(No Model.) 2 Sheets—Sheet 1.

F. F. HOWE.

TELEGRAPHIC TRANSMITTER.

No. 524,635. Patented Aug. 14, 1894.

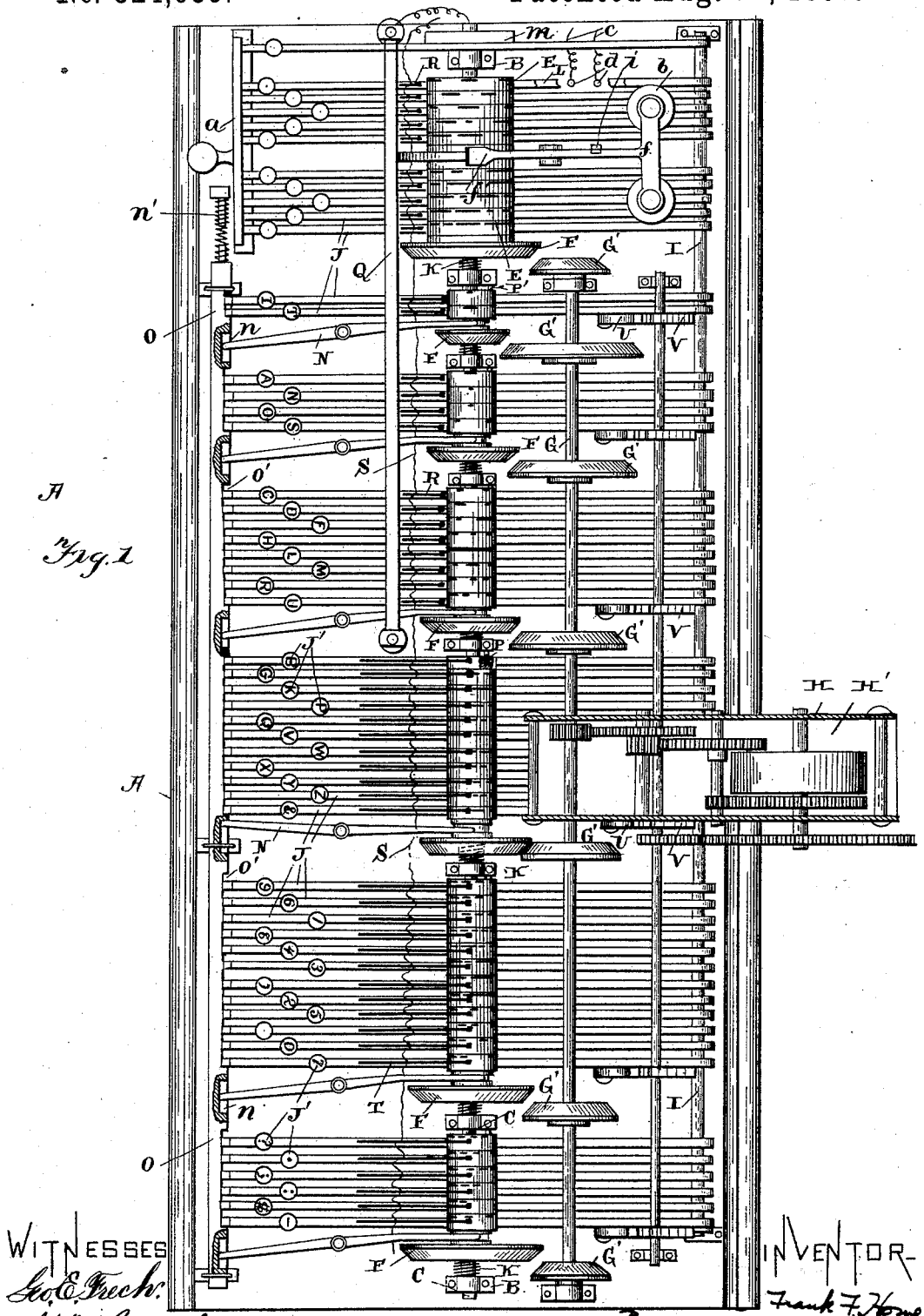

Fig. 1

WITNESSES
Geo. E. Frech.
Y. M. Copenhaver.

