April 7, 1942. G. L. ERICKSON ET AL 2,278,919

FACSIMILE APPARATUS

Filed March 23, 1939 4 Sheets-Sheet 1

FIG. 4

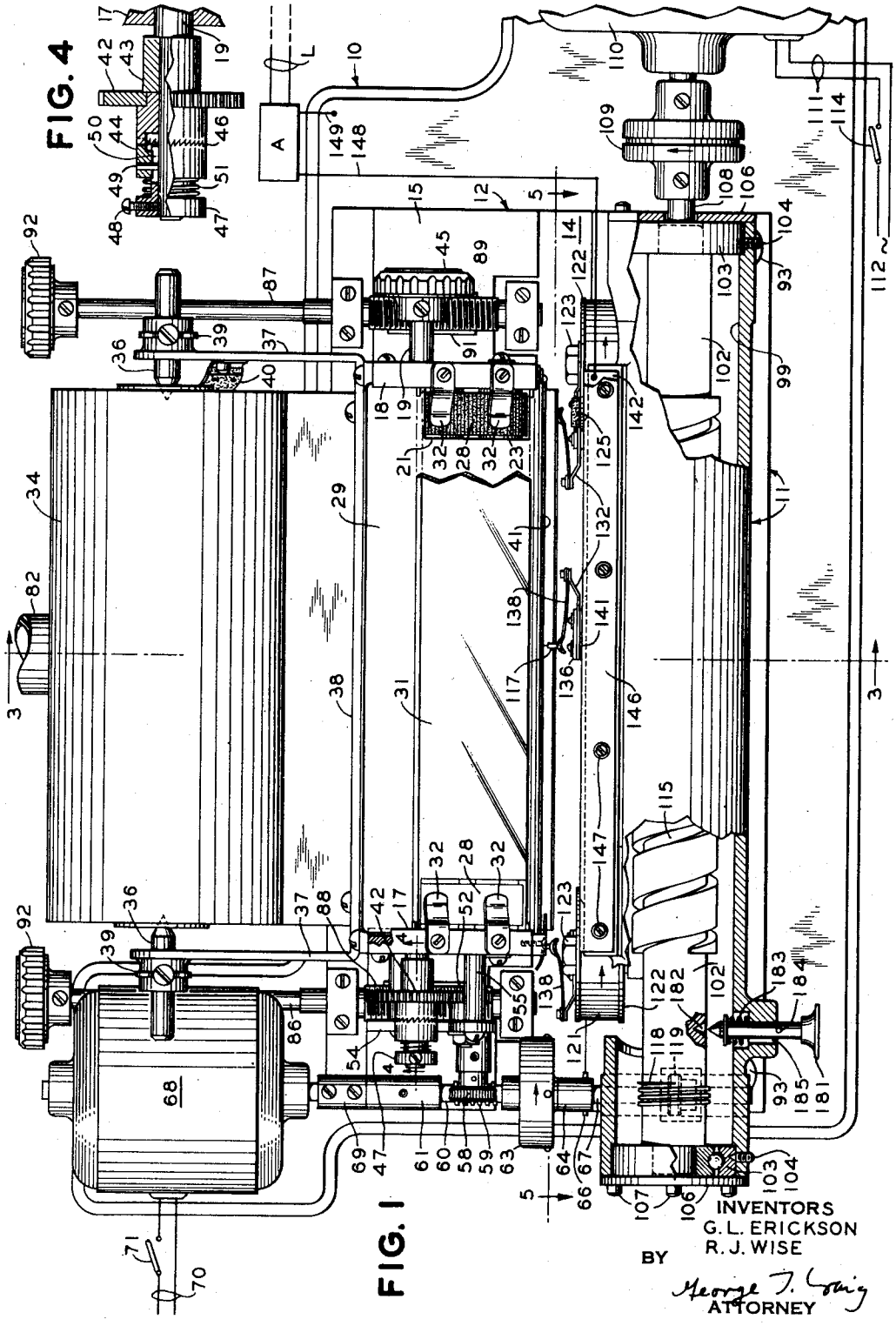


FIG. 1

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FACSIMILE APPARATUS

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FIG. 2

