

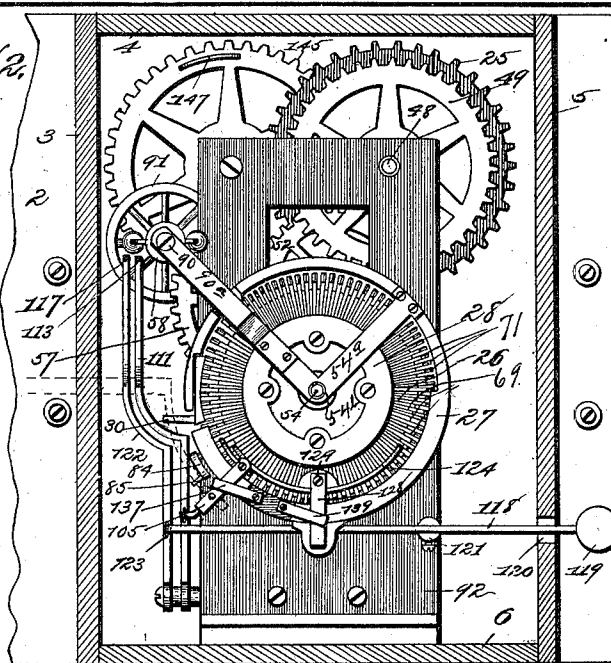
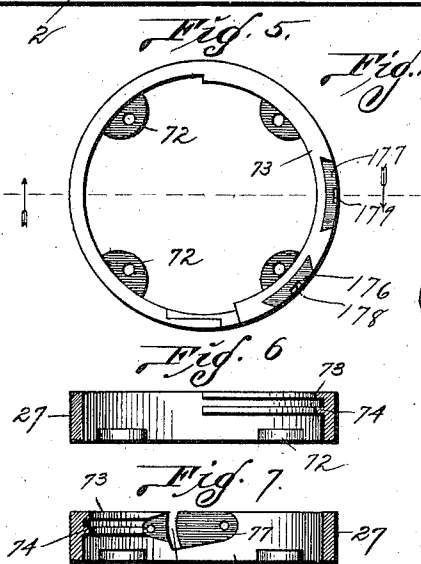
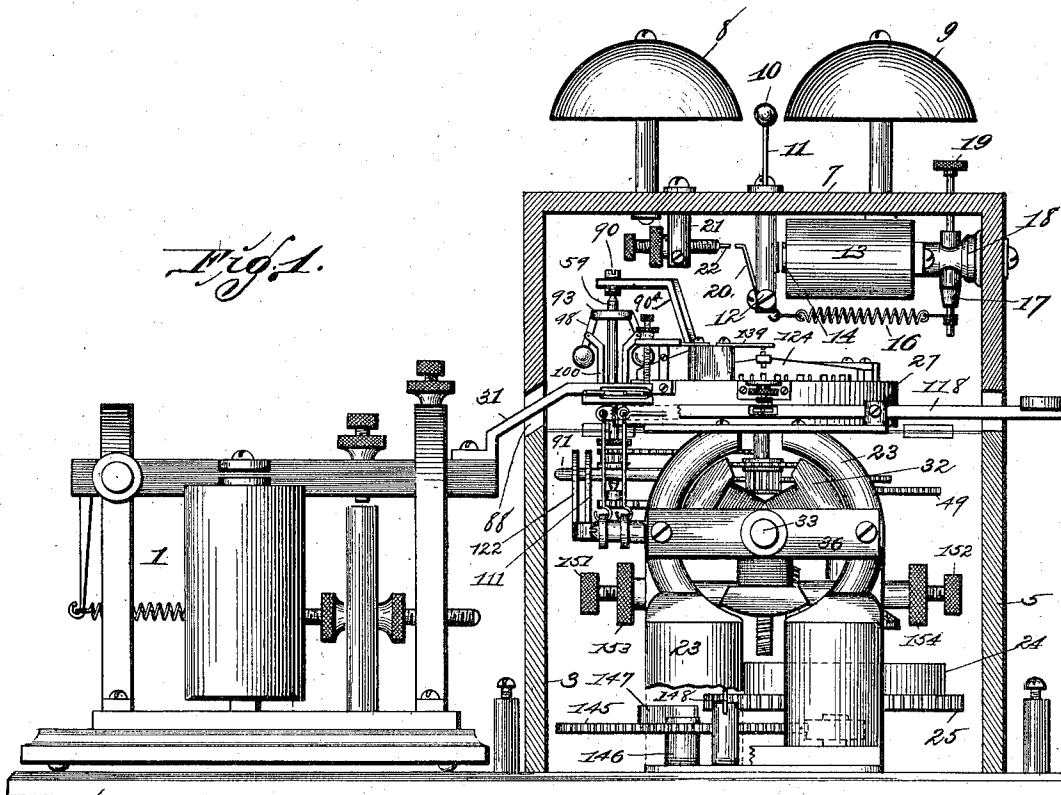
(No Model.)

5 Sheets—Sheet 1.

J. N. NEWSOM.
TELEGRAPH CALL BELL.

No. 579,169.

Patented Mar. 23, 1897.



