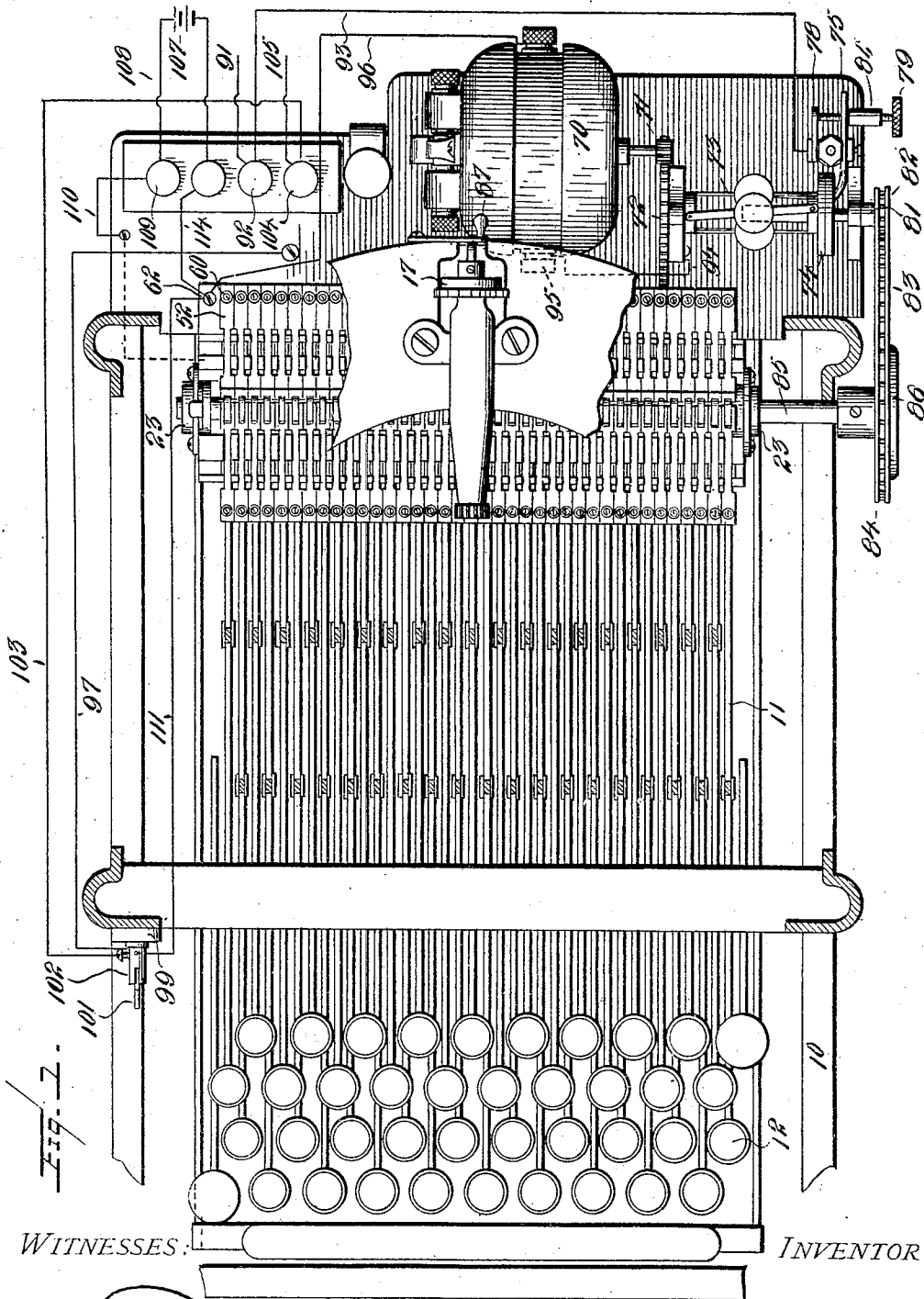


G. M. GODDARD.
TELEGRAPH TRANSMITTER.
APPLICATION FILED MAY 29, 1908.

939,683.

Patented Nov. 9, 1909.

