Oct. 7, 1952 T. I. RESS 2,613,266

MARGIN GUIDE FOR TELE-AUTOGRAPHIC APPARATUS

Filed April 27, 1950

Fig. 1.

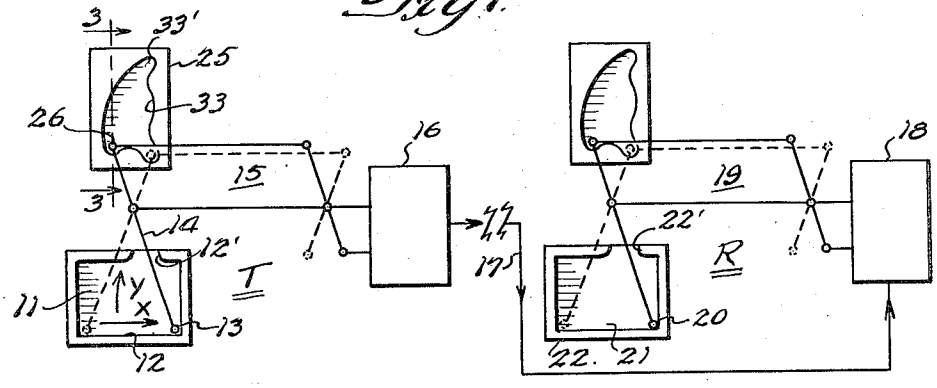


Fig. 2.

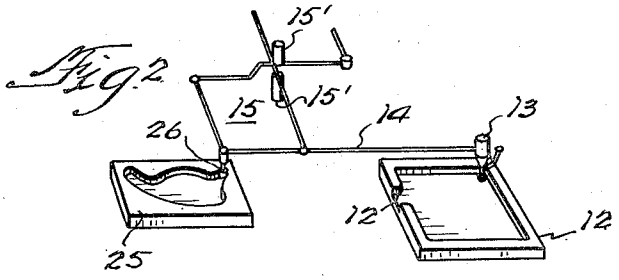


Fig. 3.

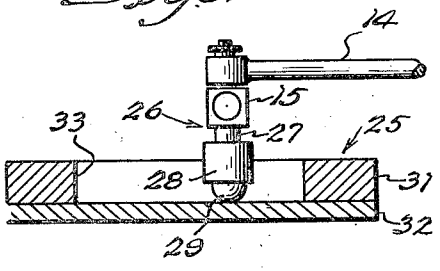
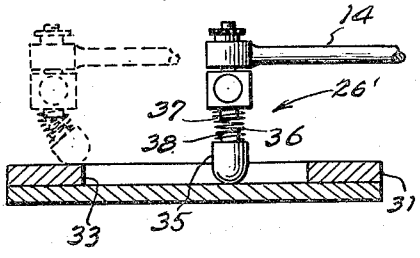


Fig. 4.



Inventor:
Thomas I. Ress.
By Theiss, Olson & Mecklenburger.
Attys.

Patented Oct. 7, 1952

2,613,266

UNITED STATES PATENT OFFICE

2,613,266

MARGIN GUIDE FOR TELE-AUTOGRAPHIC APPARATUS

Thomas I. Ress, Evanston, Ill., assignor to Consolidated Electric Company, Chicago, Ill., a corporation of Illinois

Application April 27, 1950, Serial No. 158,568

10 Claims. (Cl. 178—18)

1

This invention relates to a margin guide for tele-autographic apparatus, more particularly to a margin guide for preventing or restraining the movement of the stylus or writing head of tele-autographic apparatus beyond the boundaries of an associated writing surface and it is an object of the invention to provide improved apparatus of this character.

In tele-autographic apparatus such for example as that disclosed and claimed in the application of Robert Adler, Serial No. 81,709, filed March 16, 1949, now Patent No. 2,583,720, dated January 29, 1952, assigned to the same assignee as the present invention, and entitled Follow-Up Apparatus and Systems, a writing instrument of some form, which will be termed a stylus herein, is provided at each of two stations, one of which may be operated as a receiving station while the other one functions as a transmitting station. The stylus of the transmitting station can be manually manipulated over an associated writing surface, causing signals to be generated and transmitted to the receiving station, these signals in turn causing the stylus of the receiving station to trace on an associated writing surface a pattern corresponding to that traced by the transmitting stylus.