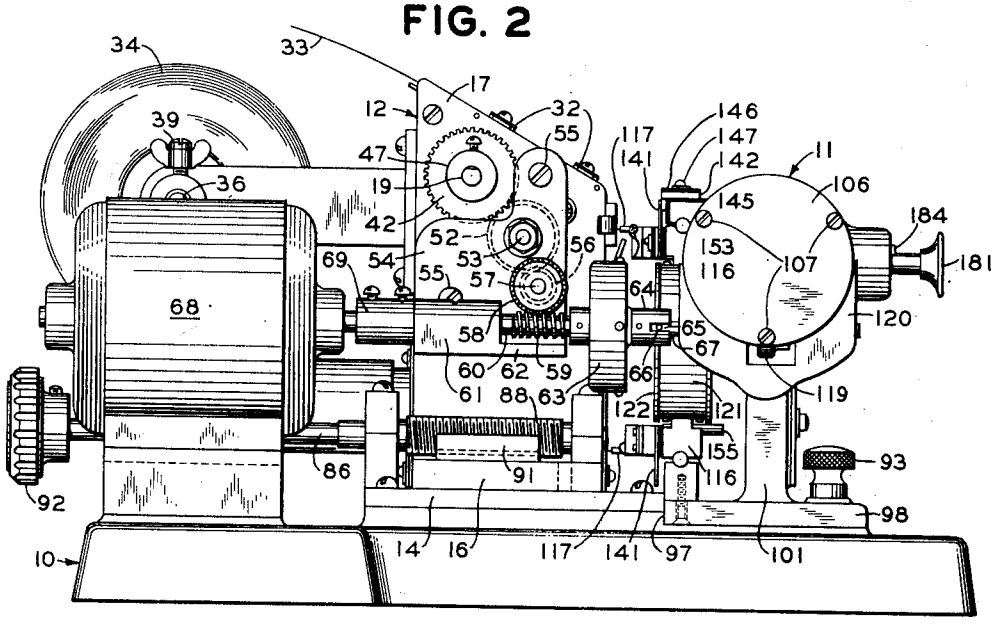
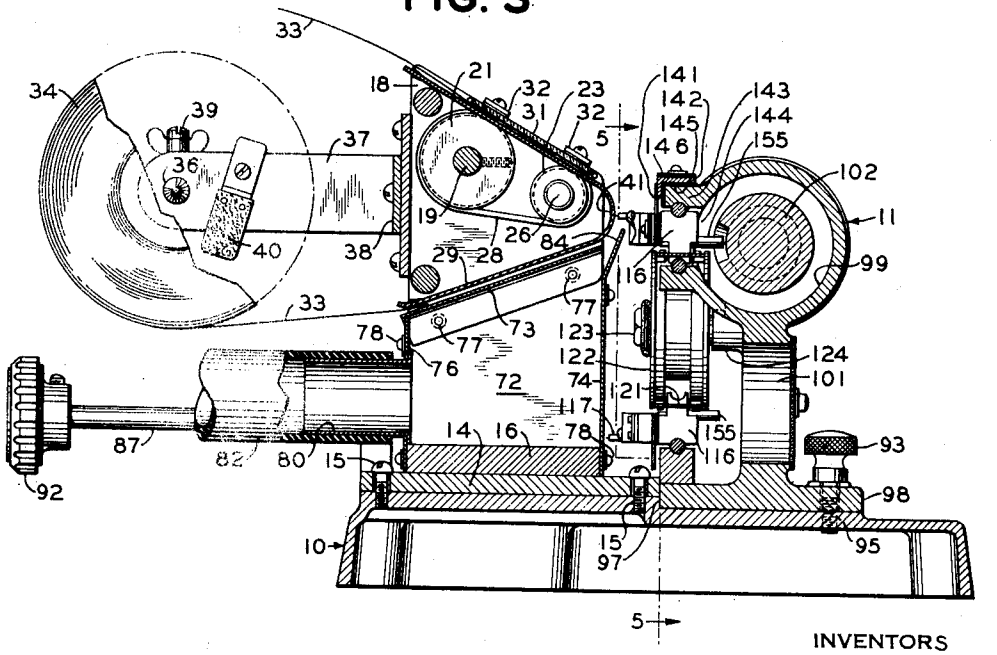


FIG. 3



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FACSIMILE APPARATUS

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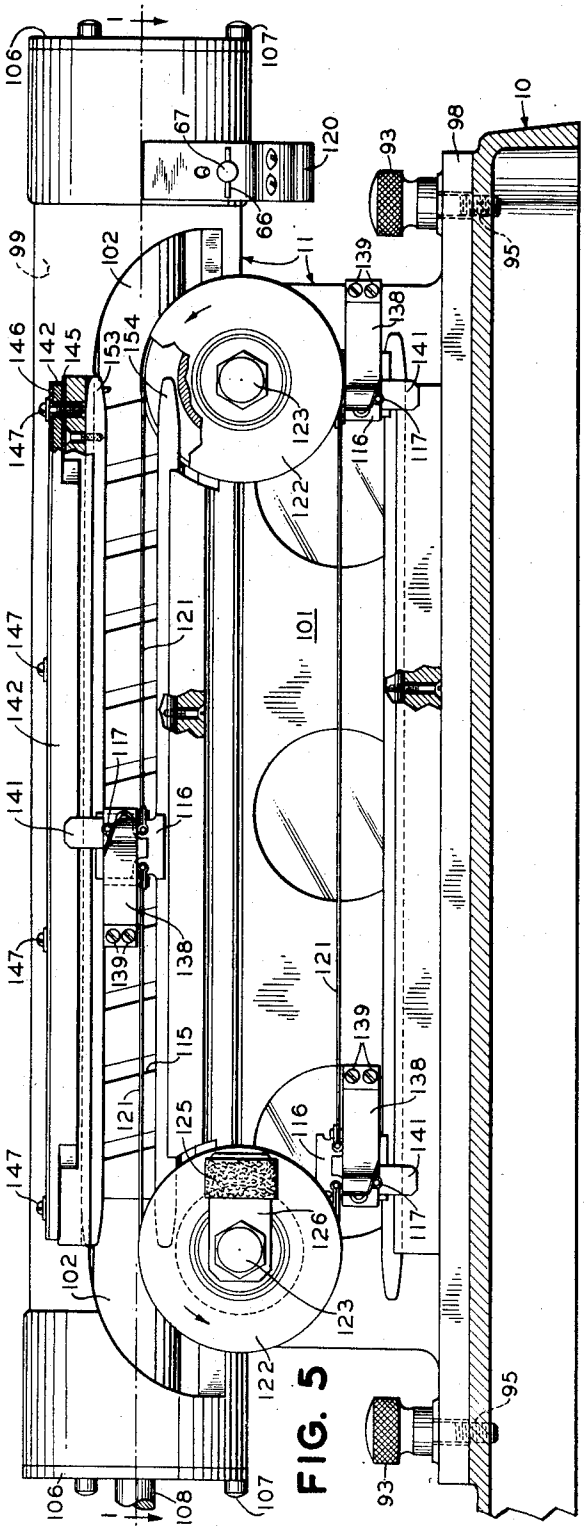