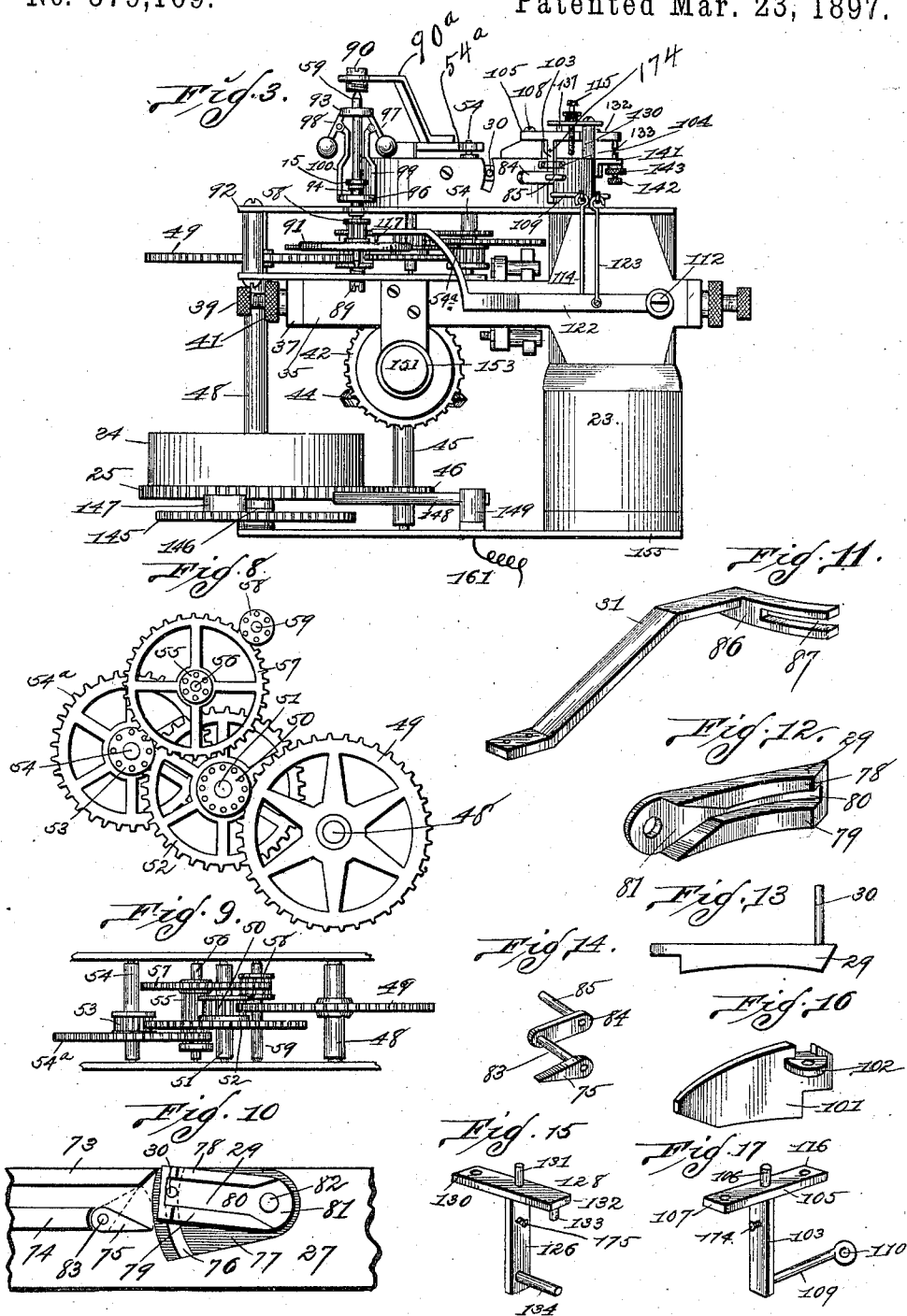
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W. P. Smith
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Inventor:—J. N. Newsom.
By Higdon Higdon & Horgan Attys.

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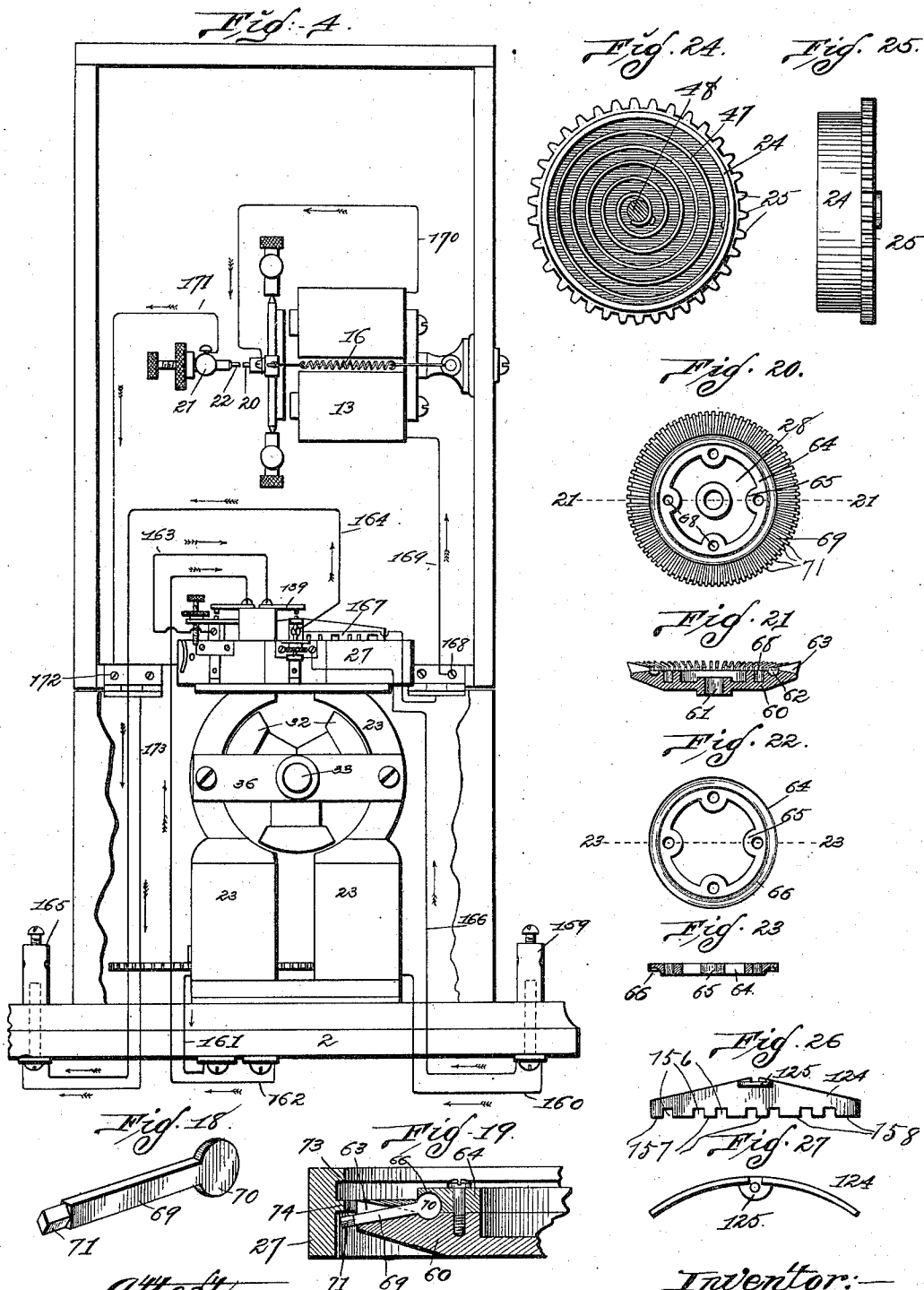
(No Model.)