INVENTOR
Frank F. Howe
By Lehmann Pattison & Mesick
Attys.

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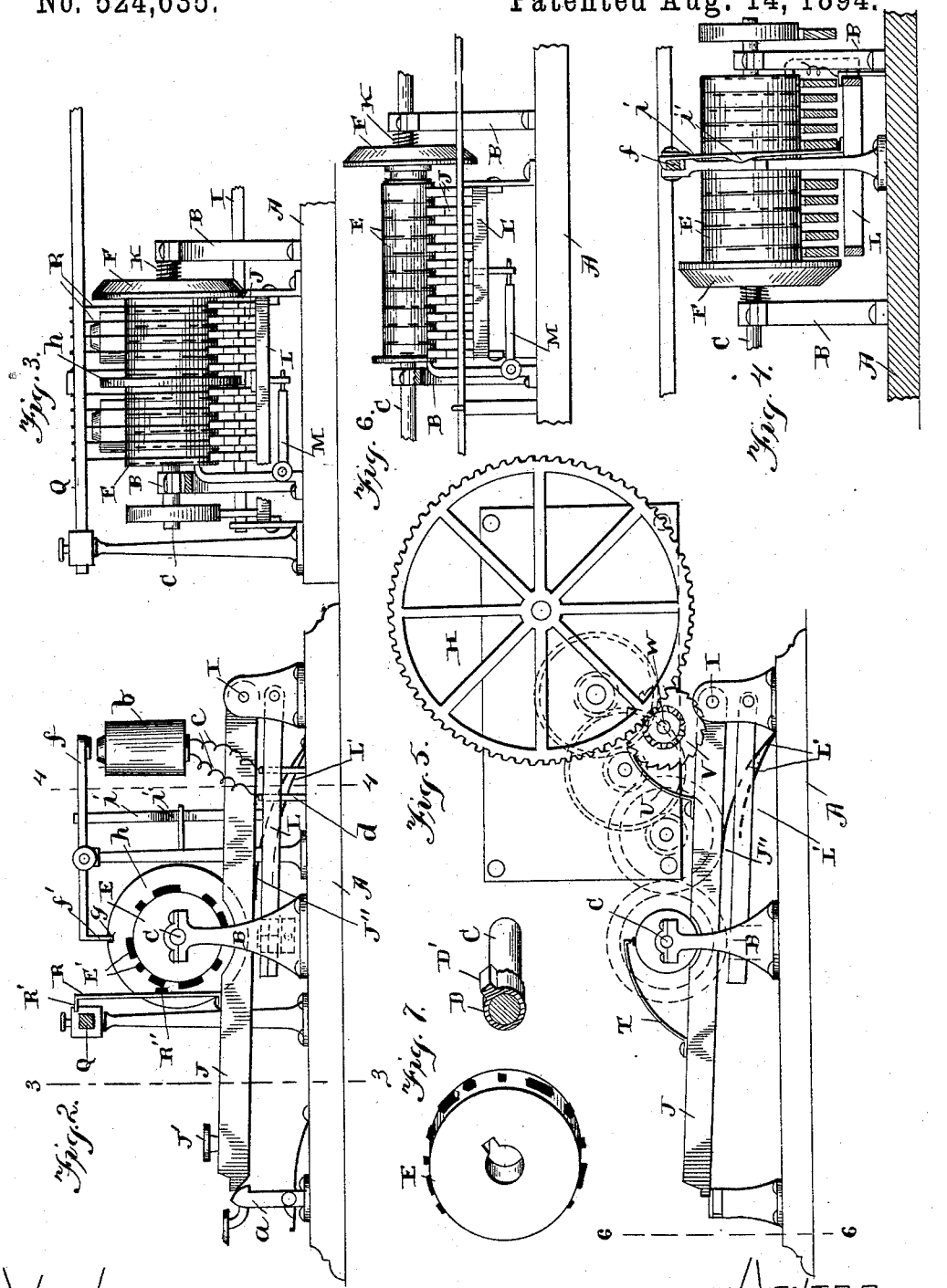

WITNESSES—
Geo. E. Frech.
J. M. Coffenhaver.

