

June 9, 1936.

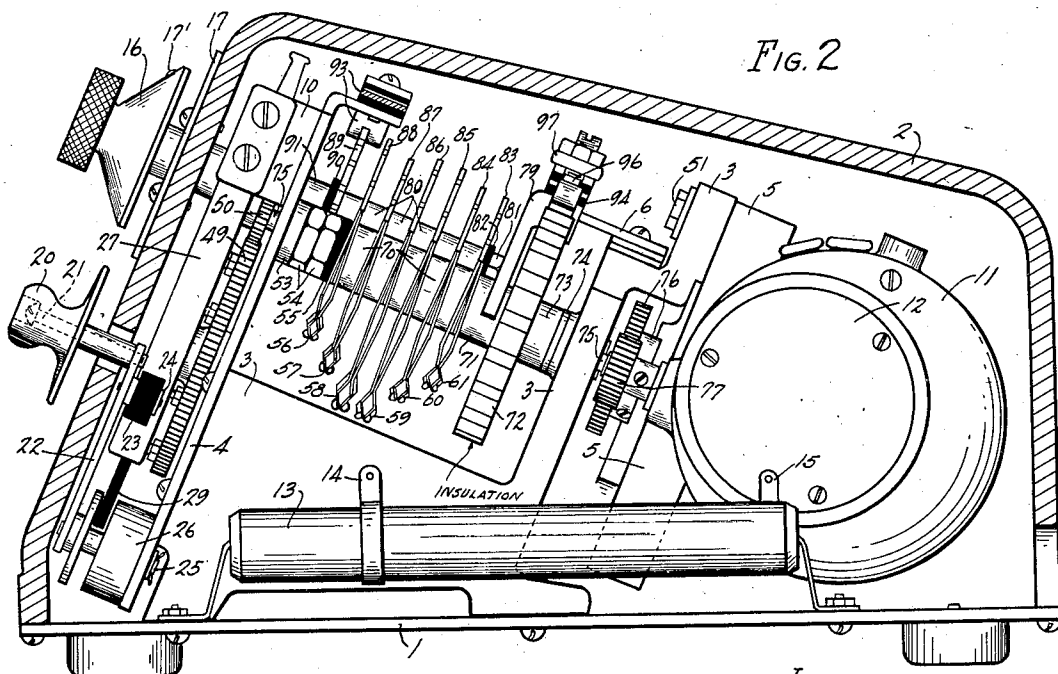
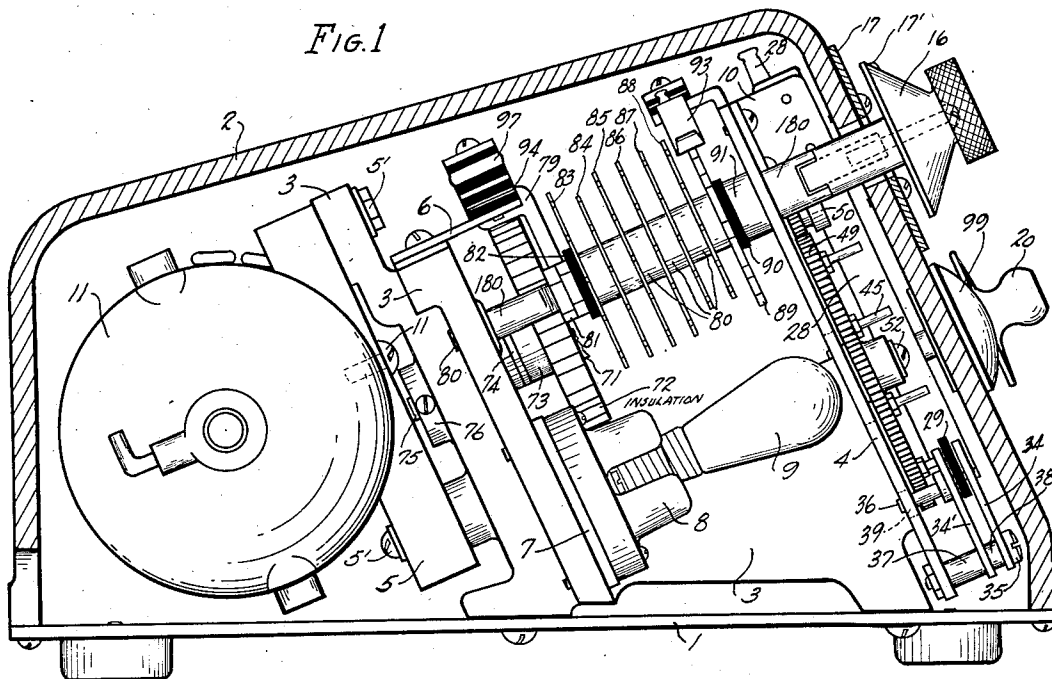
H. F. OBERGFELL ET AL

