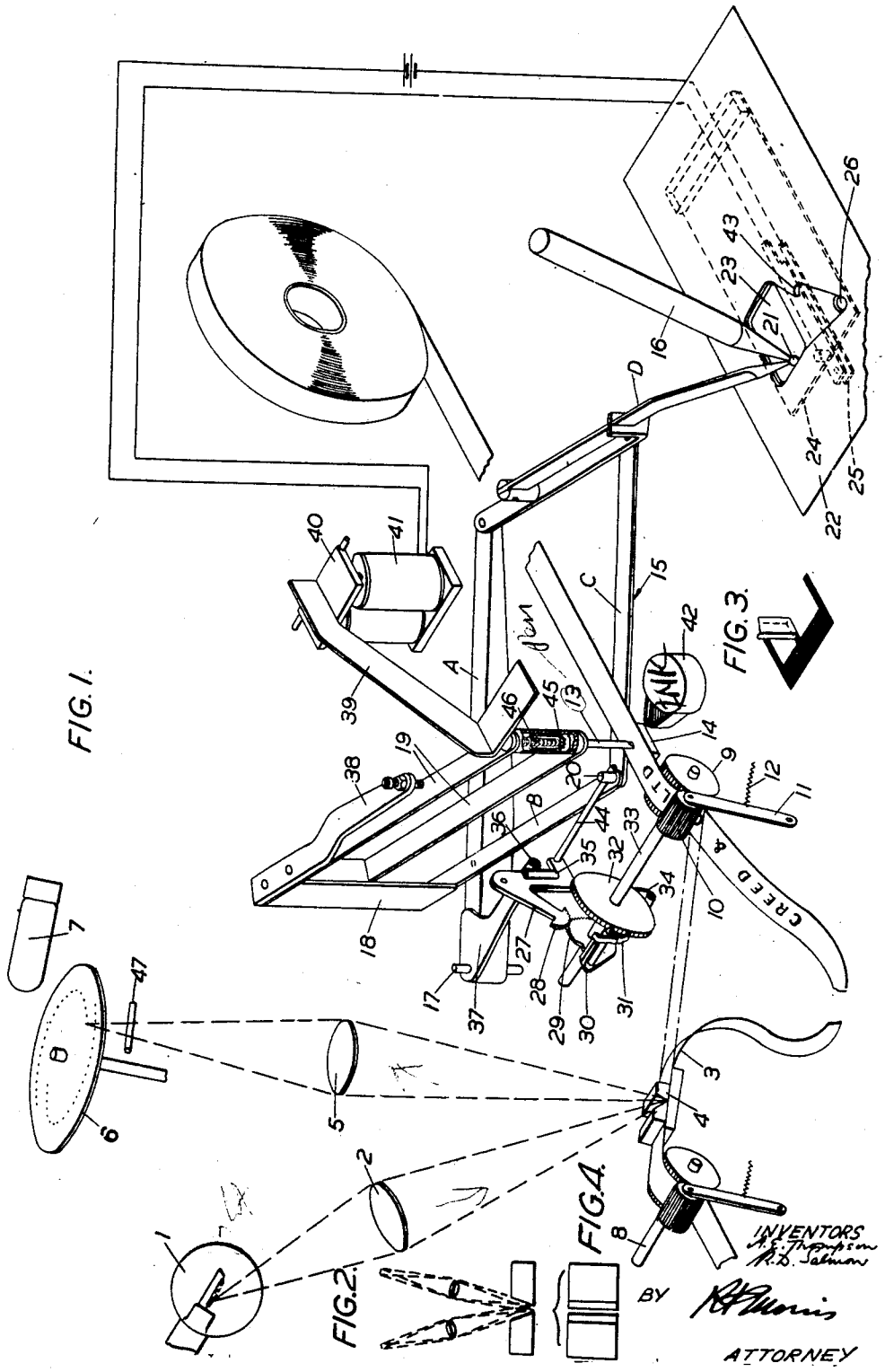
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Sept. 10, 1946. A. E. THOMPSON ET AL 2,407,304

DEVICE FOR PREPARING MESSAGES FOR FACSIMILE TRANSMISSION

Filed May 18, 1942



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Patented Sept. 10, 1946

2,407,304

UNITED STATES PATENT OFFICE

2,407,304

DEVICE FOR PREPARING MESSAGES FOR FACSIMILE TRANSMISSION

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Application May 18, 1942, Serial No. 443,440
In Great Britain January 14, 1941

4 Claims. (Cl. 33—25)

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This invention relates to the preparation of messages for facsimile telegraph transmission.