FIG. 5

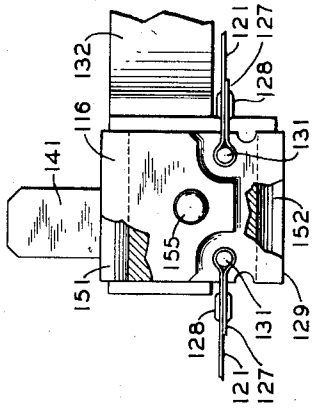


FIG. 8

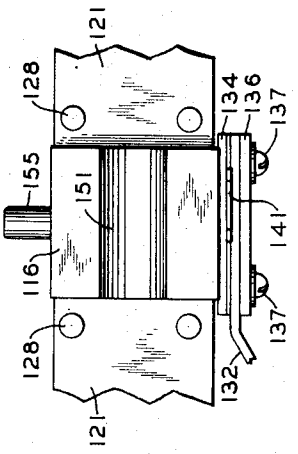


FIG. 7

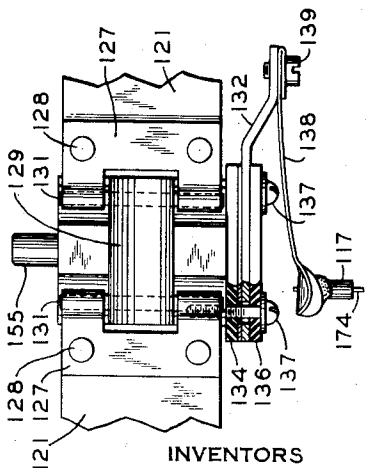


FIG. 6

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FACSIMILE APPARATUS

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FIG. 9

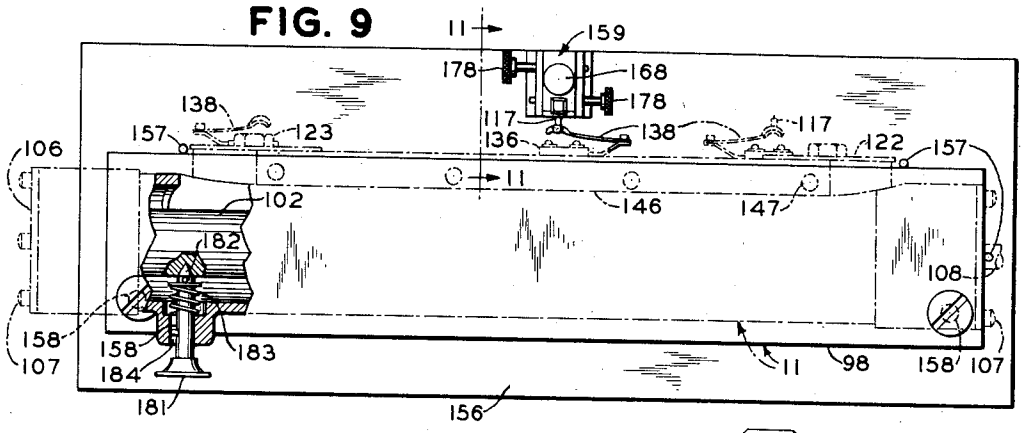
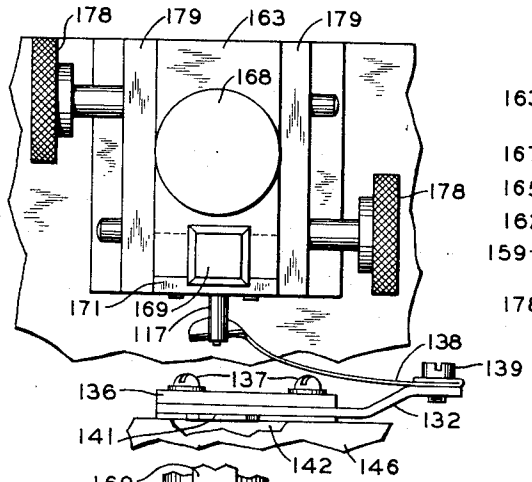