2,043,673

CODE CALL SYSTEM

Filed Oct. 9, 1933

3 Sheets-Sheet 1



-INVENTORS-
HERBERT F. OBERGFELL
EDWARD S. PETERSON
Wm. Watta Owen ATTY.

June 9, 1936.

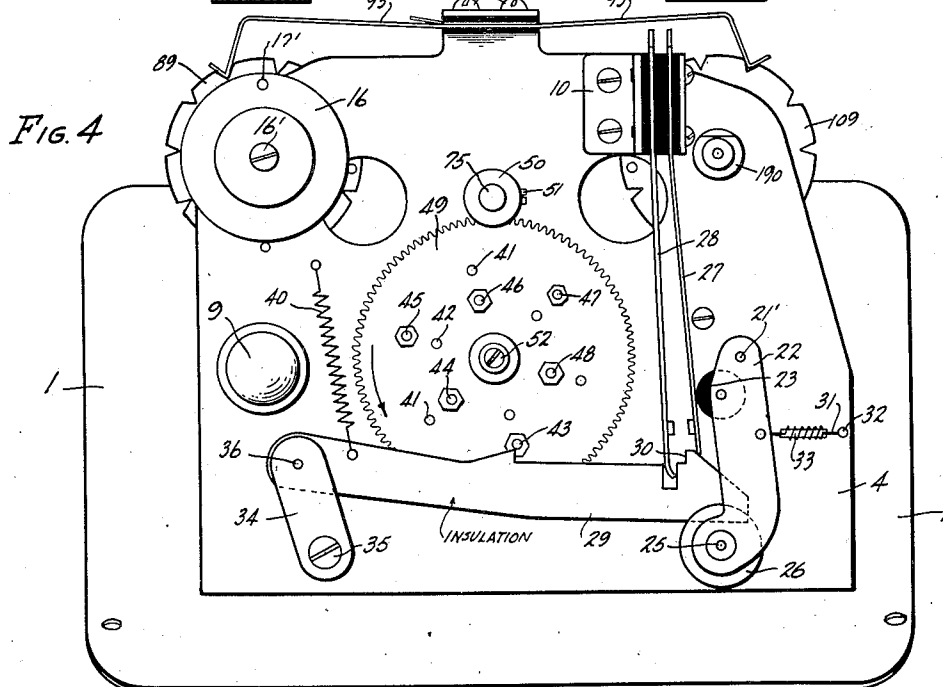
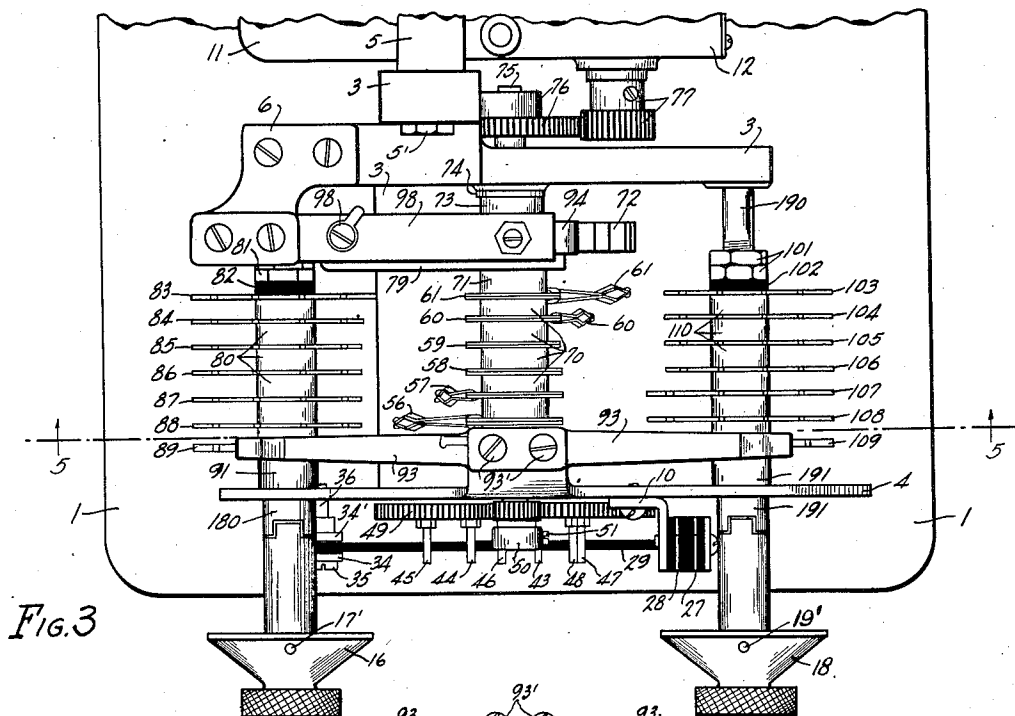
H. F. OBERGFELL ET AL