When the various switches or controls are moved between the off position and the on position or from one operating position to another, transient conditions within the control circuits frequently cause either or both of the two styluses to swing forcefully in random directions. These impulses may carry either or both of the styluses beyond the normal limits of the associated writing surfaces with the result that the styluses may be bent or otherwise damaged by forceful contact with margin frames extending around the boundaries of the corresponding writing surfaces.

It is another object of the invention to provide improved means for restraining the styluses of such a system from movement beyond a predetermined area and thereby to prevent damage to the stylus or other movable parts of the tele-autographic apparatus which might result from excessive movements thereof.

More specifically, the apparatus forming the present invention is intended primarily for use with a tele-autograph stylus mounted on a linkage system which transmits physical signals corresponding to the movements of the connected stylus to associated electrical apparatus when the device is operating as a transmitter, and which transmits mechanical movements to the stylus when the apparatus operates as a receiver.

2

In accordance with one embodiment of the invention, a cam is provided having a continuous interior cam surface. A projection extending from some part of the linkage system is adapted to engage this cam surface whereby the projection is confined to the area defined by the cam surface. The cam surface is made to define the path followed by the projection when the stylus is moved around the periphery of the associated writing surface, and, accordingly, the stylus is confined to the area of that writing surface.

It is another object of the invention to provide an improved margin guide of the character described for tele-autographic apparatus which is simple, reliable, and economical to manufacture.

This invention, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

In the drawing, in which like parts are designated by like reference numerals:

Figure 1 is a schematic plan view of tele-autographic apparatus, partially in block diagram, illustrating one embodiment of the invention;

Fig. 2 is a perspective view showing one portion of the apparatus appearing in Fig. 1;

Fig. 3 is a cross-sectional elevational view on a larger scale taken along the line 3—3 of Fig. 1; and

Fig. 4 is a cross-sectional elevational view similar to Fig. 3, but showing a different embodiment of the invention.

The tele-autographic apparatus shown in Fig. 1 includes a transmitting station T and a receiving station R. The transmitting station includes a writing surface 11 bounded by a frame 12 over the major portion of its periphery. A writing head or stylus 13 is arranged to be moved manually over the entire area surrounded by the frame 12 and to inscribe a message or other form of intelligence on the writing surface 11.

The stylus is mounted on an arm 14 which forms a part of a parallel linkage generally designated 15. The linkage 15 is pivoted at each joint and is supported by fixedly positioned pins 15' as best seen in Fig. 2. The purpose of the linkage is to transmit physical signals corresponding to the motions of the stylus 13 to electrical apparatus generally designated 16 for conversion into corresponding electric signals.

The linkage system 15 is similar to that disclosed and claimed in the application of Robert Adler, Serial No. 35,236, filed April 2, 1949, now

Patent No. 2,583,535, dated January 29, 1952, assigned to the same assignee as the present invention and entitled Translating Apparatus and Follow-Up Systems and, accordingly, will not be described in detail herein.

These signals are passed over a transmission line 17 to receiving apparatus 18. The latter converts the electrical signals into mechanical movements which are transmitted over a linkage system generally designated 19 to a receiver stylus 20 and cause the receiver stylus to move across a writing surface 21, the path traced by the stylus 20 corresponding to that traced by the transmitting stylus 13. The writing surface 21 is bounded over the major portion of its periphery by a frame 22 similar to the frame 12 associated with the transmitting writing surface. The details of the tele-autographic system will not be described herein since the apparatus may be in accordance with known systems and is preferably of the type disclosed and claimed in application Serial No. 81,709 referred to above.