FIG. 10



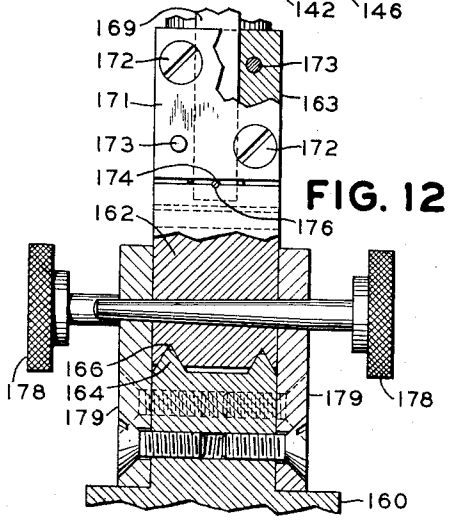


FIG. 12

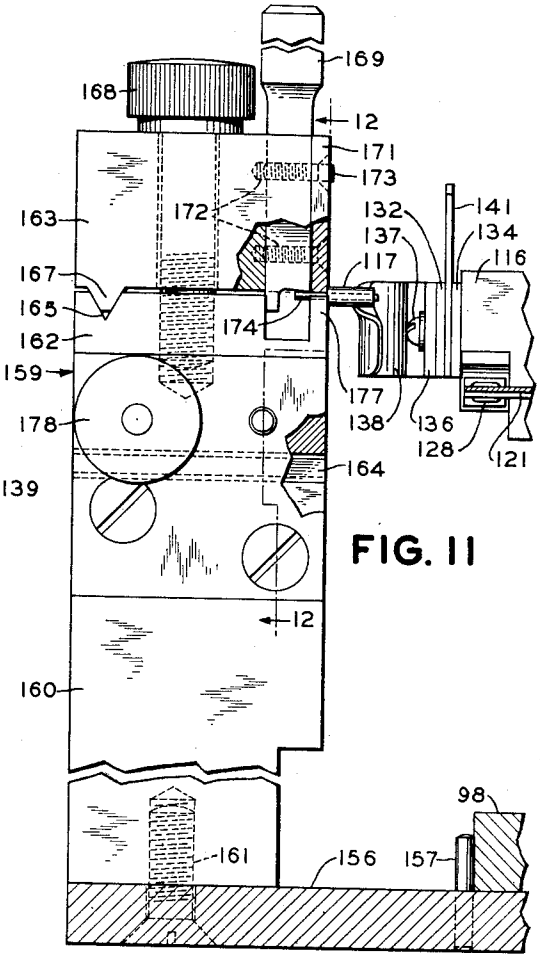


FIG. 11

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Patented Apr. 7, 1942 2,278,919

UNITED STATES PATENT OFFICE

2,278,919

FACSIMILE APPARATUS

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Application March 23, 1939, Serial No. 263,632

16 Claims. (Cl. 178—11)

The present invention relates to the transmission and reception of pictures, messages and other subject matter in facsimile and more particularly to novel and improved means for transmitting or reproducing a facsimile of transmitted subject matter.

The primary object of the invention is to provide an improved multi-stylus facsimile machine of the continuous type in which the styli are guided and moved along a common path in a novel manner.

Another object of the invention is to provide novel means for imparting movement to a stylus or a plurality of styli in a facsimile machine of the type in which a stylus traverses a given path during a scanning movement and a separate return path in the intervals between scanning movements.

A further object of the present invention is to provide novel means for accurately locating a plurality of styli in a desired position on a movable conveyor.

Still another object of the present invention is to provide improved means for supporting and propelling a record sheet of any length in a facsimile recording machine.

A further object of the present invention is to facilitate maintenance and repair of facsimile recorders by having the improved parts thereof assembled into separate interchangeable units which may be handled and serviced separately.

Other and more specific objects of the invention are defined by the terms of the appended claims and will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a top plan view partially sectioned on line 1—1 of Fig. 5 of a recorder embodying the invention;

Fig. 2 is a left side elevation of the embodiment of the recorder shown in Fig. 1;

Fig. 3 is a view in sectional elevation taken on line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary view of a detail of the paper feeding mechanism;

Fig. 5 is an enlarged sectional view taken on line 5—5 of Fig. 1, as viewed in the direction of the arrows illustrating inventive features of the stylus supporting and driving unit;

Fig. 6 is an enlarged bottom plan view partially in section and illustrates details of a stylus holder and stylus;

Fig. 7 is an enlarged top plan view of a stylus holder and stylus;

Fig. 8 is a side elevation partially in section of a stylus holder and stylus;

Fig. 9 is a view in plan illustrating the method of mounting the styli;

Fig. 10 is a view in plan of a fragmentary part of Fig. 9 drawn to an enlarged scale;

Fig. 11 is an enlarged fragmentary sectional elevation taken on line 11—11 of Fig. 9; and

Fig. 12 is an enlarged fragmentary section taken on line 12—12 of Fig. 11.

Referring now more particularly to Fig. 1, the apparatus embodying the invention and designed for recording comprises a base 10 upon which are mounted two separate units indicated generally by reference characters 11 and 12 respectively, the former embodying the stylus support and driving mechanism, and the latter the paper supporting and advancing mechanism.

The paper carrying and feeding unit 12 now to be described in detail comprises a sub-base 14 (Fig. 3) which is secured to the base 10 by suitable fastening means such as screws 15. A plate member 16 resting upon the sub-base 14 is provided with similar upright frame members 17 and 18 in which a shaft 19 is journaled having secured thereon pulleys 21, one adjacent each upright member. An idler pulley 23 is mounted for rotation on a stub shaft 26 secured to the frame member 18 and a like pulley 23 is mounted in a similar manner from the frame member 17. Short flexible belts 28 pass over each set of pulleys 21 and 23 and project through openings formed in the combined guide member and platen 29 which is of a U-shape as shown in Fig. 3 and is carried by the frame members 17 and 18 to which it is secured by suitable fastening means. A strip of smooth material 31, preferably glass, which has the advantage of being transparent, is pressed against the belts 28 by means of two pairs of spring fingers 32, one pair being secured to the frame member 17, and the other pair being secured to the frame member 18. A record sheet or web 33 is drawn from a rotatably mounted supply roll 34 which is carried by oppositely disposed pins 36 secured to the rearwardly extending arms 37 of the U-shaped member 38. A set screw 39 for each pin 36 permits it to be readily adjusted, and a spring mounted friction member 40 carried by one of the arms of the member 38 prevents a too rapid unwinding of the roll 34. The web 33 is drawn over the platen portion 41 of the member 29 by its frictional engagement with the belts 28 which are moved at the proper speed to space the scanning lines in a manner now to be described.