2,043,673

CODE CALL SYSTEM

Filed Oct. 9, 1933

3 Sheets-Sheet 2



- INVENTORS -
HERBERT F. OBERGFELL
EDWARD S. PETERSON
Mr. Walter Owen. ATTY.

2,043,673

Filed Oct. 9, 1933

3 Sheets-Sheet 3

FIG. 5

FIG. 6

Mr Natho Owen. ATTY:

UNITED STATES PATENT OFFICE

2,043,673

CODE CALL SYSTEM

Herbert F. Obergfell, River Forest, and Edward S. Peterson, Elmwood Park, Ill., assignors to Associated Electric Laboratories, Inc., Chicago, Ill., a corporation of Delaware

Application October 9, 1933, Serial No. 692,732

6 Claims. (Cl. 177—380)

This invention relates to code call systems for operating bells or other devices in accordance with selected codes.

The principal object of the invention is the provision of an improved motor driven code call machine which is small, compact, and simple in construction and reliable in operation.

One of the features relates to the dial and wiper shaft assemblies in which the dial assemblies are manually set in accordance with the desired code to position segments of code discs in the rotary path of the wipers.

Another feature relates to the adjustable code stopping means of the machine which may be set to send the code one, two, three, or six times before it stops.

Another feature relates to the provision of the master code interrupter contacts which are arranged to close the circuit to operate the signals after a wiper engages a segment of a code disc and which are arranged to open the signal circuit before the wiper leaves such segment in order to prevent sparking at the wipers and segments.

Other features will be apparent from the following description of the drawings comprising Figs. 1 to 6, inclusive.

Fig. 1 shows a left-hand side view of the portion of the machine with the right hand code dial assembly and a portion of the wiper shaft removed.

Fig. 2 shows a right hand side view of a portion of the machine with the right hand code dial assembly removed.

Fig. 3 shows a top view with the cover removed.

Fig. 4 shows a front view with the cover removed.

Fig. 5 shows the interrupter contacts and the relative location of the wipers and wiper shaft with respect to the left-hand and right-hand code dial assemblies on the line 5—5 of Fig. 3.

Fig. 6 shows the circuit diagram of the machine for operating the code call signals.

Briefly the machine consists of a universal motor which is operated by either alternating or direct current to rotate six wipers mounted in staggered relation to engage segments of code discs which are manually set by two radial dials. Each dial controls a shaft on which six metal code discs are mounted, each code disc having segments which may be manually rotated to a code position into the path of the rotating wipers. As the motor revolves the wipers certain of the wipers contact the segments of certain of the preset discs to prepare the signalling circuit which is completed and interrupted at the master interrupter contacts controlled by a master interrupter wheel also mounted on the wiper shaft. After the start button is operated the motor will continue to rotate the wipers until the code is completely sent or repeated twice, thrice or six times, dependent upon the setting of the automatic stopping means.