3 SHEETS—SHEET 1.



WITNESSES:

INVENTOR

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Alfred T. Sage

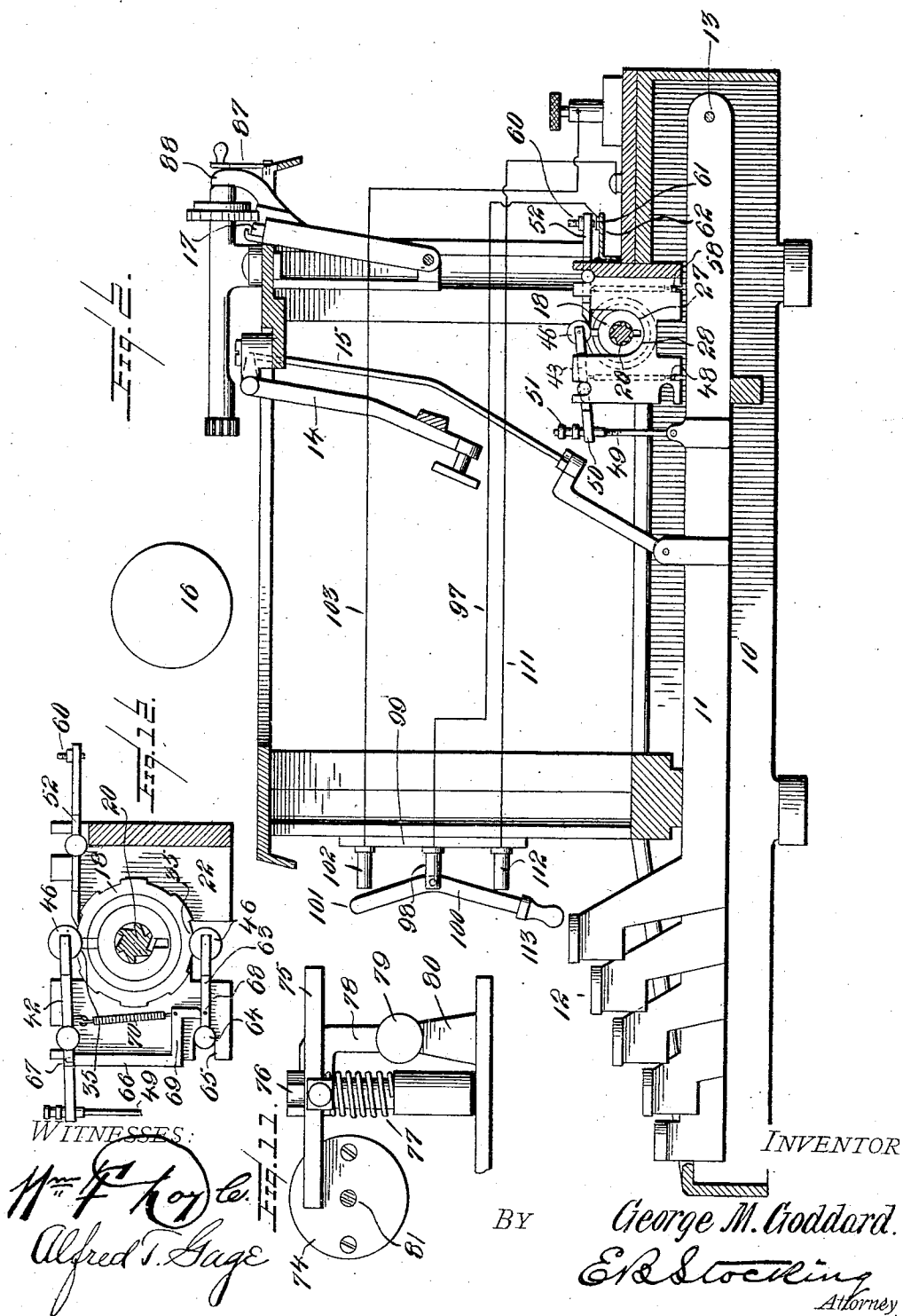
BY

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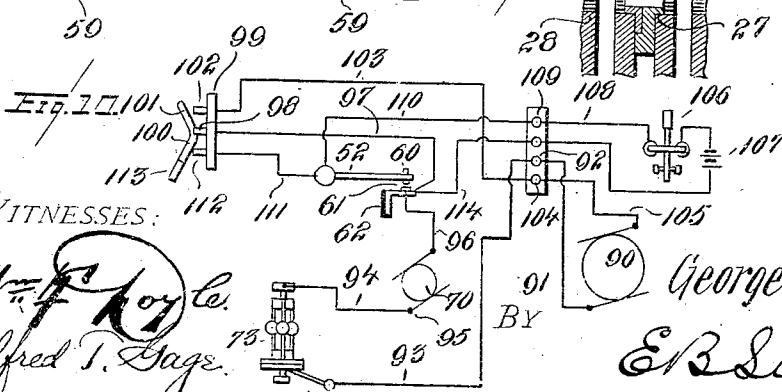
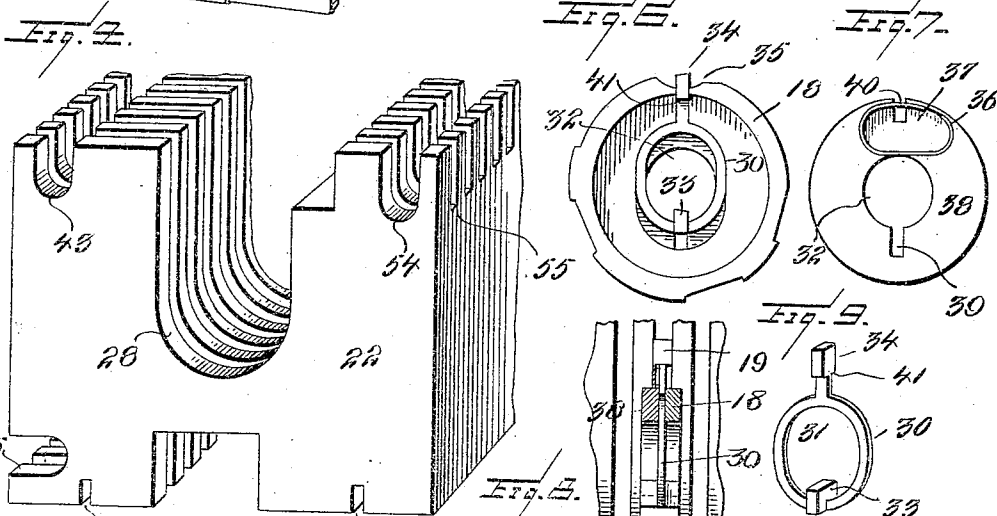
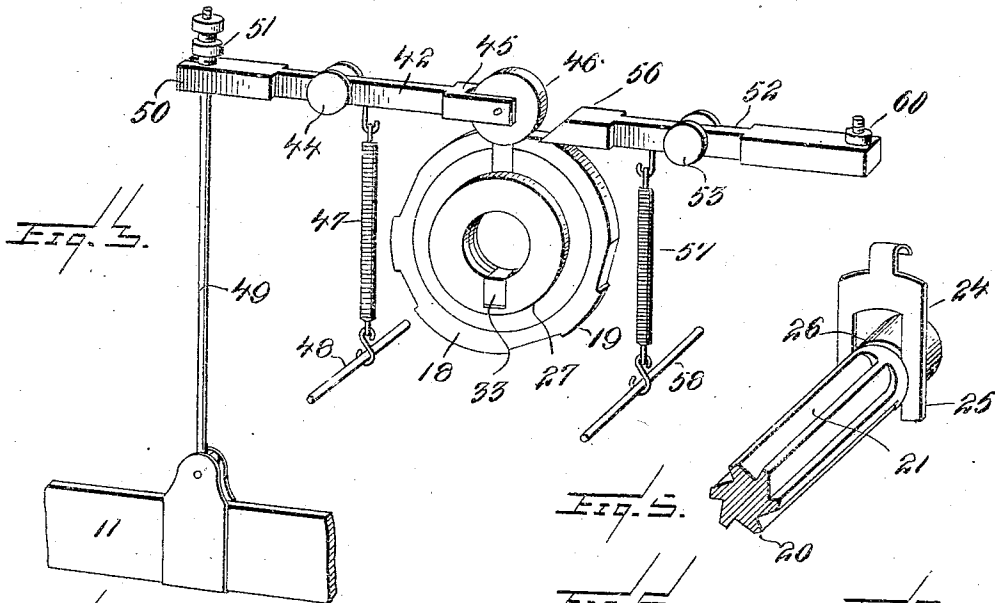
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3 SHEETS—SHEET 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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TELEGRAPH-TRANSMITTER.

939,683.

Specification of Letters Patent.

Patented Nov. 9, 1909.

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To all whom it may concern:

Be it known that I, GEORGE M. GODDARD, citizen of the United States, residing at Rutland, county of Rutland, and State of Vermont, have invented certain new and useful Improvements in Telegraph-Transmitters, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to a telegraph transmitter, and particularly to a structure embodying a key board bearing characters and controlling cams provided with equivalent characters of a telegraphic code.

15 The invention has for an object to provide a novel and improved construction of means for mounting and operating the cams carrying the telegraphic code characters whereby such cams may be actuated by the depression of an operating lever and motion transmitted from the cam to a telegraphic key lever adapted to produce a hit or hammer action whereby a clear, distinct and accurate transmission of the cam character is secured upon the telegraphic line.