5 Sheets—Sheet 3.

J. N. NEWSOM.
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Fig. 29

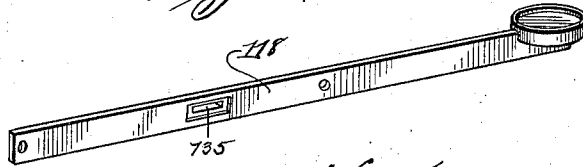


Fig. 28

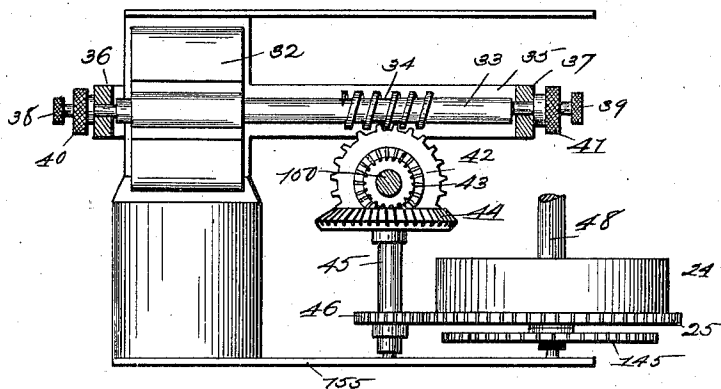


Fig. 30

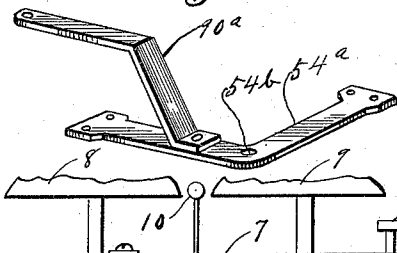


Fig. 31.

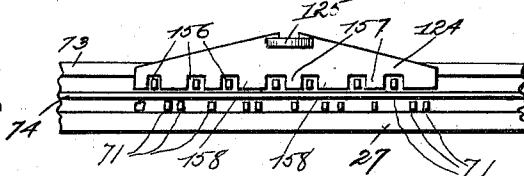
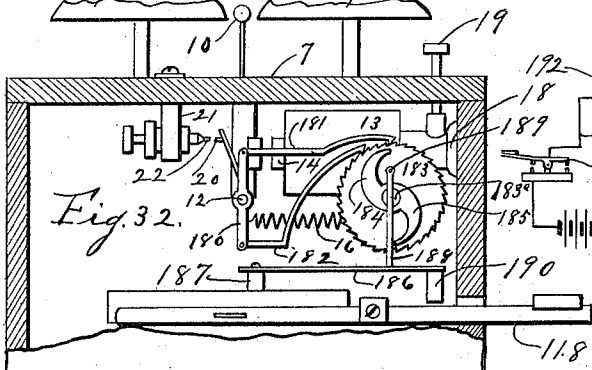


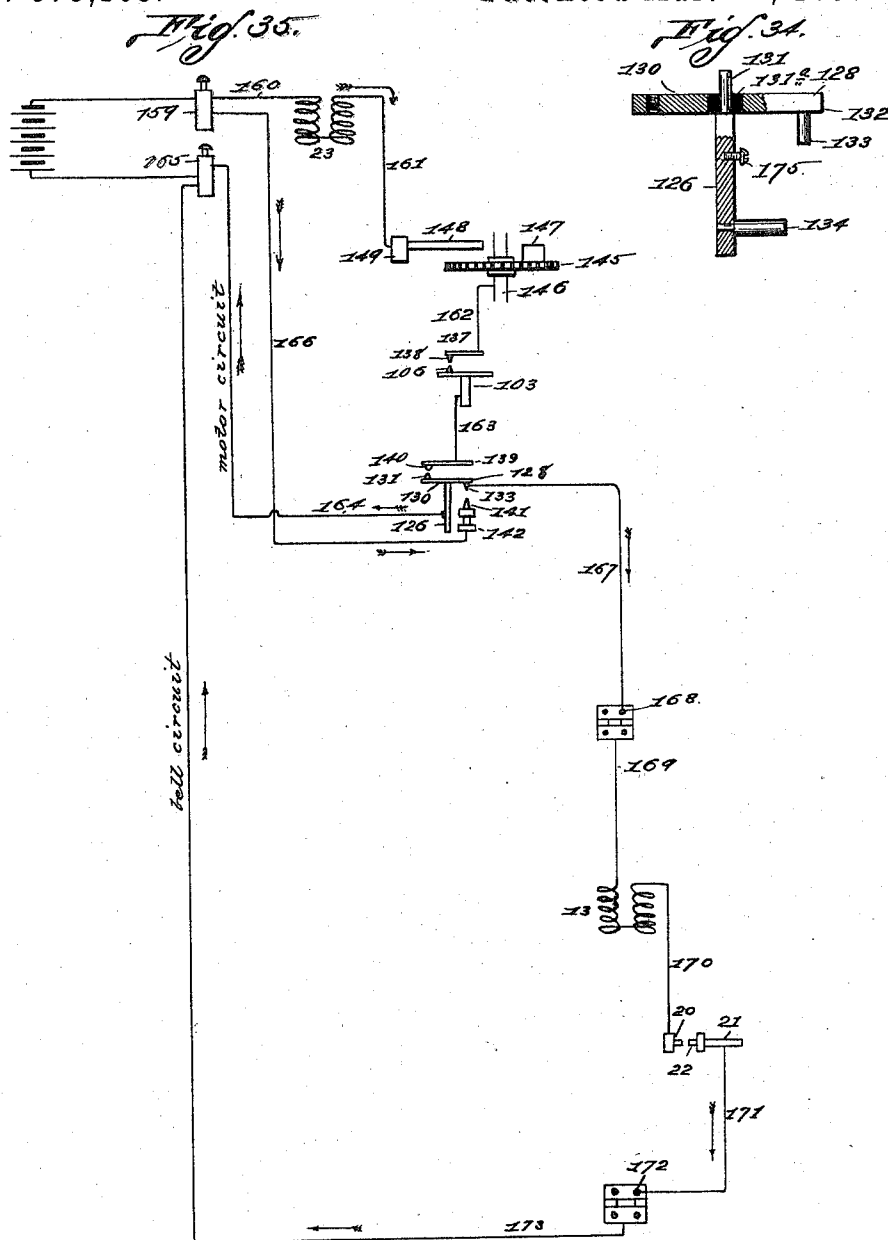
Fig. 32.



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UNITED STATES PATENT OFFICE.

JOSEPH N. NEWSOM, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO
MICHAEL SUTTER, OF SAME PLACE.

TELEGRAPH CALL-BELL.

SPECIFICATION forming part of Letters Patent No. 579,169, dated March 23, 1897.