Driving power is imparted to the shaft 19 for moving the belts from a gear 42 through a ratchet clutch mechanism comprising clutch members 43 and 44. The gear 42 is secured to the clutch member 43 which in turn is journaled on the shaft 19 to rotate freely thereon as shown in detail by Fig. 4 of the drawings. In order that the paper web 33 may be advanced manually at any time and independently of the driving gear 42, the shaft 19 is extended outwardly beyond the frame member 18 and terminates in

a conveniently accessible knob 45 (Fig. 1). Upon the knob 45 being turned manually in a clockwise direction as viewed from the right hand side of the apparatus, the previously mentioned ratchet clutch comprising the members 43 and 44 slips by reason of the ratchet form of the intermeshing teeth 46 on the clutch members 43 and 44. The clutch member 44 drives the shaft 19 from the clutch member 43 through a sleeve 47 which is secured to the end of the shaft by means of a set screw 48 and the clutch member 44 is constrained to turn with the sleeve 47 by means of a pin 49 engaging an axial slot 50. A compression spring 51 tends to maintain the clutch teeth in engagement.

The gear 42 meshes with an idler pinion 52 (Fig. 2) rotatably carried by a stub shaft 53, the latter being mounted upon an auxiliary frame member 54. The frame member 54 is carried by and spaced from the frame member 17 by means of three studs or equivalent fastening means 55. The idler pinion 52 is driven by a pinion 56 secured on a shaft 57 journaled on the auxiliary frame member 54. A worm wheel 58 is secured to the shaft 57 and is in meshing engagement with a driving worm 59 carried by a shaft 60 which is journaled in a bearing 61 on a horizontal extension 62 of the auxiliary frame member 54. The shaft 60 extends forwardly toward the stylus carrying unit 11 beyond the worm 59 and is provided with an overrunning clutch 63 of the "free-wheeling" type. The driving member 64 of the clutch 63 is hollow and is slotted as indicated at 65 to accommodate a driving pin 66 secured adjacent the end of a shaft 67 extending from the stylus carrying unit 11 later to be described. It will be noted that the slots 65 and the pin 66 together form a quick detachable clutch member which is conveniently engaged when the unitary structure 11 is placed in operative position upon the base 10.

An auxiliary high speed motor 68 secured to the base 10 is connected to the shaft 60 by means of any suitable flexible coupling such as that illustrated at 69. The motor 68 is connected to any suitable power source by conductors 70 (Fig. 1). A switch 71 which may be manually operated is provided so that the paper web 33 may be advanced at a high speed independently of the synchronous driving mechanism of the unit 11, the clutch 63 permitting this accelerated movement of the paper. It will be understood that the switch 71 may be an automatically operated means, such as that disclosed in the copending application of Parrett et al., Serial No. 161,358, filed August 28, 1937, controlled by marks, indentations or apertures in the paper or by automatic means such as that disclosed in the copending application of Ridings et al., Serial No. 264,512 filed March 28, 1939. In this latter application is disclosed and claimed an arrangement for spacing the recording web from the styli, which is desirable when the web is moved rapidly and is necessary when the styli are moving and the web is stationary. This latter condition will exist when the recorder is arranged, by the inclusion of a clutch or otherwise, to stop feeding of the web while the motor 110 continues to operate at scanning speed, as will hereinafter appear.

The space between frame members 17 and 18 which lies beneath the lower wall of the paper-carrying guide 29 is enclosed to form a chamber 72 by means of a sloping top wall member 73 and front and rear wall members 74 and 76. These three wall members are secured in a suitable manner as shown at 77 and 78 to the frame members 17 and 18 and the rear wall member 76 is apertured to receive a connection member 80 for a hose or other conduit 82 which is in communication with the interior of the chamber 72 formed by the wall members 73, 74 and 76.

The portion of the wall member 74 adjacent to the platen section 41 of the paper holder 29 is bent outwardly as indicated at 84 so that its upper edge lies closely adjacent the line of travel of the several styli. This provides a narrow elongated opening through which dust or fumes liberated during recording may be drawn into the chamber 72 for ultimate disposal by way of the conduit 82 which is in communication with a suction blower and filter or other suitable device (not shown) to be found in the prior art.

The sub-base 16 of the unit 12 which, as previously stated, is slidably mounted upon the base 14, is adjustably positioned by means of a pair of shafts 86 and 87 threaded as indicated at 88 and 89 to engage blocks 91 secured to the sub-base 16 adjacent the members 17 and 18 respectively and each provided with a threaded recess for the purpose. The shafts 86 and 87 are each provided with a hand wheel 92 situated at a convenient point beyond the paper supply roll 34 and these hand wheels may be operated simultaneously to move the unit 12 bodily or they may be operated independently to correctly align the unit 12 with respect to the unit 11.

The mechanism 11 which is removable from the base 10 as a unit is secured thereto by conveniently accessible thumb screws 93 (Fig. 5) engaged in threaded apertures 95 therein. The base 10 of the apparatus is provided with a shoulder 97 (Fig. 3) which serves accurately to locate the sub-base 98 of the recording unit 11 with respect to the guiding and feeding unit 12 when it is clamped in operative position by means of the thumb nuts 93.