The two stations T and R may be reversed in their function by operation of suitable control switches, not shown, whereby the station designated T may become the receiver and the station designated R may become the transmitter. During such a changeover, transient impulses may very likely be produced which cause either or both of the styluses to swing violently in random directions. Such movements may also occur when the apparatus is first turned on, especially if it happens that the two styluses 13 and 20 are not approximately aligned at the time.

These movements may, under certain conditions, be so violent as to throw either or both of the styluses against the corresponding frames 12 and 22 thereby damaging the lower tip of the stylus. If contact is not made between the stylus 13 and the frame 12 during such a random but violent movement of the stylus some other portion of the linkage 15 may be damaged.

In the preferred embodiment of the invention, movement of the stylus 13 beyond the edges of the writing surface 11 is prevented or restrained by a cam 25 cooperating with a cam follower 26 affixed to some portion of the linkage 15. Identical apparatus is employed in connection with the receiver stylus 20, but since its operation is identical to the apparatus associated with the transmitter stylus 13, the invention will be described below in connection with the latter.

The cam follower 26, best seen in Fig. 4, may be connected to the arm 14 at the end opposite the stylus 13, as best seen in Fig. 2. It will be apparent upon examination of the linkage system in Fig. 1, that movement of the stylus 13 along the indicated Y axis will cause the rearward end of the arm 14 and hence the cam follower to move along a roughly parallel but slightly curved line. It will also be apparent that as the stylus is moved along the indicated X axis the cam follower will move along a curved path in a generally opposite direction to the movement of the stylus. As the stylus is moved around the four edges of the writing surface 11, the cam follower traces a very roughly rectangular pattern which is, however, made up of curved lines and generally distorted because of the nature of the linkage 15.

The cam follower 26 preferably comprises a shaft 27, a roller 28 rotatably mounted on the shaft 27, and a sliding surface or ball bearing 29 located at the lower extremity thereof.

The cam 25 is a relatively thick plate 31 having a window or an opening therethrough. A continuous plate 32 is secured to the bottom of the plate 31 to provide a surface upon which the ball bearing 29 may ride. The walls 33 of the window or opening in the plate 31 form a cam surface with which the roller 28 cooperates. This cam surface 33 is a continuous, interior surface defining the path of the roller 28 which the latter traces as the stylus 13 is moved around the outer periphery of the writing surface 11.

It will be noted that the frames 12 and 22 have respective gates or openings 12' and 22' and that the corresponding cams have recesses 33' to permit the corresponding styluses to move a short distance through these gates. These gates are associated with another invention disclosed and claimed in the application of Thomas I. Ress, Serial No. 166,415, filed June 6, 1950, assigned to the same assignee as the present invention and entitled Paper Feed Control Apparatus.

If a transient impulse, such as those referred to above, tends to drive the stylus 13 beyond the limits of the writing surface 11, the roller 28 of the projection 26 engages the cam surface 33 and prevents movement of the stylus 13 beyond the edges of the writing surface. The shock is thereby absorbed by the roller as it strikes the cam surface rather than by the stylus 13 striking the frame 12. The possibility of damage to the stylus from this cause is thereby eliminated.

It is possible that transient impulses may be produced which are of such force that the striking of the rigid cam follower against the rigid cam surface may cause damage to the linkage 15. That is, the forces applied to the linkage system may be of sufficient magnitude that the rigid limitation of movement by the cam follower and the cam surface may result in bending or breakage of the linkage.

Another embodiment of the invention illustrated in Fig. 4 is intended to restrain with limited force the movement of the stylus beyond the boundaries of the writing surface, but to yield in the event of an excessive force before damage is sustained by the linkage system. The stylus 13 thereby may be forced beyond the boundaries of the writing surface 11 and into contact with the frame 12, damage then being sustained by the stylus 13 rather than by the relatively more costly linkage system.

In accordance with this embodiment, a cam follower 26' is provided comprising a snubber 35 and a spring 36 connecting the snubber to the arm 14. More specifically, a stub shaft 37 extends downwardly from the arm 14 and is threaded to receive the spring 36. Similarly, the snubber 35 has a projection 38 which is threaded to receive the other end of the spring.