Application filed April 27, 1896. Serial No. 589,237. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH N. NEWSOM, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Telegraph Call-Bells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a telegraph call-bell; and it consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of my telegraph call-bell, the case being shown in section and the mechanism being shown as connected to an ordinary telegraph-sounder. Fig. 2 is a top plan view of the mechanism of the call-bell shown in Fig. 1 with the cap and alarm devices connected to the top of the case removed. Fig. 3 is a front elevation of the mechanism shown inside of the case in Fig. 1 and shown in plan in Fig. 2. Fig. 4 is a diagrammatic view showing the electrical connections employed in the mechanism shown in Fig. 1. Fig. 5 is a top plan view of the case within which the pawl-wheel operates. Figs. 6 and 7 are vertical sectional views of the case shown in Fig. 5. Fig. 8 is a top plan view of a system of clock-gearing of which I make use. Fig. 9 is a side elevation of the same part shown in Fig. 8. Fig. 10 is an enlarged view of the pawl-case, looking from the center, and shows the dog for operating the pawls. Fig. 11 is an arm used to connect the telegraph-sounder with the call-bell mechanism. Fig. 12 is a side elevation, and Fig. 13 is a top plan view, of the dog shown in Fig. 10 which is used for operating the pawls. Figs. 14, 15, 16, and 17 are detail views of parts of the mechanism shown in Figs. 1, 2, and 3. Fig. 18 is a perspective view of a pawl. Fig. 19 is a sectional view showing the operation of the pawl shown in Fig. 18. Fig. 20 is a top plan view of a pawl-wheel of which I make use, the outer part of this wheel consisting largely of pawls such as are shown in Figs. 18 and 19. Fig. 21 is a sectional view on the line 21 21 of Fig. 20. Fig. 22 is a top plan view of the wheel shown in Fig. 20 with the pawls removed. Fig. 23 is a vertical sectional view

on the line 23 23 of Fig. 22. Fig. 24 is a top plan view of the spring-casing and toothed wheel which operate the clockwork. Fig. 25 is a side elevation of the same wheel. Fig. 26 is a side elevation of a form of which I make use. Fig. 27 is a top plan view of the form shown in Fig. 26. Fig. 28 is a part of the clock-gearing of which I make use. Fig. 29 is a finger-guard used in releasing the mechanism after it has become automatically locked. Fig. 30 is a bracket of which I make use, and Fig. 31 is a diagrammatic view illustrating the use of the form shown in Fig. 26. Fig. 32 is a side elevation of the mechanism which I employ in connection with the alarm-bell for the purpose of stopping the ringing of said bell. Fig. 33 is a diagrammatic view illustrating the use of my call-bells in connection with the telegraph-circuit. Fig. 34 is a sectional view of the parts shown in Fig. 15 and illustrating how the contact-point 131 is insulated from the contact-point 133. Fig. 35 is a diagram of the electric circuits of which I make use in my invention.

Referring to the drawings by numerals, an ordinary telegraph-sounder 1 and my telegraph call-bell rest upon the table 2. The telegraph call-bell is inclosed in a box consisting of the walls 3, 4, 5, and 6 and the cover 7. On the outside of the box on top of the cover 7 are positioned ordinary alarm-bells 8 and 9, between which is a clapper 10. The arm 11 of the clapper 10 extends down through the cover 7 and is fulcrumed at the screw 12. In the upper right-hand corner of the box is positioned an ordinary magnet-coil 13, and adjacent the free end 14 of said coil is a sensitive bar 15, attached near the lower end of the arm 11 of the clapper 10. A retractile coil-spring 16 is attached to the extreme lower end of the arm 11 and to a post 17, which is rotatably mounted in the post 18, which supports the magnet-coils 13, and said post 17 has a thumb-screw 19, by which it may be operated to adjust the tension of the retractile coil-spring 16 upon the arm 11. A conductor is attached to the lower end of the arm 11 and has the free end 20, and a second conductor is attached to the binding-post 21 and terminates in the free end 22 adjacent to the free end 20, said ends being so positioned rela-

tive to each other that the vibration of the arm 11 opens and closes the current between said conductor. (See Fig. 1.)

The principal features of my invention are found in the mechanism for operating the bell just described, which mechanism is inclosed in the box and consists of the motor 23 for operating the necessary connections and winding up a spring, which spring is inclosed in the casing 24 and operates the main wheel 25 of the clockwork, which clockwork operates the pawl-wheel 26 in the case 27, and the pawls 28, carried by said pawl-wheel, are manipulated by a dog 29, pivoted to the inner face of the pawl-case 27. A pin 30, projecting from said dog 29 and through an aperture in said case 27, is operated by an arm 31, attached to and operated by the telegraph-sounder 1.

The motor 23 is of the ordinary construction. Referring to Fig. 28, the armature 32 is mounted upon the shaft 33, which shaft carries the worm 34. An arm 35 extends parallel with the shaft 33, and at each end cross-pieces 36 and 37 are attached to said arm. Said cross-pieces have horizontally-alined screw-threaded apertures, in which are positioned the thumb-screws 38 and 39, upon which thumb-screws are located the jam-nuts 40 and 41. Each end of the shaft 33 is provided with a recess in which the points of the thumb-screws 38 and 39 operate. A spur-gear 42, having the bevel-gear 43 attached to its hub, is mounted directly under the worm-gear 34 and with its teeth in mesh with said worm-gear. The bevel-gear 44 meshes into and is operated by the bevel-gear 43. Upon the lower end of the shaft 45 of the bevel-gear 44 is a spur-gear 46, which meshes into and operates the gear 25 upon the spring-case 24. Inside of the case 24 is an ordinary clock-spring 47, the inner end of which is attached to the shaft 48, as shown in Fig. 24. The shaft 48 is loosely positioned in the hub of the wheel 25.

Referring to Figs. 3, 8, and 9, the ordinary clock-gear 49 is located upon the upper end of the shaft 48 and meshes into a pin-gear 50 upon the stub-shaft 51. Upon the same shaft, fixed to the hub of the pin-gear 50, is a spur-gear 52, meshing into a pin-gear 53 upon the shaft 54. The spur-gear 54 meshes into the pin-gear 55 upon the shaft 56, and the spur-gear 57 is located upon the shaft 56 and meshes into the pin-gear 58 upon the shaft 59. This train of gearing is clearly shown in plan in Fig. 8, in elevation in Fig. 9, and its connections and location are shown in Figs. 2 and 3.

The pawl-wheel 28 is located upon the upper end of the shaft 54 and consists of the disk 60, having the centrally-located aperture 61 and an annular recess 62 in its upper face, said recess being semicircular in cross-section. Around the upper outer edge of the disk 60 is a series of teeth 63, arranged radially, the recesses between said teeth inter-

secting said recess 62. A flat ring 64, having the inwardly-projecting perforated ears 65, is placed upon the upper face of the disk 60 in a concentric position, the outer edge of said ring 64 coming inside of the inner ends of the teeth 63 and covering the annular recess 62. The lower outer edge 66 of the ring 64 is recessed to form an arc of a circle, said arc matching the semicircle described by the annular recess 62. Screws 67 pass through the perforated ears 65 and are screw-seated in the recesses 68 in the disk 60, holding said disk firmly in position. Pawls 69, having the circular heads 70, are positioned between the teeth 63, with the heads 70 in the annular recess 62 and the opposite end of the pawls projecting radially outward from said recess 62, with the body of the pawl lying upon the face of the disk 60 in the recesses between said teeth 63. When the ring 64 is placed in position, it holds the pawls 69 in their position and allows them to freely vibrate upwardly. The pawls 69 have the squared or diamond-shaped ends 71 so arranged that diagonally opposite corners are in a horizontal position, as shown in Fig. 18. For the details of construction of the pawl-wheel just described see Figs. 20, 21, 22, and 23. As before stated, the pawl-wheel 28 rotates within the pawl-case 27. The pawl-case 27 is shown in plan in Fig. 5 and in vertical section in Figs. 6 and 7. Projecting inwardly from the lower edge of said case are perforated ears 72, by which the said case is attached to the frame. Upon the inner face of this case are two lugs 73 and 74, arranged in a parallel position and extending partially around said case.