20 A further object of the invention is to produce a novel and improved construction of clutch shaft adapted to contain a plurality of character cams each provided with a clutch normally held out of engagement with the shaft by a cam lever adapted when said lever is released to engage said shaft and rotate the cam for the purpose of actuating the telegraphic key lever.

35 Another object of the invention is to provide a switch connection by which the driving motor circuit may be opened and the motor made inoperative, and the telegraph circuit through the key lever may be closed when the operator desires to receive a message from the line previously used for transmission.

40 Other and further objects and advantages of the invention will be hereinafter fully set forth and the novel features thereof defined by the appended claims.

45 In the drawings:—Figure 1 is a horizontal section through a typewriter to which the present invention is attached with parts of said typewriter in elevation. Fig. 2 is a vertical section through these parts; Fig. 3

is an enlarged perspective of the code cam and its connections; Fig. 4 is a similar view of the bearing block for these parts; Fig. 5 is a sectional perspective of the clutch shaft 55 and the retaining key therefor; Fig. 6 is an elevation of one of the cams with the inclosing plate removed; Fig. 7 is a similar view of the inner face of this plate; Fig. 8 is a vertical section through the cam assembled; 60 Fig. 9 is a detail perspective of the shaft clutch carried by the cam; Fig. 10 is a diagram showing the electrical connections between the several parts; Fig. 11 is a detail section of the governor disk; Fig. 12 is a 65 vertical section illustrating a modified form of cam and connections adapted to carry a plurality of characters and travel for less than a complete rotation.

Like numerals refer to like parts in the 70 several views of the drawings.

The invention is here illustrated as an attachment for application to any character of typewriter having a depressible operating key, but is capable of use without the typewriter mechanism, this being merely a convenient accessory for securing copies of messages simultaneously with the transmission thereof.

75 In the present application of the invention, the numeral 10 indicates the base or frame of a typewriter which is provided with the usual operating keys or levers 11 having the finger plates 12 and pivotally mounted at 13 at the back of the machine. 80 These levers are provided with the usual alphabetical characters and numerals but may receive any other characters desired. In the typewriter connection, the type bar 14 is connected by the ligament 15 with the key lever 90 to be operated thereby and contacts with the platen 16 in the usual manner, this platen being fed by the dog mechanism 17 at the rear of the machine.

85 For the purpose of transmitting messages over the telegraphic line, a series of cams 18 are provided which contain upon their periphery the proper code characters 19 corresponding with the key lever at the front of the machine, and these cams are mounted 100 upon a clutch shaft 20 provided with a series of longitudinally extending grooves

21. This shaft extends through the bearing block 22 and is journaled at the opposite ends in the bearing plates 23 secured to said block. It is also held against longitudinal displacement by means of the key 24 slidably mounted in contact with one of the blocks and having bifurcated ends 25 adapted to enter a groove 26 in the shaft 20. The shaft when so mounted is freely rotatable within the cams carried thereon. These cams have bearing faces 27 resting upon the curved faces 28 in the bearing block, while the periphery of the cam extends between these faces. These cams 18 may be of any desired construction and provided with any preferred means for connection with the clutch shaft 20 when it is desired that they be driven thereby, but a convenient form thereof is herein shown, and embodies the clutch 30, Figs. 6 and 9, which comprises an annular portion 31 surrounding the central aperture 32 in the cam and having an inwardly projecting lug 33 to engage a seat in one of the grooves 21 of the cam shaft. The clutch is also provided with an outwardly extending shifting lug 34 which projects from the periphery of the cam and is preferably there disposed in a recess or depressed portion 35. This clutch is held in its engaged position, as shown in Fig. 6, by means of the tension spring 36 which is disposed in a recess 37 on the inner periphery of the inclosing plate 38 for the cam, this plate being slotted at 39 to receive the lug 33 and at 40 to receive the lug 34. This spring bears against the inner face 41 of the lug 34 normally holding the clutch in engagement with its driving shaft. In the operation of the machine, these cams are held at rest until the character to be used is actuated, and for this purpose a cam lever 42 is pivotally mounted in the bearing 43 of the block 22 and extends within the slots thereof so as to be held and guided in its operation. This pivot comprises the curved faces 44, and the end of this lever above the cam is bifurcated as at 45 and carries the contact roller 46 which is held under pressure against the cam and clutch by means of the spring 47 extending from the lever to a fixed part 48, as shown in Fig. 3, thus holding the lug 33 of the clutch out of engagement with the shaft 20 so that this shaft may freely turn within the cams. When it is desired to clutch the cam to the shaft, a depression of the lever 11 withdraws roller 46 by the connecting rod 49 extending to the end 50 of the lever 42. The connection between these parts may be adjusted to secure the desired tension by means of the nuts 51 threaded upon the end of the rod 49.