The aforementioned sub-base 98 of the unit 11 is integrally connected to an elongated tubular casing 99 by a web member 101. It will be understood that the tubular casing 99 may be a separate piece secured to the base 98 in any suitable manner. However the structure illustrated is simple to manufacture since the tubular casing, the connecting web and the sub-base may be constructed integrally by a casting operation, making the machine more rigid and eliminating any necessity of providing for delicate adjustments. A worm member or lead screw 102 is rotatably supported in the casing 99 upon anti-friction bearings 103 of any suitable and well known type which are retained in position by set screws 104 and both ends of the casing 99 are closed by caps 106 secured in position by suitable fastening means 107. One of the caps 106 is apertured to permit protrusion of the extended portion 108 of the lead screw 102 to its point of connection with a flexible coupling 109 which is interposed between the lead screw and a driving motor 110. This motor 110 is connected by conductors 111 to a power source indicated at 112 which is of the same frequency as the source feeding the driving motor of the transmitter. A switch 114 may be provided for stopping the motor when desired. It will be apparent to those skilled in the art that any suitable means may be utilized for producing synchronism between the moving parts of the apparatus by which the picture is transmitted with the moving parts of the recorder. The

lead screw in the illustration is provided with a single thread 115 of a pitch such that one of the stylus holders 116 and a stylus 117 secured thereto are advanced along the entire length of the platen 41 during the time in which the paper web 33 advances one hundredth of an inch.

Advancement of the paper web is accomplished through the gears already described including the worm 59 by means of a worm 118 integral with or secured to the shaft 102 which engages a worm wheel 119 secured on the shaft 67, the latter being journalled in removable housing 120 secured adjacent the end of the housing 99. It will be understood that the description previously given that as the lead screw 102 turns, rotation is imparted to the shaft 60 through the coupling composed of the parts 65 and 66 and the clutch 63.

The stylus holders 116 of which there are three in the specific embodiment selected for illustration are secured in any suitable manner to a belt 121 which passes over a pair of idler pulleys 122 journalled on studs 123 mounted in bosses 124 formed on the casing 99. A friction brake which exerts a constant drag on the idler pulley at the end of the scanning travel of the stylus is indicated by reference character 125. The latter is mounted on a resilient arm 126 which is secured to the end of the stud 123.

In the illustrative embodiment, the belt 121 is made up of several sections which are joined together by the stylus holders 116 serving as links as shown in Fig. 6 of the drawings. Adjacent ends of the belt 121 at the point of connection to a stylus holder 116 are provided with apertured members 127 secured to the belt by suitable fastening means 128. The upstanding central portions 129 of the stylus holders, which are roughly of T-shape as shown by Fig. 3 of the drawings, are apertured to receive pins 131 which engage in the apertures of the members 127. The arrangement just described in specific detail provides a connection between the sections of the belt 121 and the stylus holders 116 which is flexible and does not interfere with the passage of the stylus holders 116 over the idler pulleys 122 but yet prevents angular movements of the stylus holders with respect to the platen 41. It will be understood that while a preferred construction has just been described, nevertheless the jointed belt 121 may be an endless belt with the stylus holders 116 secured thereto in any suitable manner as by riveting, welding or soldering.

Each stylus holder 116 has a stylus holding arm 132 clamped thereto between insulating pieces 134 and 136 by means of screws or other suitable fastening means 137. A flexible arm 138 is secured adjacent its end to the end of the arm 132 by screw means 139, the latter providing for adjustment of the position of the arm 138. As previously stated the stylus carrying arm 132 associated with each stylus holding member 116 is insulated therefrom by means of insulating pieces 134 and 136 and signals are fed to the stylus 117, or received therefrom if the machine is modified to transmit, by means of a small collecting shoe 141 which is clamped against the arm 133 by means of the screws 137. Each collector shoe 141 in turn cooperates with an angle-shaped collector rail 142 (Figs. 2 and 3) which is secured to the outer wall 143 of an elongated slot 144 communicating with the interior of the chamber 99. The collector rail 142 is insulated from the wall 143 by strips of insulating material 145 and 146. The entire assembly comprising the collector rail 142 and the associated insulating strips are secured to the wall 143 by means of screws 147 which are encircled by insulating sleeves.

In the arrangement shown, incoming signals are fed by the conductor 148 to the rail 142 from the line L by way of a suitable amplifier A (Fig. 1). Connection from the amplifier to the platen 41 may be conveniently accomplished by grounding the lead 149 at a desired point on the metallic structure of the machine.

The stylus holders 116 are grooved as indicated at 151 and 152 so that they will be received and guided by the rod like rail members 153 and 154 located in the previously mentioned slot 144 (Figs. 3 and 5). Each stylus holder is provided with a driving member in the form of a stud 155 which enters the groove of the thread as the holder enters the slot 144.

The stylus holders are spaced on the belt so that the stylus points are separated a distance substantially equal to the length of the platen and the lead screw 111 is slightly longer than the platen so that one stylus engages the lead screw before another stylus, just completing a scanning operation, is disengaged from the lead screw. By keeping proper tension in the belt or by imposing friction on one of the pulley wheels, for example by the brake member 125 previously described, the effect of any slight shock occurring upon engagement of a stylus holder with the lead screw will be damped out. The flare at the entrance of the guiding slot 144 serves to allow a certain amount of leeway in the spacing of the stylus points on the belt.

