over the intersection of said lines, said frame having means for passage therethrough of strips carried by said pairs of rollers, and means to accommodate a fixed sheet and said strips, separable means for movably supporting a writing instrument over said intersection, and a guide member carried by said means and adapted to follow matrix strips propelled by said pairs of rollers.
10. 7. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, a removable clamping frame mounted over the intersection of said lines, said frame having means for passage therethrough of strips carried by said pairs of rollers, and means to accommodate a fixed sheet and said strips, separable means for movably supporting a writing instrument over said intersection, and a guide member carried by said means and adapted to follow matrix strips propelled by said pairs of rollers, said bed having a removable portion at said intersection, and means for feeding sheets to a position underlying the opening formed on removal of said portion.
- 15 8. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, means for movably supporting a writing instrument relatively to the intersection of said drive lines, and a guide member carried by said means and adapted to follow matrix strips propelled by said pairs of rollers.
- 20 9. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, intersecting matrix strips carried respectively by said pairs of rollers, means for movably supporting a writing instrument relatively to the intersection of said drive lines, and a guide member carried by said means and adapted to follow the respective contours of said strips.
- 5 10. A machine for use in reproducing an inscription comprising a bed, pairs of opposed feed rollers carried thereby on intersecting drive lines, means for driving said rollers, intersecting matrix strips carried respectively by said pairs of rollers, means for movably supporting a writing instrument relatively to the intersection of said drive lines, and a guide member carried by said means and adapted to follow the respective contours of said strips, and means on said strips at points corresponding to interruptions in the inscription adapted to lift and return said supporting means.
- 10 11. The method of forming matrices for reproducing an inscription consisting in moving a plurality of strips at an angle to each other, forming the original inscription and transferring it to said moving strips, whereby said inscription is separated into component lines on the respective strips, and defining said lines to adapt them for guiding a follower.
- 15 12. The method of reproducing an inscription consisting in moving a plurality of strips at an angle to each other, forming the original inscription and transferring it to said moving strips, whereby said inscription is separated into component lines on the respective strips, and defining said lines to adapt them for guiding a follower, again moving said strips in the former relation to each other and with reference to a fixed sheet and causing a scribing instrument to be guided on said sheet by said lines.
- 20 25 30 35

GLENN W. WATSON.