Tape facsimile telegraph systems lend themselves to compact, lightweight design, ideally suitable for mobile services. Tape may be prepared manually or by means of a typewriter. Manually prepared tape provides the simplest, lightest and most compact arrangement, but hitherto it has suffered from two serious disadvantages, viz. that to transmit handwriting satisfactorily it is necessary to employ a finely divided scanning system, and that delay is introduced between the moment of writing and the moment of transmission of the message.

It is the purpose of this invention to provide means manually-operable for the preparation of subject matter for transmission in a tape facsimile system; such means being convenient in use, reducing the time between preparation and the transmission of a message to a minimum, and imparting to the subject matter characteristics that will facilitate the scanning and transmission operations.

The invention consists in a device for writing facsimile telegraph messages, comprising a pantograph, a manually-held stylus mounted at one tracing point of the pantograph, and a recording pen mounted at the other tracing point. A pantograph is a structure of four rods pivoted together in the form of a parallelogram; two adjacent rods have extensions in the direction away from their common pivot, these extensions providing, one a fixed pivot and the other a tracing point; a second tracing point is provided at the junction between the other two rods. With such a structure the two tracing points always trace out similar figures.

It will be readily understood that, if the characters on a facsimile telegraph message sheet are formed of relatively thin lines, it is necessary to employ a scanning mesh of correspondingly fine dimensions. There is a fixed relationship between the number of lines per inch in the scanning mesh and the speed of transmission in words per minute, for given size characters and for a given frequency band width in the channel of communication. It is, therefore, necessary to employ a scanning mesh as coarse as possible, in order to obtain the maximum speed in words per minute. Hence it is advantageous to arrange the thickness of the lines forming the characters to be as great as possible consistent with legibility, i. e., the thickness of the line should be equivalent to a large fraction of the normal height of the characters. It has been found that

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an advantageous relationship is provided if this ratio is 1:5. If these proportions are maintained, the actual size of the characters is limited in one direction by the signal-to-noise ratio of the photo-electric amplifier used in the scanning system, and, in the other direction, only by the dimensions of the paper required to carry the message.

Experience has shown that it is difficult in normal handwriting to maintain the optimum relation between the size of the characters and the thickness of the line, and this invention provides means whereby the characters of the size required may be written rapidly and conveniently, whilst still maintaining the desired thickness of the line.

It has further been found that, where those lines of a character to be transmitted that lie parallel to the scanning lines are of the same width as those perpendicular to the scanning lines, these being, in the case of a tape, the vertical and the horizontal lines respectively, it is more difficult to ensure that the parallel (vertical) lines are correctly reproduced. These (vertical) lines are therefore made thicker than the other (horizontal) lines. With such an arrangement, satisfactory scanning may be obtained by arranging two scanning lines to correspond with the width of a vertical stroke and the smallest element to be scanned in the vertical stroke to correspond with approximately two-thirds the width of a horizontal line.

Means may be provided whereby a single movement of the manually-operated member causes the recording pen to be inked, and the paper to be fed in an intermittent manner past the recording position.

The amount of intermittent motion of the paper may be variable in accordance with the width of the character recorded.

The drawing shows one embodiment of the invention.

Figure 1 is a perspective view of the essential elements of the invention.

Figure 2 is a side view of the scanning mask and optical elements.

Figure 3 is a detail view of the tip of the pen.

Figure 4 is a plan view of the scanning mask.

Referring to Fig. 1, an image of the straight filament of the lamp 1 is projected by the lens 2 on to the surface of the tape 3, exposed through the mask 4. An image of the brightly illuminated surface of the tape 3 appearing in the opening of the mask 4 is projected by lens 5 on to the surface of the rotating disc 6. The disc 6 is pro-

vided with a series of holes arranged in spiral form so that successive holes pass across successive elemental portions of the image of the slit, and a photo-electric cell 7 is mounted on the other side of the disc so that light passing through the holes of the disc may fall into the cell. Closely associated with the photo-electric cell 7 is a thermionic amplifier, (not shown) suitable for controlling a radio transmitter valve.

The mask 4 is shown in plan and section in Fig. 2, the sides of the mask being arranged at angles such that light falling on them is not reflected into the lens 5. They are finished with a dull black non-reflecting surface and provided with knife edges adjacent to the paper, so that the portion of the paper exposed in the slit between the two knife edges will be sharply defined. The mask is supported a few thousandths of an inch above the surface of the paper, so that the knife edges will not tend to pick up paper dust.