Referring now to Figs. 1 to 5 in detail, the chair shaped casting 3 is fastened to the base plate 1 by means of machine screws and is provided in its rear upright portion with holes in which the dial shafts 180 and 190 and the wiper shaft 75 rotate. The motor 11 is a universal motor arranged to operate on either alternating or direct current and is securely fastened to the bar 5 which is mounted on the rear upward portion of casting 3 by machine screws 5'.

The interrupter spring assembly, comprising the wiping spring 79, springs 94 and 95, interrupter contacts 96, and bar 97, is also mounted on the rear upright part of casting 3 by means of the bracket 6 and machine screws. The porcelain base 8 of lamp 9 is also mounted on casting 3 by means of machine screws and the felt washer 7. The front plate 4 is secured to the front of casting 3 by means of machine screws and provides holes in which the dial shafts 180 and 190 and the wiper shaft 75 rotate. The motor 11 is provided with an enclosed gear box 12 which operates the gear 77 which meshes with the gear 76 secured on the rear end of the wiper shaft 75 by means of the set screw shown. The gear 50 is secured to the front end of the wiper shaft 75 by means of set screw 51 and meshes with the teeth of the stop wheel 49 which is rotated on a stud (not shown) secured to the front plate 4. The stop wheel 49 is held on the stud by means of the washer and machine screw 52 which is screwed into the stud in the plate 4. When the motor 11 is operated the wipers in the gear box 12 and the gears 76 and 77 rotate the wipers and wiper shaft 75, and the gear 50 in a clockwise direction, and the stop wheel 49 in a counter-clockwise direction.

The wiper assembly consists of the fibre disc or wheel 72 mounted on a knurled portion of the shaft 75 against the hub 73 and a hard rubber sleeve 78 is then slid over the shaft 75 against the fibre wheel 72. The brass collar 71 and the wipers 61, 60, 59, 58, 57, 56 each separated by a brass collar 70 are then assembled in the order named over the rubber sleeve 78 after which the fibre washer 55 is slid over the shaft 75. By means of nuts 54 which are screwed on a threaded portion of the shaft 75 the wipers 56 to 61, inclusive, and wheel 72 are securely held in their set positions against the hub 73 of shaft 75. The wipers are held in their positions shown in Fig. 6 and are insulated from the shaft 75 by fibre wheel 72 and rubber sleeve 78 and the fibre washer 55 and rotate with the shaft.

The left-hand code dial assembly consists of the shaft 180 upon which the rubber sleeve 92 55 and fibre washer 90 is first slid over the shaft 180 to the hub 91 after which the centering disc 89 and code discs 88, 87, 86, 85, 84, and 83 each separated by a brass collar 80 are slid over the shaft 180 and rubber sleeve 92, and set in the 60

positions shown in Fig. 6. The fibre washer 82 is slid over the shaft 180 and then the nuts 81 are screwed on a threaded portion of shaft 180 to hold the discs in their set positions so that the discs will rotate with the shaft 180 when turned. By means of the fibre washers 82 and 90 and the rubber sleeve 92 the code discs are insulated from the shaft 180. The code discs are each set to the position shown in Fig. 6 before the nuts 81 are tightened. The front end of shaft 180 is provided with a cut-away portion and an extension shown dotted over which the sleeve of the dial piece 16 extends. A screw 16' extending through the sleeve of the dial piece 16 screws in the shaft 180 to secure the dial piece 16 thereto. The extended portion on the sleeve of the dial piece engages the cut-away portion of the shaft so that when the dial 16 is turned manually the shaft is rotated therewith.

The right-hand code dial assembly is somewhat similar to the left-hand code dial assembly having, however, different coded discs. An insulating fibre washer and the rubber sleeve 192 is slid over the shaft 190 to the hub 191 after which the centering disc 199 and the code discs 198, 197, 196, 195, 194, and 193 each separated by a brass collar 110 are slid over the shaft 190 and rubber sleeve 192 and set in the positions shown in Fig. 6. The fibre washer 192 is slid over the shaft 190 after which the nuts 101 are screwed on a threaded portion of shaft 190 to hold the discs in their set positions so that the discs will rotate with the shaft 190 when turned. The shaft 190 is manually turned by a dial piece 18 similar to the dial piece 16.