Referring to Fig. 10, the wedge-shaped dog 75 is pivoted at its large end directly in front of and in alinement with the lug 74. Just in front of the point of the free end of the dog 75 is a vertical aperture 76, penetrating the case 27 in the form of an arc of a circle. Some distance farther in front of said dog the dog 29 is pivoted in such a position that the pin 30 operates in the aperture 76. A detail perspective of the dog 29 is shown in Fig. 12, and a top plan view of said dog and showing the pin 30 is shown in Fig. 13.

The inner face of the dog 29 is curved, corresponding to the curvature of the pawl-case 27, and said pawl-case is recessed, as shown at 77, to allow said pawl to retreat into the inner face of said case. Upon the inner face of the said dog 29 are two lugs 78 and 79, arranged in parallel position and forming the rectangular recess 80 between said lugs. At the forward or pivoted end of said dog the lug 78 is chamfered upwardly and the lug 79 is chamfered downwardly, thus forming the enlargement 81 of the recess 80. The pin 82 is rigidly fixed in the end of the dog 29 and loosely seated in the pawl-case 27, allowing said dog to freely vibrate within the limits of the recess 77. The pin 83 is rigidly fixed at one end in the dog 75 and passes loosely

through the case 27. Upon the outer end of said pin 83 is a crank-arm 84 and crank-pin 85, as shown in Fig. 14.

When the pawl-wheel 28 is positioned within the pawl-case 27 and upon the shaft 54, as shown in Fig. 2, the ends 71 of the pawls 69 describe a circle concentric with the axis of the wheel in a horizontal plane corresponding to the plane occupied by the pawl-case 27 and in such a position relative thereto that when the shaft 54 is rotated by the operation of the spring 47 within the spring-case 24 acting upon the shaft 48 and, through the train of gearing already described, upon the shaft 54 the ends 71 of the pawls enter the opening 81 of the recess 80 in the dog 29. The arm 31 has the bifurcated end 86, in which is the slot 87. The bifurcated end 86 stands at right angles to the arm 31 and describes an arc of a circle. The arm 31 is attached to and operated by the telegraph-sounder, which is positioned in such a way that the arm projects from the sounder through the aperture 88 and adjacent to the pawl-case 27. The bifurcated end 86 is located in a horizontal plane corresponding to the plane occupied by the said pawl-case 27 and in such a position that the pin 30 is located in the slot 87 and near to its closed end, and the pin 85 is located near the open end of said slot. A vibration of the arm 31 will operate the free ends of the dogs 29 and 75 in opposite directions. In other words, when the point of the dog 75 is raised the free end of the dog 29 is lowered, and vice versa, both by the operation of the arm 31. In this way the track of the end 71 of the pawl 69 is determined. The pawls enter the opening 81 of the recess 80, and by the operation of the telegraph-sounder they are guided either above or below the lug 74 on the inner face of the pawl-case 27. When the dog 29 is lowered, the point of the dog 75 is raised, and the pawls, passing through the recess 80, pass under the dog 75 and under the lug 74. When the free end of the dog 29 is elevated, the free end of the dog 75 is lowered, and the pawls pass from the recess 80 above the dog 75 and above the lug 74, as shown in Fig. 10. The shaft 59 terminates at each end in center points which operate in bearings 89 and 90. Below the pin-wheel 58 upon the shaft 59 is located a balance-wheel 91. The shaft 59 passes through the frame 92 and has upon its upper end a collar 93, rigidly fixed thereto. A collar 94, having the enlarged end 95, operates loosely upon the center of the shaft 59 and is attached at its lower end to the frame 92. A collar 96 operates loosely upon the collar 94. The arms 97 and 98 are governor-balls and have their ends pivoted in opposite sides of the collar 93, and connecting-rods 99 and 100 are pivoted to said arms 97 and 98 intermediate of their ends and connect said arms to the collar 96. By the speed of the shaft 59 the governor-balls operate to raise the arms 97 and 98, thus raising the collar 96 against

the head 95 of the collar 94, and by the frictional contact therewith regulate the speed of the shaft 59 and the pin-wheel 58, and through the train of gearing operate to regulate the speed of the pawl-wheel 28. The bearing 90 is supported in the free end of the bar 90^a, which bar is attached to the bar 54^a. The bars 90^a and 54^a are shown in perspective in Fig. 30 and in top plan view in Fig. 2. The bar 54^a is attached at its ends to the pawl-case 27, and in the center is the bearing 54^b, which supports the upper end of the shaft 54, upon which the pawl-wheel operates.

A guide-shoe 101 is positioned just inside of the pawl-case 27 adjacent the dog 75. The rounded lower edge of this shoe rides directly upon the pawl 69 just inside of the end 71. At the upper rear end of the shoe 101 is a horizontally-projecting perforated ear 102. The vertical bar 103 is positioned adjacent the shoe 101 and outside of the pawl-case 27 and held in position by the bearing 104. A horizontal bar 105 is attached at its center to the upper end of the vertical bar 103, and from the center of said bar 105 a contact-point 106 projects upwardly. The end 107 of the bar 105 has an aperture through which a thumb-screw 108 is inserted and screw-seated in the aperture of the ear 102. Extending horizontally outward from the lower end of the bar 103 is an arm 109, having the eye 110 in its outer end. A lever 111 is pivoted at one end to the frame of the motor by the screw 112 and extends forwardly and upwardly to a point above the balance-wheel 91. A downwardly-projecting pin 113 is fixed in the free end of this lever 111 and is positioned in such a way that the pin will engage the spokes of the balance-wheel 91 when the free end of the lever is lowered. A rod 114 is attached to the lever near its pivoted end and connects said lever with the eye 110 of the arm 109.

A thumb-screw 115 is positioned in the end 116 of the bar 105 with its point projecting downwardly outside of the pawl-case 27 and in such a position as to contact with the upper face of the bifurcated end 86 of the arm 31. By adjustment of the thumb-screw 115 the operation of the shoe 101 is regulated and determined relative to the operation of the arm 31.

A lever 122, in every way resembling the lever 111, is pivoted by the screw 112 to the frame of the motor and lies in a position parallel with said lever 111 and has a pin 117 at its forward end corresponding to the pin 113 in the forward end of the lever 111 and for a similar purpose.

A finger-lever 118, carrying the button 119 at its outer end, passes through the aperture 120 in the wall 5 of the box and is fulcrumed by the bearing 121 near its center to the upper plate 92 of the frame which supports the pawl-case 27. The free end of the lever 118 is attached to the lever 122 by the rod 123.