A pin 47 is mounted in the path of the beam of light between lens 5 and disc 6, at such a distance from the disc that the out-of-focus shadow thrown by the pin just cancels out any variation in intensity of the image due to lack of uniformity in the field strength of lenses 2 and 5 or in the brightness of the filament 1. It should be noted that the use of a single lens between the paper tape and the disc 6 in place of two lens of correspondingly greater (*f*) number greatly reduces the variation in light intensity.

The scanning disc 6 is driven through suitable gearing from a source of power (not shown), which also drives the paper feeding roller 8.

The roller 8 pulls the paper tape 3 at a uniform rate past the mask 4. The tape also passes between a feeding roller 9 and the pressure roller 10, the pressure roller 10 being mounted on a lever 11 acted upon by a spring 12, arranged so that, in the event of the paper tape becoming taut, as shown by the dotted lines between the feed roller 8 and the feed roller 9, the pressure roller 10 will be slightly lifted to relieve the pressure between the roller 10 and the roller 9, so permitting the paper tape to be pulled continuously by the roller 8, even though the roller 9 may be stationary.

The message is inscribed on the tape by means of the pen 13, the tape being supported on a platform 14. The pen 13 is carried on a pantograph movement 15, manually controlled by a stylus 16.

The pantograph is mounted on pivot 17, fixed to the base of the machine. A, B, C and D are the four arms of the pantograph. These are all arranged on a level below that of the platform 14. The arm B is provided with an extension 18 carrying spring blades 19, which support the pen 13 so that the pen 13 is free to move in a vertical direction. A vertical line passing through the centre of the pen 13 also passes through the axis of the pivot 20, joining the pantograph members B and C. The arm D is connected by means of a universal joint 21 to the stylus 16. A writing platform 22 is provided, with an aperture 23, exposing a spring blade 24, mounted on the underside of the writing platform 22 and adapted to operate a pair of contacts 25. The writing platform 22 is provided with another aperture 26, which also exposes the spring plate 24.

The pivot 20, joining the pantograph members B and C, is also adapted to co-operate with a pin 44 carried by one arm of a bell-crank lever 27, the second arm of which is cut with gear teeth 28 meshing with gear teeth 29 on a lever 30, carrying the feeding pawl 31, adapted to co-operate

with the feeding ratchet wheel 32 fixed to the spindle 33 that carries the feeding roller 9. A retaining pawl 34 also co-operates with the ratchet wheel 32. Bell-crank 27 is also provided with a roller 35, which co-operates with roller 36 carried by the extension 37, fixed to the member A of the pantograph system.

The spring members 19 carrying the pen 13 are normally pressed in an upward direction against the adjustable stop 38. The pen is mounted in the tube 45 and pressed in a downward direction by the spring 46, to regulate the pressure on the paper when the pen is depressed. The pen is pushed down on to the paper by means of the extension 39 of the armature 40 of the electro-magnet 41. The electro-magnet 41 is controlled by the contacts 25 from a suitable source of power.

In order that the pen shall produce vertical strokes that are thicker than the horizontal strokes, the pen is made in cross section, as shown in Fig. 3.

An inkwell 42 is provided for supplying ink to the pen.

The operation of the device is as follows. The stylus 16 is used as a pencil, being manually pressed upon the spring blade 24 and moved in a manner corresponding to the form of the character required, thus causing the pen 13 to move in a like manner. The lengths of the arms A, B, C and D are arranged so that the movement of the pen is less than the movement of the stylus. Slight pressure on the spring blade 24 closes contacts 25, thereby energizing electromagnet 41, which thus presses the pen 13 on to the surface of the paper. Before each character is written, the stylus is inserted into the hole 26. This moves the pen to bring it above the inkwell 42. The slight movement imparted to the spring blade 24 by the pressure of the stylus in the hole 26 closes contacts 25 and energizes the electromagnet 41, so pushing the pen 13 into the inkwell 42.

The hole 26 is so placed with respect to the aperture 23 that, while the stylus 16 is moving from the aperture 23 to the hole 26, movement is imparted to the roller 36 to bring it into engagement with the roller 35, thereby causing the lever 27 to rotate in a clockwise direction, and the lever 30 to rotate in an anti-clockwise direction, thus imparting to the roller 9 a forward feeding motion.