For transmitting the telegraphic character from the cam to the line wire, a telegraphic key lever 52 is provided and pivotally mounted by a bearing 53 adapted to rest

within the bearing slot 54 of the block 22, while this key lever is guided and retained by the slots 55 of the block. The inner end of this lever is provided with a contact face 56, preferably beveled to form an edge. This face is held in contact with the cam by means of the spring 57 extending from the lever to a fixed point 58, as shown in Fig. 3. The fixed points 48 and 58 for the controlling springs in the present instance comprise rods extending longitudinally of the bearing block 22 and disposed within the slots 59 at the base of said block by which they are held in position and yet may be removed and replaced as found desirable. The free end of the key lever is provided with the usual contact point 60 comprising an adjustable set screw by which the necessary motion for contact may be adjusted. This point is adapted to engage an opposite contact point 61 disposed beneath the lever upon the plate 62 extending transversely of the machine and insulated from the other parts.

In Fig. 12 of the drawing a modified form of the transmitting cam is shown adapted to carry the same character two or more times and to travel for less than a complete rotation. In this form of the invention the parts before described are used complete and in addition thereto a second cam lever 63 adapted to engage and operate the clutch to stop the rotation of the cam when engaging the same. The lever 63 is provided at one end with a bearing 64 mounted in the slot 65 of the bearing block 22. The levers 42 and 63 are connected by a hanger 66 having a pivotal connection at 67 with the lever 42 and a similar connection 68 with the lever 63. This hanger is provided with an angle portion 69 from which a spring 70 extends and is connected to the lever 42. By this means a proper movement of the rollers 46 toward and from the cam is secured in unison for the same degree of travel. The cams when used as shown in Fig. 12 are provided with a recess 35 opposite each of the rollers as before described.

The clutch shaft 20 for driving the cams may be actuated in any desired manner, for instance, by means of an electric motor, as shown at 70 in Fig. 1. The shaft of this motor is provided with a pinion 71 meshing with a gear 72 carried by the governor 73. This governor also carries at its opposite end a circuit plate 74 bearing in contact with a brush 75 mounted in a rotatable post 76 provided with a tension spring 77 by which the brush is normally forced toward the plate 74. This post is also provided with an arm 78 adapted to bear in contact with the adjusting screw 79 mounted in a standard 80. By this means the post may be adjusted with its brush toward and from the plate 74 for varying the pressure of the cur-

rent conducting brush thereon, and the consequent amount of current fed to the motor, as hereinafter described. The shaft 81 from the governor is provided with a sprocket wheel 82 from which a chain 83 extends to the sprocket 84 on the extended end 85 of the clutch shaft 20. The sprocket 84 is mounted on an insulated hub 86 to prevent the conduction of current through the chain thereof.

When it is desired to use the levers of the typewriter without actuating the carriage mechanism thereof the dog 17 controlling the carriage feed may be held out of action by means of the lever 87 or other device adapted to engage and hold the stop 88 to prevent oscillation of the dog 17 for the carriage feed of the typewriter.

The electrical connections for operating the several parts are diagrammatically illustrated in Fig. 10 where the current may be received from any desired source of power, such as an incandescent light circuit from generator 90 and conducted by the line 91 extending to the connecting post 92 from which a line 93 extends to the post of the brush 75, as before described, thence through the governor 73, and the line 94 extending from the bearing thereof to the connector 95 at one side of the motor 70. From the opposite side of the motor the line 96 extends to the plate 62 carrying the contacts 61 coöperating with the contact 60 carried by the key lever 52. From this plate a line 97 extends to the switch post 98 of the switch plate 99 which is disposed at the front of the machine or in a position accessible to the operator. This plate is provided with a lever 100, the end 101 of which is adapted to engage the contact 102 on the switch plate from which the line 103 extends to the connecting post 104, and thence by line 105 back to the source of power. With the switch 100 open, as shown in Fig. 2, the circuit through both the motor and the transmitter is broken thus rendering the motor inoperative and opening the telegraph circuit.

The transmitter circuit extends from the battery 107 through the telegraph instrument 106 and the line 108 to the connecting post 109 and thence by line 110 to the key lever 52, before described, while the plate carrying the contacts 61 is provided with a return line 114 forming the opposite side of the circuit to the battery 107. For the purpose of controlling the transmitting or key circuit the line 111 extends from the key lever to the contact 112 carried by switch plate 99 and adapted to be engaged by the end 113 of lever 100. When the end 113 of this lever is in contact the current passes through the switch lever and the contact 98 upon which it is mounted, and the line 97 to the plate 62 and thence by line 114 to the telegraph line. With the sides of the switch

100, 101 and 103 open, as shown in Figs. 2 and 10, both, the circuit through the motor and the transmitter circuit are broken thus rendering the motor inoperative and opening the telegraph circuit. With the switch blade 101 inserted in post 102, the circuit through the motor is closed and the telegraph circuit opened making the transmitter operative by the sending operator. With switch blade 100 in post 112 the circuit through the motor is broken and the telegraph circuit closed, making the telegraph circuit previously used for transmitting, ready for receiving messages.