INVENTOR—
Frank F. Howe
By Lehmann Pattison & Nesbit
attys

UNITED STATES PATENT OFFICE.

FRANK F. HOWE, OF MARIETTA, OHIO.

TELEGRAPHIC TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 524,635, dated August 14, 1894.

Application filed January 15, 1894. Serial No. 496,968. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. HOWE, of Marietta, in the county of Washington and State of Ohio, have invented certain new and useful Improvements in Telegraphic Transmitters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in telegraphic transmitters; and it consists in the novel features of construction hereinafter fully described, and especially designated in the claims.

The object of my invention is to provide an improved transmitter which may be operated by persons not versed in the art of telegraphy.

I have adopted the Morse code for my improved apparatus, and in practicing the same I employ a plurality of movable disks, each carrying the necessary teeth to transmit the dots and dashes of a single character. As the dots and dashes required for the several characters vary in number, I constitute it a further object of my invention to arrange in series the several character transmitting disks requiring substantially the same number of dots and dashes and move each series at a speed commensurate with the number of teeth carried thereby.

Referring to the accompanying drawings, Figure 1 is a plan view of my improved transmitter. Fig. 2 is an end view of the call mechanism. Fig. 3 is a sectional elevation on line 3—3 of Fig. 2. Fig. 4 is a similar view on line 4—4 of the same figure. Fig. 5 is an end view of the modified form of contact transmitting mechanism. Fig. 6 is a section on line 6—6 of Fig. 5. Fig. 7 is a detail view of the shaft, sleeve and one of the disks.

A designates the base of the instrument from which extend supports B in which is fixed the shaft C. Upon the shaft are the revoluble sleeves D having splines D′ which secure transmitter disks E to the sleeves. Also secured to one end of each sleeve is a beveled friction gear F. Parallel with shaft C and suitably journaled is drive shaft G carrying beveled gears G′ which engage gears F as shown. This drive shaft is actuated by a spring motor H arranged upon a base H′, which latter is hinged at its rear side on the bearing rod H″ on the rear edge of base A. By this arrangement it will be seen that the motor mechanism may be turned back and out of the way whenever it is desired to adjust any of the mechanisms beneath it presently to be described. The gears F, G′ are so graded as to size so that the sleeve next the call mechanism at the left hand end of the machine will be given the greatest speed, while the next sleeve will be driven a little slower and so on to the end of the series. Each disk carries upon its periphery a plurality of teeth E′ so arranged as to transmit the dots and dashes of the character which the disk represents. Extending transversely beneath the disks are the key levers J, which at their rear ends are pivoted on rod I, while at the front ends they carry the characters J′.

There is a lever for each transmitting disk and they are held normally raised by springs J″.

Sleeves D are movable longitudinally on shaft C and are held normally out of engagement with the driving gears by coiled springs K which are confined in recesses K′ of gears G′, the springs also serving to hold the indicating disks normally out of line with their respective key levers. Beneath each set of levers is a vertically swinging frame L which is held raised by spring L′ and which is adapted to be depressed by the levers bearing thereon. This frame is connected with the lower arm of the bell crank lever M, which latter is adapted to engage the end disk of the series, so that when the key is depressed, frame L moving downward with it operates said lever, and the latter moving longitudinally sleeve D against spring K throws its gear in engagement with the driving gear, and at the same time positioning the disks over their respective key levers. Frame L is only momentarily in a lowered position with the bell crank lever engaging the disks, for as soon as the key lever is released so as to engage its locking mechanism presently to be described the frame resumes its normal position, throwing said lever away from the disks.