As the stylus 16 moves from the hole 26 to the aperture 23, the pin 20 engages with pin 44 to rotate the lever 27 in an anti-clockwise direction, thereby retracting the pawl 31 a distance corresponding to the distance required between adjacent characters. Further motion of the stylus 16 in the aperture 23 will impart additional rotary motion in an anti-clockwise direction to the lever 27, corresponding to the width of the character inscribed, so that the total motion imparted to the ratchet wheel 32 will be proportional to the width of the character inscribed, plus the minimum distance required between adjacent characters.

The maximum amount of feeding motion will depend upon the maximum distance through which the feeding pawl is retracted whilst the pen is moved to the right in the aperture 23. The feeding action, however, does not commence until the stylus commences to move from the aperture 23 to the aperture 26; thus, to and fro movements within the aperture 23 do not produce any feeding movement. The minimum amount of feeding movement is determined by adjusting the po-

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sition at which the retraction of the feeding pawl commences; this will normally occur just before the stylus reaches the aperture **23**. The ratchet wheel **32** is made with a large number of teeth corresponding to one letter-feed.

For the purpose of feeding a letter space between words, the stylus **16** is moved from the hole **26** to the stop **43** on the writing platform **22** and back again to the hole **26**. As there is no hole in the plate corresponding to the position **43**, the spring blade **24** is not depressed and, consequently, the electro-magnet **41** is not operated.

Any suitable means may be employed to maintain at a constant level the ink presented in the inkwell **42** to the pen **13**.

Thus, among the advantages of this invention are that it provides:

1. Manually-operated means, for the preparation of subject matter for transmission in a tape facsimile system, that is convenient in use, that reduces the time between the preparation and the transmission of a message to a minmum, and that imparts to the subject matter characteristics that will facilitate the scanning and transmission operations.
2. Means whereby the characters of the size required may be written rapidly and conveniently, whilst still maintaining the desired thickness of line.
3. Means whereby the movements of the manually-operated device may be greater than the movements of the recording pen.
4. Means whereby the vertical lines may be made thicker than the horizontal lines.
5. Means whereby the tape, without being broken, may be fed with an intermittent motion past the writing position and, with a continuous motion past the transmitting position.
6. Means whereby the recording pen may be inked and the paper fed in an intermittent manner past the recording position by a single movement of the manually-operated member.
7. Means whereby the amount of intermittent motion of the paper may be varied in accordance with the width of the character recorded.
8. Means whereby the number of lens systems may be reduced and whereby the intensity of illumination of the image falling on the scanning disc may be made substantially uniform over its entire surface.

What is claimed is:

1. A device for writing facsimile telegraph messages comprising means for writing including a pantograph, a manually held stylus mounted at one tracing point of the pantograph and a pen mounted at the other tracing point for vertical movement relative to the pantograph; a universal joint connecting said stylus to the first mentioned tracing point and means actuated by the stylus when in its lowermost position for shifting the recording pen vertically into and out of engagement with the writing surface, said means including an electromagnet and its armature supported independently of said pantograph arms, said armature having an extension extending into position to engage said pen to control the vertical movements thereof.

2. A device for writing facsimile telegraph messages as set forth in claim 1, comprising a pen inking device including an ink supply located below the pen when said pen is moved laterally out of alignment with the writing surface and into alignment with the supply, in position for inking contact with the pen when the pen is vertically shifted by the stylus.

3. A device for writing facsimile telegraph messages on a tape comprising writing means including a pantograph, a manually held stylus mounted at one tracing point of the pantograph and a recording pen mounted at the other tracing point, a universal joint connecting the point of said stylus to the first-mentioned tracing point, and means actuated by movement of the pantograph for feeding the tape forward between the writing of consecutive characters including a tape feed roller, a pawl and ratchet mechanism having a driving connection with the feed roller, means for aactuating the pawl after the writing of each character, and means for varying the throw of the pawl in proportion to the width of said character.

4. A device for writing facsimile telegraph messages on a tape comprising writing means including a pantograph, a manually held stylus mounted at one tracing point of the pantograph and a recording pen mounted at the other tracing point, a universal joint connecting the point of said stylus to the first-mentioned tracing point, and means actuated by movement of the pantograph for feeding the tape forward between the writing of consecutive characters including a tape feed roller, a pawl and ratchet mechanism having a driving connection with the feed roller, means for actuating the pawl after the writing of each character, and means for varying the throw of the pawl in proportion to the width of said character, said throw-varying means including pawl retracting mechanism actuated by movement of the pantograph during pen strokes longitudinally of the tap in accordance with the extent of such strokes.

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