When a transient impulse causes a violent swing of the stylus 13, the snubber 35 will engage the cam surface 33 immediately prior to engagement of the stylus with the frame 12. If the forces behind this movement are of a value which would not damage the linkage 15, the cam follower 26' will withstand the force and prevent the engagement of the stylus with the frame. However, if a larger force is applied, the spring will bend, as indicated by the dotted representation in Fig. 4, and the snubber 35 will ride up over the plate 31 permitting further movement of the stylus 13 and the linkage system 15 in response to the transient impulse. Such movement may bring the stylus into forceful engagement with the frame 12 thereby damaging the stylus but the

forces to which the linkage system is subjected are limited accordingly.

The spring **36** is preferably pre-tensioned in order that it may offer substantial initial resistance to bending. The stiffness of the spring should, of course, be of such predetermined value that it will resist movement of the stylus **13** into contact with the frame **12** in the event of minor transient impulses, but will yield to forces which might cause damage to the linkage system **15**.

While a particular embodiment of the invention has been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made, and it is, therefore, contemplated to cover by the appended claims any such modifications as fall within the true spirit and scope of the invention.

The invention having thus been described, what is claimed and desired to be secured by Letters Patent is:

1. In tele-autographic apparatus including a writing surface of restricted area and a writing head arranged to move to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to such head, said cam follower cooperating with said cam member whereby said cam member restricts the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface.

2. In tele-autographic apparatus including a planar writing surface of restricted area and a writing head mounted on a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to said linkage system at a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restricts the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface.

3. In a tele-autographic system including a planar writing surface of restricted area and a writing head mounted on an arm forming a part of a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to such arm at a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restricts the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface.

4. In a tele-autographic system including a writing surface of restricted area, a parallel linkage system and a writing head, said linkage system permitting said writing head to move over the restricted area of said writing surface to any point thereon; a cam member having a continuous interior cam surface; and a cam follower mechanically connected to said linkage system whereby the movements of said head and said cam follower bear a definite determinable relationship to each other, said cam follower cooperating with said cam member whereby said cam member restricts the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface.

5. In tele-autographic apparatus including a writing surface of restricted area and a writing head arranged to move to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to such head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower being resilient and movable thereby beyond said cam surface upon application of a force of predetermined value.

6. In tele-autographic apparatus including a writing surface of restricted area and a writing head arranged to move to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to such head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower being resilient whereby said cam follower may escape from the area encompassed by said cam surface upon application of a force of predetermined magnitude.

7. In tele-autographic apparatus including a planar writing surface of restricted area and a writing head mounted on a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to said linkage system to a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower being resilient whereby said cam follower may escape from the area encompassed by said cam surface upon application of a force of predetermined magnitude.

8. In a tele-autographic system including a planar writing surface of restricted area and a writing head mounted on an arm forming a part of a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface, and a cam follower connected to such arm at a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower being resilient whereby said cam follower may escape from the area encompassed by said cam surface upon application of a force of predetermined magnitude.

9. In tele-autographic apparatus including a planar writing surface of restricted area and a

writing head mounted on a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface; and a cam follower connected to said linkage system at a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower including a roller for contacting and rolling along said cam surface.

10. In tele-autographic apparatus including a planar writing surface of restricted area and a writing head mounted on a linkage system permitting movement of such head to any point within said restricted area; a cam member having a continuous interior cam surface, and a cam follower connected to said linkage system

at a point substantially removed from said head, said cam follower cooperating with said cam member whereby said cam member restrains the movement of said cam follower to the area encompassed by said cam surface, said cam surface defining the path followed by said cam follower as said head is moved along the edges of such writing surface, said cam follower including a cam-engaging portion and a coil spring connecting said portion to said linkage system.

THOMAS I. RESS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,715,781	Pein	June 4, 1929
1,910,702	Lebius	May 23, 1933
2,462,904	Rosen	Mar. 1, 1949