In the operation of the invention, the switch is thrown to engage the contact 102 thus throwing the current through the motor and circuit before described so that the clutch shaft is continuously driven, while all of the cams thereon are at rest and held in that position by the cam levers connected with the key levers of the typewriter keyboard. Upon the depression of one of the keyboard levers the pressure of the roller upon the cam is relieved allowing the clutch carried by the cam to be thrown by its spring into engagement with the groove of the cam shaft thus rotating the cam for one complete revolution or until the pressure upon the keyboard lever is relieved when the roller again engages the cam and forces the clutch thereon out of contact with the shaft so that the cam is released therefrom and stands at rest. In the rotation of the cam the telegraphic code characters upon the periphery thereof engage the inner end of the key lever 52 causing the contact carried thereby to engage the coöperating contact upon the plate, thus effecting the make and break of the telegraphic circuit necessary to transmit the telegraphic signal through the line and sounder or receiving instrument in circuit therewith. The cam carrying the characters which require but a single signal such as an E may be provided with a number of characters upon their periphery and governed as shown in Fig. 12 to effect only a partial rotation at each time they are released, although the characters may be repeated by retaining the pressure upon the key board lever. This form of key lever directly operated by a cam wheel provides a positive make and break contact having the tapping or hammer effect desirable to secure the most accurate transmission and entirely avoiding the interposition of springs or wiping contacts with commutator devices which in use quickly become worn and inaccurate in their transmitting action. It is also desirable to control the rotation of the clutch shaft relative to the speed of the operator or receiver of the message and for that purpose the amount of current fed to the driving motor may be controlled by an adjustment of the brush at the governor as

described, or by any other well known means. The motor is here shown as one means of actuating the shaft, but any other desired or proper means may be used for that purpose.

Having described my invention and set forth its merits, what I claim and desire to secure by Letters Patent is:—

1. In a telegraph transmitter, a shaft provided with a longitudinally extending clutch groove therein, a cam mounted thereon and having a clutch member disposed within the cam to enter said groove, and a key lever coöperating with said cam and provided with an electrical contact.

2. In a telegraph transmitter, a shaft provided with a clutch recess therein, a cam mounted thereon and provided with a clutch member therein to enter said recess, a key coöperating with said cam and provided with an electrical contact, and means for normally holding said cam member in unclutched position relative to said shaft.

3. In a telegraph transmitter, a shaft provided with a clutch recess therein, a cam mounted thereon, a key lever coöperating with said cam and provided with an electrical contact, a clutch member carried by said cam to enter said recess, a cam lever adapted to normally retain said member in unclutched position, and an operating connection for said lever.

4. In a telegraph transmitter, a shaft provided with a clutch recess therein, a cam mounted thereon, a key lever coöperating with said cam and provided with an electrical contact, a clutch member carried by said cam to enter said recess, a cam lever adapted to normally retain said member in unclutched position, and a key board lever connected to said cam lever to release the same from said cam.

5. In a telegraph transmitter, a shaft provided with a clutch recess therein, a cam mounted thereon, a key lever coöperating with said cam and provided with an electrical contact, a clutch member carried by said cam to enter said recess, a cam lever adapted to retain said member in unclutched position, a key board lever connected to said cam lever to release the same from said cam, and a tension spring connection from both the cam lever and key lever to retain them normally in contact with the periphery of the cam.

6. In a telegraph transmitter, a clutch shaft, a series of cams mounted thereon, key levers coöperating with said cams each provided with an electrical contact, a clutch member carried by said cam, a cam lever adapted to retain said member in unclutched position, a key board lever connected to said cam lever to release the same from said cam, tension spring connections from the cam lever and key lever to retain them normally

in contact with the periphery of the cam, and a slotted block having curved bearings for the cams, cam lever and key lever.

7. In a telegraph transmitter, a shaft provided with longitudinally disposed clutch grooves thereon, a series of cams disposed upon said shaft and each provided with a clutch member disposed within said cam and movable transversely to said grooves, key levers mounted to engage the periphery of said cams and provided with an electrical contact, and means in alinement with the cam for normally retaining said clutch member out of contact with the coöperating shaft.