It is necessary that the stylus points on each of the styli be very accurately mounted so that they will all follow in the same horizontal plane and will be maintained in a fixed position with respect to the platen 41. The accurate positioning of each stylus point is accomplished in a novel manner by apparatus forming part of the present invention and disclosed in Figs. 9 to 12 of the drawings. Referring to these figures and more particularly to Fig. 11, a jig or special fixture is disclosed comprising a base 156 which is provided with pins 157 adapted to locate the unit 11 after its removal from the base 10 for the purpose of performing the stylus locating operation. Holes 158 in the base 156 are spaced to accommodate the thumb screws 93 or their equivalent so that the unit 11 may be clamped in position on the base 156 in contact with the pins 157. The stylus supporting and shearing assembly 159 holds a stylus in position temporarily until it is secured to one of the resilient stylus carrying spring members 138. The clamping assembly referred to comprises an upright supporting pillar 160 secured to the base 156 by a screw 161. Two blocks 162 and 163 are adapted to be mounted on the pillar 160 which is formed at its upper end with V-shaped rails 164 which engage in grooves 166 in the underside of the block 162. The block 163 is provided with a V-shaped rail 167 which is adapted to fit in a V-shaped groove 165 formed on the upper surface of the block 162 and is recessed to provide a groove in which a cutting tool 169 is slidably retained by means of a plate 171 which is secured in position by fastening means 172. Dowel pins 173 are provided so that the plate 171 is positioned accurately to clamp the end 174 of the stylus 117 against an arcuate groove 176 formed in a lip 177 extending upwardly from the block 162. The recess in the block 162 rearwardly of the

lip 177 accommodates the plunger 169 when it is pressed or driven downwardly to clip off the end 174 of the stylus.

The blocks 162 and 163 are securely held during a cutting and soldering operation in the correct position with respect to the unit 11 by a pair of tapered pins 178 passing through the body of the block 162 and tapering apertures in plates 179 which are rigidly secured to the upper portion of the pillar 160.

The unit 11 is provided with a locating pin 181 (Fig. 1) which may be engaged in a recess 182 in the lead screw 102. A spring 183 presses the pin 181 into the recess when a member 184 enters the slot 185 upon rotation of the pin 181. In normal operation of the unit 11 the pin is maintained in its retracted position by engagement of the member 184 against the flattened surface formed on the exterior of the chamber 99.

When a set of styli are to be fitted to the unit 11 it is removed from the base 10 of the recording machine and is placed on the base 156 to which it is secured by the thumb nuts 93 or equivalent fastening means. The assembly 159, in position on the base 156, holds a stylus firmly clamped in the groove 176 upon tightening the screw 168. One form of stylus which can be successfully used in the machine of the present invention comprises a core preferably of hardened steel 174 and a brass collar, the core of which can be clamped, as stated, in the groove 176 by the bar 171. The lead screw 102 is turned by hand or otherwise until one of the spring arms 138 is in a position to receive the stylus. The lead screw 102 is retained accurately in this position by turning the pin 181 until the member 184 enters the slot 185 permitting engagement of the end of the pin in the recess 182.

The stylus is then secured to the spring arm 138 by soldering or welding, the arm being in a position which need only be approximately correct. It is to be noted that since the arm 138 need not be positioned accurately, no delicate adjusting means are required to bring the arm 138 to a single definite position. After the stylus has been secured to the arm a small portion of its tip is then clipped off by depressing the cutter bar 169 after which the clamping screw 168 is released and the pins 178 are withdrawn to allow the block 162 to be moved back. The following spring arm 138 carried by the belt 121 is then brought into approximately correct position before the block 160 by again turning the lead screw. In the embodiment shown the pitch of the lead screw is such that when it is rotated through ten turns, the belt is moved a distance equal to one third of its length, thus bringing the next spring arm into approximately the correct position. The soldering or welding and clipping operation is repeated following which the third stylus is installed on the remaining spring arm. In this way each stylus is accurately positioned in its holder and therefore all of the styli will traverse a single common line across the platen 41.

In operation of the apparatus to continuously record transmitted subject matter in facsimile, a roll 34 of suitable recording paper is secured between the paper holder spindles 36 and its end is fed into the machine by hand so that it lies in contact with the exposed surface of the member 29 and the driving belts 28, this operation being facilitated by turning the knob 45. The motor 110 is started by closing the switch 114 when the transmitter begins to scan transmitted subject matter and signals received over the line L will be recorded on the paper roll in successive lines by the styli 117, each stylus tracing a single line and the next stylus tracing a line immediately beneath the previously recorded line. Apparatus similar to that disclosed in the above mentioned copending Ridings et al. application, Serial No. 264,512 filed Mar. 28, 1939, may be employed to close the switch 114 to phase the machine with the transmitter. At the conclusion of reception of a given piece of subject matter the hand wheel 45 may be turned or the switch 71 closed to start the motor 66 until enough of the blank paper has been ejected so that it may be torn, using the edge of the member 31 as a guide.

Successive pieces of subject matter may be recorded automatically in spaced relationship upon the web 33 by using an arrangement similar to that disclosed in the application of Parrott et al., Serial No. 161,356, filed August 28, 1937. The leads 70 of the motor 66 will then be connected to a circuit controller operated by spaced means on or in the paper web 33 to advance the paper at a rapid rate between recordings to avoid delay and save line time.

The apparatus of this invention may be operated with one or two styli by mounting the styli frictionally upon the belt 121 and operating the belt at a higher speed than the rate of travel of each stylus when it is driven by the lead screw. In this way the stylus which is traversing the platen will move at a relatively slow speed throughout the length of the platen, while the stylus which has completed a recording line is moving at a considerably higher speed through a distance which is approximately equal to twice the width of the platen 41. In this form of the apparatus, an electrically or mechanically operated latch is preferably provided, along with means to effect its release, to permit the stylus holder, which has been brought into starting position, to be received in the slot 144 at the instant transmission of a new scanning line is begun.

While the invention has been described and explained in detail in connection with an illustrative embodiment thereof, it is to be understood that the invention may be embodied in other forms and, therefore, the invention is not limited except as indicated by the terms and scope of the appended claims.