A form 124 is positioned inside of the pawl-

case 27 and upon the outer ends of the pawls 69. In plan view the form 124 is curved, as shown in Fig. 27, to correspond with the curvature of the pawl-case 27. At the center of the upper edge of the form 124 is an inwardly-projecting perforated ear 125 in a horizontal position. A vertical bar 126 is positioned outside of the pawl-case 27 adjacent the perforated ear 125 and is held in position by a bearing 127, similar to the bearing 104, and a horizontal bar 128 is attached at its center to the upper end of said vertical bar 126. A screw 129 passes through an aperture in the end 130 of said bar and is screw-seated in the aperture of the ear 125. Projecting upwardly from the center of the bar 128 is a contact-point 131, and projecting downwardly from the outer end 132 of said bar 128 is a contact-point 133. The contact-point 131 is insulated from the contact-point 133 by the insulation 131^a, as shown in Fig. 34. Projecting outwardly from the lower end of the vertical bar 126 is a pin 134, designed to operate in the elongated aperture 135 in the lever 118.

A post 136 extends upwardly from the pawl-case 27 between the vertical bars 103 and 126, and a bar 137 is positioned horizontally with one end attached to the upper end of the post 136, and the free end of said post extends outwardly to a position above the bar 126, and a contact-point 138 projects downwardly from the free end of the bar 137 in vertical alinement with the contact-point 106 and adjacent thereto.

A bar 139, in every way resembling the bar 137, is attached to the post 136 and extends in the opposite direction from the bar 137 and has a contact-point 140 depending down in alinement with the contact-point 131 and adjacent thereto.

Attached to the outer upper edge of the pawl-case 27 is a perforated ear 141, carrying the set-screw 142 and the jam-nut 143, the point of said set-screw 142 being in alinement with the contact-point 133 and adjacent thereto. Upon the shaft 48 below the gear 25 is a pinion 144, meshing into the gear 145 upon the stub-shaft 146. The gear 145 is positioned horizontally, and upon its upper face and near the outer edge is a lug 147, projecting upwardly and designed to contact with the free end of the bar 148, which is rigidly fixed at its opposite end to a post 149, attached to the bottom of the frame, as shown in Fig. 3.

The pinion 144 is insulated from the shaft 48, and the stub-shaft 146 and the post 149 are insulated from the frame. The gear 145 runs loosely upon the shaft 146.

The spur-gear 42 and the bevel-gear 43 are supported by the shaft 150, which shaft is supported by having center points on its ends positioned in the recessed centers of the thumb-screws 151 and 152, which thumb-screws are held in position by the jam-nuts 153 and 154, as shown in Fig. 1. The plate 155 forms the base of the machine and rests upon the table 2.

The pin 174 is fixed to the vertical bar 103

and is designed as a means of attaching a conductor-wire to said bar. A similar pin 175 is fixed to the vertical bar 126 for a similar purpose. Blocks of insulation 176 and 177 are seated in the outer edge of the ring 73 and have in their outer faces the centrally-located recesses 178 and 179, in which recesses the vertical bars 103 and 126 operate, respectively.

Referring to Fig. 32, the bar 180 is mounted upon the fulcrum 12 of the bell-armature and rigidly fixed thereto in such a way that the vibration of said armature vibrates or rocks said bar 180. Pawls 181 and 182 are attached to the upper and lower end of said bar 180, respectively, and the free ends of said pawls engage the teeth of the disk 183, which disk is mounted upon the pin 183^a, projecting from the casing, and said disk carries upon its face the eccentrics 184 and 185. A leaf-spring 186 is attached at one end to a post 187, which is rigidly fixed to the frame of the mechanism, and an arm 188 extends upwardly from near the free end of said spring and has in its upper end the horizontally-projecting pin 189, which is designed to be engaged by the face of the eccentrics 184 and 185 as they are rotated by the rotation of the disk 183. Upon the under side of the free end of the spring 186 is a block 190, designed to engage the upper surface of the lever 118. The spring 186 normally holds the block 190 out of engagement with the lever 118. When the mechanism operates to close the bell-circuit and start the bell to ringing, the vibration of the bell-armature will operate the bar 180, and by this means the pawls 181 and 182 will operate to rotate the disk 183 and thus rotate the eccentrics 184 and 185. As these eccentrics are carried around the pin 189 engages the face of one of the eccentrics and is raised, thus raising the spring 186 and block 190. When said pin 189 is raised to its highest point and slips off from the point of the eccentric which is operating it, the spring 186 will be released and the block 190 will descend with sufficient force to operate the lever 118, and thus raise the form from the pawl-wheel and the lever 122 from the balance-wheel of the governors, separating the contact-points 132 and 133 and thus stop the bell from ringing and start the pawl-wheel.

The pawl-wheel 28 turns from left to right. The pawls are thrown up or down by the vibration of the sounder-lever operating the arm 31 and the dogs 29 and 75, as heretofore described. Each pawl represents a dot or space, two pawls represent a dash, and four pawls a double dash, &c. A dot or a dash made by the telegraph-sounder or on the sender and recorded by the sounder throws the pawls corresponding to that dot or dash below the dog 75 and below the lug 74. A dot will throw one pawl down below the lug 74. A space will throw the next pawl up above the dog 75 and above the lug 74. A dash will throw two pawls below the dog 75 and the lug 74, and in this way the Morse alphabet or any

modification thereof is indicated on the pawl-wheel as written by the sender and repeated by the telegraph-sounder.

In Fig. 31 I have shown the form 124 with recesses in its lower edge, as required for the call "A." In the Morse alphabet "a" is represented by a dot and a dash, and upon the form 124 I employ the series of recesses 156, each designed to receive a single pawl. Between the recesses 156 I employ a series of lugs 157 and a series of lugs 158, which ride upon the upper edge of the pawls 69. When the telegrapher writes "a" upon the sender-key four times in succession, the pawls 69 will be distributed relative to the lug 74 as follows:

When the operator begins writing or calling and previous thereto, the pawls are all passing upwardly and into the recess above the lug 74. The first dot made by the operator throws a pawl down, then the space that follows throws a pawl up, then the dash that follows throws two pawls down, and then follows a space which throws a pawl up and completes the writing of the letter "a." This operation is repeated four times in succession and the pawl-wheel turned around until the four "a's" thus written are under the form 124, when the lugs 158 drop into the vacancies between the pawls which are above the lug 74, which vacancies are made by the dots and dashes sending corresponding pawls below the lug 74. When the form 124 drops down, as just described, the machine stops and the bell rings, calling the operator designated by the call "A." The call of a form, such as 124, is read by the lugs 157 and 158. The lug 157 indicates a dot, and the lug 158 indicates a dash, and a double dash would be indicated by a lug twice the length of the lug 158. A space, such as is used in the middle of a letter, which is in effect a double space, is indicated by a notch twice the length of one of the notches 156, or, in other words, it is a notch large enough to receive the ends of two pawls. By varying the notches 156 and the lugs 157 and 158 a form may be constructed to receive any letter or character which can be written by the use of the Morse alphabet or any modification thereof.