8. In a telegraph transmitter, a shaft provided with longitudinally disposed clutch grooves thereon, a series of cams disposed upon said shaft and each provided with a clutch member movable transversely in said grooves, key levers mounted to engage the periphery of said cams and provided with an electrical contact, and a spring carried by said cam to normally engage said clutch with said shaft.

9. In a telegraph transmitter, a shaft provided with longitudinally disposed clutch grooves thereon, a series of cams disposed upon said shaft and each provided with a clutch member movable transversely to said grooves and having an operating lug, key levers mounted to engage the periphery of said cams and provided with an electrical contact, a spring carried by said cam to normally engage said clutch with said shaft, and a cam lever provided with a roller traversing the periphery of said cam to engage the operating lug from said clutch member thereon.

10. In a telegraph transmitter, a shaft provided with longitudinally disposed clutch grooves thereon, a series of cams disposed upon said shaft and each provided with a clutch member movable transversely to said grooves, key levers mounted to engage the periphery of said cams and provided with an electrical contact, a spring carried by said cam to engage said clutch with said shaft, a cam lever provided with a roller traversing the periphery of the cam to engage an operating lug from said clutch member thereon, means for retaining said roller in contact with the periphery of said cam, and key operated means for relieving such contact.

11. In a telegraph transmitter, a grooved constantly rotating shaft, a cam mounted upon said shaft, an annular clutch member carried by the cam and surrounding said shaft, engaging and releasing lugs carried by said clutch member, the latter being projected at the periphery of said cam, and a face plate for said cam provided with a spring for normally projecting the releasing lug beyond the periphery thereof.

12. In a telegraph transmitter, a cam pro-

vided upon its periphery with transmitting characters and with an elongated interior recess, an annular clutch member disposed in said recess and provided with oppositely disposed lugs one of which is projected beyond the periphery of the cam, and means carried by said cam for normally projecting said lug.

13. In a telegraph transmitter, a slotted block provided with a central curved bearing face, curved bearing faces at the top thereof at opposite sides of the central bearing face, and a transmitting cam having a lateral flange resting upon said central face with its periphery disposed within the slots of said block.

14. In a telegraph transmitter, a slotted block provided with a central curved bearing face, a curved bearing face at the top thereof at opposite sides of the central bearing face, a transmitting cam having a lateral flange resting upon said central bearing face with its periphery disposed within the slots of said block, a key lever mounted in one of the top bearing faces, and a cam lever mounted in the opposite top bearing face.

15. In a telegraph transmitter, a slotted block provided with a central curved bearing face, a curved bearing face at the top thereof at opposite sides of the central bearing face, a transmitting cam having a lateral flange resting upon said central bearing face with its periphery disposed within the slots of said block, a key lever mounted in one of the top bearing faces, a cam lever mounted in the opposite top bearing face, springs extending downward from said key and cam levers, and fixed retaining rods for the lower ends of said springs disposed in the slots at the base of said block.

16. In a telegraph transmitter, a slotted block provided with a central curved bearing face, a curved bearing face at the top thereof at opposite sides of the central bearing face, a transmitting cam having a lateral flange within the slots of said block, a key lever mounted on one of the top bearing faces, a cam lever mounted on the opposite top bearing face, springs extending downward from said key and cam levers, shaft bearings disposed at the opposite ends of said block, and a driving shaft mounted in said bearings.

17. In a telegraph transmitter, a slotted block provided with a central curved bearing face, a curved bearing face at the top thereof at opposite sides of the central bearing face, a transmitting cam having a lateral flange within the slots of said block, a key lever mounted on one of the top bearing faces, a cam lever mounted on the opposite top bearing face, springs extending downward from said key and cam levers, shaft bearings disposed at the opposite ends of said block, a shaft mounted in said bear-

ings, and a key slidably mounted at one end of said shaft to engage a groove therein.

18. In a telegraph transmitter, a shaft having a clutch recess therein, a rotatable cam provided with transmitting characters and mounted on said shaft, a clutch carried by said cam and having a peripheral contact face, a lever engaging said face for normally holding said clutch out of contact with the shaft, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, and a cooperating contact for said key in said circuit.

19. In a telegraph transmitter, a rotatable cam provided with transmitting characters, a key board lever for controlling the movement of said cam, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, a cooperating contact beneath said key in said circuit, a motor for actuating said cam, and a speed governing device in circuit with the motor for regulating the current fed to said motor to govern the speed thereof.