Lever N which is pivoted between its ends extends parallel with the key levers and has at one end a clutch connection with sleeve D, while at its opposite end it plays in recess *n* in bar O extending under the front ends of the several keys. This bar is notched at O′ beneath each key to allow any one of the same to be depressed, but when said movement is effected the sleeve D moving longitudinally swings lever N as before described, thereby moving longitudinally bar O over the depressed key and under all the other keys so that the characters cannot be piled in sending. Bar O may be operated by any one of the several levers N independently of, and without disturbing the other levers. The bar is returned to its normal position by spring *n′*. When the disks have made a complete revolution a recess P in the end disk comes opposite stop P′ on support B and allows sleeve D to yield to the pressure of spring K, thereby throwing the mechanism out of gear automatically, and releasing the depressed key lever as will be readily understood. By means of this arrangement it will be seen that the disks are always in the same position when they begin to rotate. In case it is desired to have each disk of a series carry a sufficient number of teeth to indicate two or more of the same characters, I can provide as many recesses as there are characters and thus indicate the character without making a complete revolution of the cylinder, while the latter will always begin its rotation at the beginning of a character.

Suitably supported over the levers is bar Q to which one pole of the circuit battery is connected. Carried by each lever is an upright circuit closing spring R, having its upper end turned outward at R′, and carrying on its inner side the projection R″. The springs of the several keys are connected by the fine wire S which leads from the other pole of the battery. When a key is depressed the upper end of the spring carried thereby is brought quite close to the bar Q, and as the indicating disks are set in motion at the same time it will be seen that the projections carried by the disk corresponding with the depressed key will engage the projection R″ of the spring, thereby forcing the same outward against said bar and closing the circuit during said engagement, and as the disk projections vary in length the pulsations will indicate dots and dashes of the Morse telegraph code as may be required to designate the character being sent. The disks in this arrangement of the transmitter mechanism are preferably formed of vulcanized fiber, as there is no wear incident to their frictional contact with the brass springs. The disks may however be of metal and form part of the circuit which may be closed by any one of the upwardly curved spring contacts T carried by levers J as illustrated in Fig. 4.

Each frame L carries a dog U which plays on ratchet V on the winding shaft W of the motor so that at each depression of the frame the shaft will be given a partial revolution, thereby automatically winding the main spring of the motor.

The disks of the call mechanism at the left hand end of Fig. 1 are revolved and thrown in gear in the manner described above. Each disk of the call designates one office, and a sufficient number of teeth are placed thereon and they are so arranged as to effect three calls of the office desired, followed by the signature of the calling office, conforming in this respect to the standard regulation. Each call key when depressed as far as possible is engaged by the automatic spring held latch *a*, so that the bell crank lever M in this case serves to hold the mechanism in gear, with the disks rotating and repeating the call and signature until answered by the office called or the circuit is otherwise interrupted.

b is a magnet from which lead the circuit wires *c* to posts *d*. When frame L, which is of iron is raised it bears against both of said posts and cuts out the magnet, but when the frame is depressed the current passes through the magnet coils, thus holding down the rear end of armature *f* suitably pivoted between its ends as shown. The heavier front end of this armature is turned down at *f′* to engage when depressed notch *g* in flange *h* carried by sleeve D. The armature is held by the magnet as long as the current is closed, but as soon as the office called answers, or any other interruption occurs the same is opened thus releasing the armature and allowing it to drop into engagement with said notched flange, thereby locking the call and in fact the whole transmitter mechanism. The operator sees immediately that his call has been answered and releases the call key from engagement with latch *a*, thus allowing the call mechanism to assume its normal position, with its gear out of engagement with the driving mechanism as will be readily understood. Notch *g* in flange *h* is so arranged that it is engaged by the armature when either a dot or dash tooth is bearing against one of springs R, thus stopping the call mechanism on a closed circuit, so that the same is not rendered useless in case the operator at the calling station is not present to communicate with the office responding to his call. By this arrangement it will be seen that the circuit is closed whenever notch *g* passes beneath the armature end so that the latter is held by the magnet and cannot drop into said notch until the circuit is opened by the responding office.

i is a dog carried by frame L of the call mechanism having enlargement *i′* between its ends with its upper end spear shaped. When the key lever is released as above described the armature will remain in engagement with the notched flange and this dog is provided for the purpose of reaching up over the armature so as to draw its rear end down-

ward when one of the keys is again depressed, thus overcoming the tendency of the armature to bind in the notch. The enlargement of the dog is for engaging the frame and push it, the dog, laterally and from engagement with the armature as the dog descends.