Referring to Fig. 4, the electric current coming from the batteries or any suitable source is attached to the binding-post 159, and from said binding-post passes through the wire 160 to the coils of the motor 23, leaving the motor-coils by the wire 161. The current enters the post 149 and passes through said post and through the arm 148 to the lug 147 upon the upper face of the gear 145, through said gear to its hub, then down the stub-shaft 146, and is carried by a wire 162 to the bar 137, thence through the bar 137 and from the contact-point 138 to the contact-point 106, thence through the wire 163, attached to the vertical bar 103, to and through the bar 139, and from the contact-point 140 to the contact-point 131, through the vertical bar 126, then

through the wire 164 to the binding-post 165. This circuit I designate the "motor-circuit." A second circuit starts from the binding-post 159, passes through the wire 166 to the thumb-screw 142, thence to the contact-point 133, thence through the wire 167 to the screw 168, thence through the wire 169 to the coils 13 of the bell, thence through the wire 170 to the contact-point 20, thence to the contact-point 22, thence through the post 21 and through the wire 171, through the screw 172, thence through the wire 173 to the binding-post 165. This circuit I term the "bell-circuit."

In the operation of my device, after it has been wired up and connected up, as described, and the current is turned on, the motor will operate to wind up the spring within the case 24, and the action of this spring upon the shaft 48 through the train of gearing connected therewith will start the pawl-wheel 28. The telegraph-sounder not being in operation and being held in its upper position all of the pawls will pass into the opening 81 and through the recess 80 in the dog 29, then above the dog 75 and into the recess between the lugs 73 and 74, passing on around the inner face of the pawl-case 27 to the opposite end of the lug 74. The pawls will assume their normal position after leaving the end of said lug. Should an operator desire to call the operator in charge of the instrument having the call "A," he will write upon his sender-key the letter "a" successively until the pawls operated by the telegraph-sounder, as before described, pass under the form 124, and said form settles down and stops the pawl-wheel by the lugs 157 and 158 engaging in the openings corresponding to the pawls which have been sent below the lug 74, as before described. When the form 124 drops down, the contact-point 133, carried by the bar 132, to which the form 124 is attached, is brought into engagement with the contact-point 142 and closes the bell-circuit. Then the bell will commence ringing and will continue to ring until the operator comes and unlocks the instrument by pressing down upon the button 119 and operating the lever 118, which operation raises the lever 122, releases the balance-wheel 91, and also raises the vertical bar 126 in its bearing, breaking the circuit between the contact-points 133 and 142 and raising the form 124, and thus releasing the pawl-wheel, when the pawl-wheel will start and continue to run until stopped by a similar operation. When the pawl-wheel is running, the gear 144 upon the shaft 48 is operated and drives the gear 145, carrying the lug 147. When this lug comes in contact with the arm 148, the motor-circuit is closed, and the motor will operate to wind up the spring within the case 24. A contact is made between the lug 147 and the arm 148 at each revolution of the gear 145, and in this way the motor is operated at regular intervals and keeps the spring within the case 24 wound up and keeps the machine in operation unless

it is stopped, as hereinbefore described. In case the telegraph-circuit should close, attracting the sound-armature of the sounder down and holding the arm 31 down, thus directing the pawls 69 below the dog 75 and the lug 74, the shoe 101 will drop a distance equal to the distance between the upper edges of the pawls when they are above the lug 74 and the upper edge of the same pawls when they are below the lug 74. The dropping of the shoe 101 will operate the rod 114, and the lever 111 will be lowered until the pin 113 engages the spokes of the balance-wheel 91 and stops the machine, and this operation opens the motor-circuit by separating the contact-points 138 and 106 and will thus stop the motor. When the telegraph-line is again opened, the arm 31 raises, and in doing so raises the bar 105 by means of the set-screw 115, the point of which rests upon the outer end of the bifurcated end 86 of said arm 31. This operation raises the pin 113 out of contact with the spokes of the balance-wheel 91 and allows the instrument to start. When the bell-circuit is closed, the force of the battery is transferred from the motor to the bell, and vice versa.

When a telegraph-circuit has each of its receiving instruments or sounders provided with one of my telegraph call-bells, the form on each call-bell must be constructed to indicate the call of the instrument to which it is attached. The call-bells will respond only to the signal indicated on the form, and this signal should be of such a character that it will not occur in the sending of ordinary messages. For this reason I prefer to repeat the call of the instrument designated four times or more upon the form of the call-bell. Suppose that the call of the instrument with which a sender desires to communicate is the letter "a," then the letter "a" should be indicated four times upon the form. In ordinary writing four "a's" will never occur in succession, and consequently the call-bell will never be rung except when desired.

Referring to Fig. 32, the telegraph-line 191 connects the sounders 192, 193, 194, 195, 196, and 197, the key 198, and the source of electric energy 199. Telegraph call-bells are connected to the telegraph-line, as shown, the bell A being connected to the sounder 192, the bell B to the sounder 193, the bell C to the sounder 194, the bell D to the sounder 195, the bell E to the sounder 196, and the bell F to the sounder 197.

While I have shown but one key 198, it is to be understood that any number of keys may be employed in connection with the telegraph-line, as is the usual practice. Assuming that the diagram shown represents the telegraph-circuit used by a train-despatcher and that the key 198 is the train-despatcher's key, by the use of the call-bells attached to the sounders, as indicated, the train-despatcher is able to call the operator in charge of any desired sounder by writing upon his key four times in succession the call of that sounder.

If the train-despatcher wishes to call the operator in charge of the sounder 194, for instance, he will write upon his key the letter "C" four times in succession, "C" being the call of that instrument. Should the operator be away from his instrument, the pawl-wheel will be operated by the lever of the sounder. The form will engage the pawl-wheel and start the bell to ringing, as hereinbefore described.

Other signals besides the ringing of a bell may be operated in the same way by the use of my device without departing from the spirit of my invention.

I claim—

1. In a telegraph call-bell, a pawl consisting of the rectangular body 69, the imperforate disk 70 attached to one end of said body and the end 71 attached to the opposite end of said body 69, said end 71 being substantially square and having its faces set at an angle relative to the faces of said body 69.

2. In a telegraph call-bell, a pawl-wheel consisting of a wheel having an annular recess in one of its faces, said recess being semicircular in cross-section, a ring attached to the recessed face of said wheel, said ring having one of its outer corners cut away to form an annular recess, said recess being an arc of a circle in cross-section, and said arc being less than a semicircle said recess being designed to match the first-mentioned recess, and radially-arranged teeth upon said recessed face of said wheel outside of said annular recess.

3. In a telegraph call-bell, a pawl-wheel consisting of the wheel 60, having the annular semicircular recess 62 in its face and also having the teeth 63 arranged radially upon its face outside of said annular recess, and the ring 64 attached to the recessed face of said wheel, said ring having the annular recess 66 to match the annular recess 62.