What is claimed is:

1. In a facsimile recorder, a plurality of recording styli, a conveyor carrying said styli in spaced relationship, and screw-threaded means positioned to engage each of said styli in turn to move the same at a desired scanning speed.

2. In a facsimile recorder, a plurality of recording styli, a conveyor comprising an endless belt for carrying said styli in spaced relationship, and screw threaded means positioned to engage each of said styli in turn to move the same at a desired scanning speed.

3. In a facsimile recorder, a plurality of recording styli, paper holding and feeding means, means to receive and guide said styli in succession along said paper holding means, a conveyor carrying said styli in spaced relationship, and means positioned adjacent to said stylus guide means to move each of said styli in succession through said guide means at a desired scanning speed.

4. In a facsimile recorder, paper guiding and feeding means a plurality of stylus holders each

carrying a stylus, a conveyor comprising an endless belt for carrying said styli in spaced relationship, guide means adjacent said paper feed means for receiving each of said stylus holders in turn, and screw-threaded means positioned to engage and drive a stylus holder entering said guide means.

5. A facsimile recorder comprising paper supporting and feeding means, a plurality of recording styli, only one of said styli being active at a given time for recording purposes, guide means for receiving and guiding said styli in succession across said paper supporting and feeding means, means for conveying an idle stylus from the exit end of said guiding means to the adit end, and means positioned adjacent said stylus guide means to impart scanning movement to said styli from the adit end to the exit end of said guideway.

6. A facsimile recorder comprising paper feeding means, a plurality of recording styli, only one of said styli being active at a given time for recording purposes, guiding means for receiving and guiding said styli in succession across said paper, means comprising an endless belt for conveying in idle stylus from the exit end of said guide means to the adit end and means positioned to engage a stylus traveling in said guide means to impart movement thereto and to said conveying means.

7. In a facsimile recorder, a paper positioning platen, feed means for moving the paper over said platen, a recording stylus, means to guide said stylus on a scanning line across said platen in one path of movement, a conveyor for returning said stylus from the end of the scanning line to its initial point along a separate path, and means separate from said conveyor to impart movement to said stylus along said scanning line.

8. In a facsimile machine, a scanner comprising a conveyor, a plurality of stylus holders spaced at substantially equal intervals along said conveyor and secured thereto, a stylus on each of said holders, screw threaded means positioned to move each of said stylus holders in turn at a desired scanning speed, a pair of guide rails disposed adjacent said screw threaded means to guide said styli in succession along a predetermined scanning path, and a pair of oppositely disposed grooves formed in each of said stylus holders for cooperating with said pair of guide rails upon engagement of the stylus holder with the guide rails to hold the stylus holder in alignment with the rails, whereby the styli are guided in succession along the scanning path.

9. A device for locating a stylus on the stylus carrying member of a recording unit, comprising a base designed to receive said unit temporarily, means on said base to hold a stylus accurately in position with respect to a recording surface with which said unit is to be used in a recording machine and in position to permit accurate connection of said stylus to said stylus holder.

10. A device for locating a stylus on the stylus carrying member of a recording unit comprising a base designed to receive said unit temporarily, means on said base to hold a stylus accurately in position with respect to a recording surface with which said unit is to be used in a recording machine and in position to permit accurate connection of said stylus to said stylus holder and means associated with said first named means to trim said stylus to a desired recording length.

11. A device for locating a stylus on the stylus carrying member of a recording unit, comprising a base designed to receive said unit temporarily, a clamping device on said base to hold the stylus accurately in position with respect to a recording surface with which said unit is to be used, and in position to permit accurate connection of said stylus to said stylus holder and cutter associated with said clamping device to trim said stylus to a desired recording length.

12. In a facsimile recorder, a paper support, a paper feeding means for continuously advancing said paper over the support, an endless conveyor, a plurality of styli carried by said conveyor in equi-spaced relation, means for guiding said styli in succession across said paper support, driving means for engaging each of said styli in turn to move the same across said paper support, and means for correlating said paper feed and stylus driving means.

13. In a facsimile scanning device, a platen, means for advancing a sheet thereover, an endless conveyor, a plurality of scanning elements secured to said conveyor, means independent of said conveyor for engaging said scanning elements in succession to move the same in a scanning line across said platen and means including said conveyor for returning said scanning elements to the beginning of a new scanning line.

14. In a facsimile scanning device, a platen, means for advancing a sheet thereover, a plurality of scanning elements, a worm, means carried by each of said scanning elements for engaging said worm to cause the scanning elements to be moved in a scanning line across said platen, and means for returning certain of said scanning elements to one end of said platen in position to start a subsequent scanning movement while others of said scanning elements are being moved across said platen in said scanning line.

15. In a facsimile recorder, a paper platen, a paper feeding means for advancing the paper over said platen, a pair of guide rails spaced apart to provide a slot opposite said platen, a stylus carrying member formed to engage said rails, means to convey said stylus member to a point of cooperative engagement with said guide rails, and means operating independently of said conveying means to move said stylus member along a path defined by said rails.

16. In a facsimile recorder, a paper platen, a paper feeding means for advancing the paper over said platen, a conveyor carrying a plurality of styli spaced equi-distantly from each other, a housing positioned adjacent said platen providing a support for slidably receving each of said recording styli in turn, a worm in said housing, means to drive said worm, means to drive said paper feed means correlated with said worm driving means and a member positioned on each stylus to project into said housing for engagement with said worm when slidably supported by said housing.

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