Call disks for the principal offices on the line are arranged in the call series, but for local offices with which communication may be desired from time to time I provide the additional disk *m* for each office which may be readily adjusted on the end of sleeve D, and beneath the same is the additional key lever as shown. These additional local call disks may be arranged in a convenient position within easy reach of the operator.

I here show and describe two forms of spring contacts on the same instrument. It will be understood that either form may be used to the exclusion of the other, or both may be used in the same instrument.

The bar Q is preferably angular in form and may be turned and also moved longitudinally in its supports, so that if a point where contact is had becomes rough so as to spark, a smooth surface can be readily secured by moving the bar in either of the directions above stated.

The transmitter may be used on either main or local circuits, the only difference in the said uses being in the size of the magnet employed for operating the locking armature.

The Morse telegraph code includes about forty three characters and I have here shown a key for each character. Those characters requiring the least number of dots and dashes or both are arranged on the transmitting devices having the greatest speed, so that the intervals between the pulsations will not be too long, whereas those characters requiring a greater number of pulsations will be arranged on disks traveling at slower speeds so that every dot and dash tooth will have time to make a distinct contact. The characters are thus transmitted with regularity, avoiding unnecessary pauses.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A transmitter comprising a plurality of transmitting devices arranged with two or more of said devices in a series, an operating mechanism adapted to actuate each series at a different speed, and a circuit which is opened and closed by said devices, substantially as shown and described.

2. A transmitter comprising several series of character transmitting devices, the devices representing characters requiring substantially a like number of pulsations being assembled in the same series, an actuating mechanism common to all the series and which actuates each series at a different speed, and a circuit which is opened and closed by the said devices, substantially as shown and described.

3. A transmitter comprising character transmitting devices arranged in series, a gear for each series, a power shaft, gears of different sizes thereon which mesh with the gears on the transmitting devices, and a circuit which is opened and closed through the intervention of said devices, substantially as shown and described.

4. In a transmitter, a circuit, a circuit closer, a transmitting device movable transversely with relation to the closer and which is normally out of line therewith, a means for actuating the device, a key lever, a frame adapted to be depressed by the lever, a bell-crank connecting the frame and transmitting device whereby when the frame is depressed the said device will be moved in line with the closer, substantially as shown and described.

5. A transmitter comprising a transmitting device, a rotating mechanism normally out of engagement therewith, a circuit closer with which the transmitting device is normally out of line, and a means for adjusting the transmitting device to its propelling mechanism which also places it in line with the circuit closer which it operates, substantially as shown and described.

6. A transmitter comprising a movable transmitting device, a swinging frame beneath the same, a key lever adapted to depress the frame during the latter part of its downward stroke, a circuit, a circuit closer, a connection between the frame and the transmitting device, and a lock for engaging the lever before it has completed its return movement but after the said frame has returned to its normal position, for the purpose, substantially as shown and described.

7. A transmitter comprising a transmitting device, a circuit, a circuit closer normally out of line with the transmitting device, a key lever and a mechanism arranged between the same and the transmitting device for moving the latter in line with the circuit closer when the key is depressed, a locking bar for holding the lever depressed, and a connection between the bar and the transmitting device, for the purpose shown and described.

8. A transmitter comprising a plurality of separately movable transmitting devices, a key lever for each device, a mechanism arranged between the levers and transmitting devices for moving the latter, a circuit, a circuit closer, a locking bar which holds the active key lever depressed and all the others raised, and levers fulcrumed between their ends and connected at their inner ends to the transmitting devices and at their outer ends loosely connected to the said locking bar, substantially as shown and described.

9. In a transmitter, a transmitting device, an electric magnet, a circuit in which the indicator and magnet are placed, a mechanism for setting the device in motion, a dog carried thereby, and an armature for the mag-

net which acts as a stop for the said device and which is engaged by the dog, for the purpose, substantially as shown and described.

10. The combination with a transmitting mechanism, a motor for propelling the same and a winding shaft for the motor carrying ratchets, of a dog adapted to be depressed when the transmitter is set in motion which engages the said ratchet, thus winding the motor, substantially as shown and described.

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

FRANK F. HOWE.

Witnesses:
J. M. NESBIT,
GEO. F. FRECHS.