4. In a telegraph call-bell, a pawl-wheel consisting of a wheel having an annular recess in one of its faces, said recess being semicircular in cross-section, a ring attached to the recessed face of said wheel, said ring having one of its outer corners cut away to form an annular recess, said recess being an arc of a circle in cross-section, and said arc being less than a semicircle, said recess being designed to match the first-mentioned recess, radially-arranged teeth upon said recessed face of said wheel outside of said annular recess, and pawls positioned in the recesses between said teeth with their disk-shaped heads in said annular recesses.

5. In a telegraph call-bell, a pawl-wheel consisting of the wheel 60, having the annular semicircular recess 62 in its face and also having the teeth 63 arranged radially upon its face outside of said annular recess, the ring 64 attached to the recessed face of said wheel, said ring having the annular recess 66 to match the annular recess 62, the pawls 69 positioned between the teeth 63 with their heads 70 in said annular recesses.

6. In a telegraph call-bell, a wheel rotatably mounted in a horizontal position, pawls pivotally attached to and arranged radially around said wheel, a pawl-case rigidly held in a concentric position relative to said pawl-wheel, the inner face of said case being adjacent the outer ends of said pawls, a lug on said inner face and means of controlling the outer ends of said pawls to throw them above or below said lug as desired.

7. In a telegraph call-bell, a pawl-wheel rotatably mounted in a horizontal position, a pawl-case mounted concentrically to said pawl-wheel, a dog pivotally mounted upon the inner face of said pawl-case, said dog having a longitudinal recess upon its inner face, a vibrating arm by which said dog is operated and means of rotating said pawl-wheel.

8. In a telegraph call-bell, a pawl-wheel rotatably mounted in a horizontal position, a pawl-case mounted concentrically to said pawl-wheel, a lug upon the inner face of said pawl-case, a pointed dog pivotally mounted in front of said lug with its free end extending from said lug in a horizontal position, a vibrating arm by which said dog is operated and means of rotating said pawl-wheel.

9. In a telegraph call-bell, a pawl-wheel rotatably mounted in a horizontal position, a pawl-case mounted concentrically to said pawl-wheel, a lug upon the inner face of said pawl-case, a pointed dog pivotally mounted in front of said lug with its free end extending from said lug in a horizontal position, a longitudinally-recessed dog pivotally mounted upon the inner face of said pawl-case with its free end pointing toward and adjacent to said pointed dog, a vibrating arm by which said dogs are operated and means of rotating said pawl-wheel.

10. In a telegraph call-bell, a form mounted for vibration, pawls operated to pass under said form, lugs upon the lower face of said form, said lugs and the spaces between said lugs corresponding to telegraph-signals and the spaces between said lugs being designed to receive the ends of said pawls when said pawls are manipulated in a certain way by the operation of the telegraph instrument.

11. In a telegraph call-bell, a pawl-wheel rotatably mounted, means of controlling the pawls, electrical connections for operating the pawl-controlling mechanism, and a form riding on the upper face of the pawls, said form being designed to drop into the pawls and stop the pawl-wheel when the said pawls are operated in a certain way.

12. In a telegraph call-bell, a pawl-wheel, a spring and clockwork for operating said pawl-wheel, an electric motor for winding said spring, a form so positioned that the pawls pass under it and lugs upon the face of said form corresponding to telegraph signals or letters as they are indicated by the sender upon the pawl-wheel and designed to stop said pawl-wheel when the proper signal occurs.

13. In a telegraph call-bell, a pawl-wheel, a

spring and clockwork for operating said pawl-wheel, an electric motor for winding said spring, means of controlling the pawls, electrical connections for operating the pawl-controlling mechanism, and a form riding on the upper face of the pawls, said form being designed to drop into the pawls and stop the pawl-wheel when the said pawls are operated in a certain way.

14. In a telegraph call-bell, a form mounted for vibration, pawls passing under said form, lugs upon the lower face of said form, said lugs and the spaces between said lugs corresponding to certain telegraph-signals and the spaces between said lugs being designed to receive the ends of said pawls when said pawls are manipulated in a certain way by the operation of the telegraph instrument, and a call-bell electrically connected to said form and operated by the vibration of said form.

15. In a telegraph call-bell, a pawl-wheel rotatably mounted, a means of controlling the pawls, electrical connections for operating the pawl-controlling mechanism, a form riding on the upper face of the pawls, said form being designed to drop into the pawls and stop the pawl-wheel when the said pawls are operated in a certain way, and a call-bell electrically connected to said form and so arranged that the circuit is closed and the bell rings when the form stops the pawl-wheel.

16. In a telegraph call-bell, a pawl-wheel, a spring and clockwork for operating said pawl-wheel, an electric motor for winding said spring, a form so positioned that the pawls pass under it, lugs upon the face of said form corresponding to telegraph signals or letters as they are indicated by the sender upon the pawl-wheel and designed to stop said pawl-wheel when the proper signal occurs, and a call-bell electrically connected to said form and so arranged that the circuit is closed and the bell rings when the form stops the pawl-wheel.

17. In a telegraph call-bell, a pawl-wheel, a spring and clockwork for operating said pawl-wheel, an electric motor for winding said spring, means of controlling the pawls, electrical connections for operating the pawl-controlling mechanism, a form riding on the upper face of the pawls, said form being designed to drop into the pawls and stop the pawl-wheel when the said pawls are operated in a certain way, and a call-bell electrically connected to said form and so arranged that the circuit is closed and the bell rings when the form stops the pawl-wheel.

18. In a telegraph call-bell, a pawl-wheel, a spring and clockwork operating said pawl-wheel, a motor winding said spring, an electric current operating said motor, means of controlling said electric current, a form controlling said pawl-wheel, a call-bell electrically connected to said form and operated thereby, means of electrically operating the pawls of said pawl-wheel, means of stopping the pawl-wheel when the operating-circuit is

closed and electrical connections by which the motor-circuit is opened when the bell-circuit is closed and the motor and bell circuits are both opened when the operating-circuit is closed.

19. In a telegraph call-bell, a rocking beam attached to and operated by the armature of the bell, pawls pivoted to each end of said beam, a toothed wheel mounted to be engaged by said pawls, and connections between said wheel and the conductor whereby the operation of the said wheel breaks the circuit and thus stops the ringing of the bell.

20. In a telegraph call-bell, a rocking beam attached to and operated by the armature of

the bell, pawls pivoted to each end of said beam, a toothed wheel mounted to be engaged by said pawls, eccentrics carried by said toothed wheel, a leaf-spring fixed at one end, a block upon the free end of said spring, an arm upon the free end of said spring and designed to be engaged by said eccentrics, said block being designed to strike and operate the lever which opens the bell-circuit.

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

JOSEPH N. NEWSOM.

Witnesses:

M. E. SPILLMAN,
MAUD GRIFFIN.