20. In a telegraph transmitter, a shaft having a clutch recess therein, a rotatable cam provided with transmitting characters and mounted on said shaft, a clutch carried by said cam and having a peripheral contact face, a lever engaging said face for normally holding said clutch out of contact with the shaft, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, a cooperating contact beneath said key in said circuit, a motor for actuating said cam, and a controlling switch for cutting in and out said key.

21. In a telegraph transmitter, a shaft having a clutch recess therein, a rotatable cam provided with transmitting characters and mounted on said shaft, a clutch carried by said cam and having a peripheral contact face, a lever engaging said face for normally holding said clutch out of contact with the shaft, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, a cooperating contact beneath said key in said circuit, a motor for actuating said cam, and a controlling switch in circuit with said motor.

22. In a telegraph transmitter, a rotatable cam provided with transmitting characters, a key board lever for controlling the movement of said cam, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, a cooperating contact beneath said key in said circuit, a motor for actuating said cam, a typewriter feed mechanism operatively connected with said key board lever, and means engaging a member of said mechanism for retaining it in inoperative position.

23. In a telegraph transmitter, a rotatable cam provided with transmitting characters, a key board lever for controlling the

movement of said cam, a key actuated by said cam and provided with an electrical contact for a transmitting circuit, a cooperating contact beneath said key in said circuit, a motor for actuating said cam, a typewriter mechanism operatively connected with said key board lever, and a pivoted lever adapted to engage the feed dog of said typewriter mechanism to hold it against operation.

24. In a telegraph transmitter, a cam shaft, a series of cams mounted thereon, key levers contacting with said cams and provided with an electrical contact, a cooperating contact with a transmitting circuit, an electric motor for continuously driving said shaft, a governor mechanism geared to the shaft of said motor and provided with a conducting disk, electrical connections through said governor to said motor, and a brush in the power circuit contacting with said disk.

25. In a telegraph transmitter, a cam shaft, a series of cams mounted thereon, key levers contacting with said cams and provided with an electrical contact, a cooperating contact with a transmitting circuit, an electric motor for continuously driving said shaft, a governor mechanism geared to the shaft of said motor and provided with a conducting disk, electrical connections through said governor to said motor, a brush in the power circuit contacting with said disk, and means for adjusting the contact pressure of said brush with said disk.

26. In a telegraph transmitter, a cam shaft, a series of cams mounted thereon, key levers contacting with said cams and provided with an electrical contact, a cooperating contact with a transmitting circuit, an electric motor for continuously driving said shaft, a governor mechanism geared to the shaft of said motor and provided with a conducting disk, electrical connections through said governor to said motor, a brush in the power circuit contacting with said disk, a rotatable post for said brush, a spring for normally holding said brush in contact with said disk, an arm extended from said post, and an adjusting screw mounted to engage said arm for adjustment of the post and disk.

27. In a telegraph transmitter, a cam shaft, a series of cams thereon, means for controlling said cams, transmitting keys engaging the periphery of said cams and pro-

vided with electrical contacts, a cooperating contact in a transmitting circuit, an electric motor for controlling the rotation of said cam shaft, a switch block provided with posts in circuit with the motor and transmitting key, and a switch mounted to engage either of said posts.

28. In a telegraph transmitter, a clutch shaft, a cam mounted thereon having a clutch with an operating face at its periphery and provided with a plurality of transmitting characters, a key lever mounted for actuation by said characters and provided with a circuit contact, and oppositely disposed cam levers adapted to engage the clutch upon the periphery of said cam.

29. In a telegraph transmitter, a clutch shaft, a cam mounted thereon and provided with a plurality of transmitting characters, a key lever mounted for actuation by said characters and provided with a circuit contact, a clutch mechanism slidingly mounted within said cam to engage said shaft and having a peripheral contact face, and oppositely disposed cam levers adapted to engage said face and operate said clutch in the rotation of said cam.

30. In a telegraph transmitter, a cam shaft, a cam mounted thereon and provided with a plurality of transmitting characters, a key lever mounted for actuation by said characters and provided with a circuit contact, a clutch mechanism carried by said cam to engage said shaft, a plurality of cam levers adapted to engage and operate said clutch in the rotation of said cam, a hanger extending from one of said cam levers to the other, and a connecting spring extending from said hanger to one of said cam levers.

31. In a telegraph transmitter, a shaft having continuous longitudinally extending clutch grooves, a cam mounted thereon and provided with duplicated transmitting characters, a clutch cooperating with said grooves and adapted to prevent a complete rotation of the cam, transmitting means extending from said cam to an electrical contact, and keyboard means for effecting an operation of said clutch to release said cam from its driving shaft.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE M. GODDARD.

Witnesses:

W. A. GODDARD,
MAUD M. TARBLE.