Each of the discs have ten segments cut in its periphery. The centering discs 89 and 109 have ten notches between their segments in which the tensioned spring 93 drops to properly position the dial shaft assemblies and in addition completes a circuit to all of the code discs. The code discs 83 to 88, inclusive, and 103 to 108, inclusive, each have a different predetermined number of segments as shown in Fig. 6 and rotate with the shafts 180 and 190 when the dials 16 and 18 are manually positioned for a desired code. The wipers 56 to 61, inclusive, and the fibre cam wheel 72 rotate in a clockwise direction. The wiper 56 in its first half revolution is arranged to wipe over either of the segments on disc 88 only in case the same is properly positioned and wiper 56 in its second half revolution wipes over any one of the segments of disc 108 dependent upon the code position the right-hand dial assembly has been rotated to. In a similar manner wiper 57 wipes over only those segments on discs 87 and 107 which have been positioned in the path of wiper 57. The remaining wipers wipe over the segments of their respective discs in case such segments have been positioned in the path of the wipers in a similar manner. As will be seen from the drawings wipers 56, 57, 58, 59, 60 and 61 are effective in the order named for wiping over any segments of their associated discs which may be positioned in their paths. The fibre wheel 72 has sixteen notches cut in its periphery into which the curved cam of spring 94 drops to separate the signal contacts 96. When the wiper shaft is rotated the curved cam of spring 94 rides on the top of a cam on wheel 72 to close the signal contacts 96. The contacts 96 are heavy tungsten contacts which make and break the signal circuit to the signals. The cams and notches in wheel 72 are arranged to make the signal circuit at a time shortly after a wiper en-

gages a segment and are arranged to break the signal circuit at a time just before the wiper disengages from such segment to prevent sparking at the wipers and segments.

The motor start springs 27 and 28, shown more clearly in Fig. 4, are mounted on the plate 4 by means of bracket 10 and machine screws. The spring 28 is normally held in the cut-out portion of the stop arm 29 while the spring 27 normally rests above the projecting cam of arm 29 as shown in Fig. 4. The stop arm 29 is made of fibre and is rotatably mounted on pin 36 and arms 34 and 34'. The arms 34 and 34' are rotatably mounted on plate 4 by means of the collars 37 and 38 and machine screw 35. The right-hand end of stop arm 29 rides in the groove in the collar 26 which is rigidly secured to plate 4. The arm 22 is rotatably mounted on the collar 26 by means of the stud 25 extending through the collar 26 and is held in place by means of a washer and a cotter pin. A spring 33 fastened to the arm 22 and to the stud 32 in plate 4 normally rotates the arm 22 to the right until the pin 31 inside of spring 33 strikes the stud 32. On the back side of arm 22 is mounted a hard rubber bushing 23 against which spring 27 normally rests. The button 20 is secured to the arm 22 by means of screw 21 which is screwed into the threaded hole 21'. In order to close the motor circuit button 20 is moved to the left thereby causing the insulated bushing 23 to move spring 27 to the left to engage spring 28 and also move spring 28 to the left to move the stop arm 29 to the left. When the arm 29 is moved to the left the center projecting cam of arm 29 disengages from the stop pin, such as pin 43, to allow the spring 40 to raise arm 29. When the button 20 is restored the spring 27 is held in engagement with spring 28 by the shoulder 30 on arm 29 to maintain the motor circuit. The motor now rotates the wiper shaft in a clockwise direction and the gear 50 rotates the stop wheel 49 in an anti-clockwise direction until one of the stop pins, for example, stop pin 45, Fig. 4, engages the center cam of stop arm 29 thereby forcing the arm 29 down to the position shown in Fig. 4 at which time the spring 27 disengages from spring 28 to open the motor circuit and leaves the shoulder 30 and passes over the end cam of arm 29, as shown. Six stop pins, 43 to 48, inclusive, are shown in the stop wheel 49; three of these pins 43, 45, and 47, are secured in stop positions in holes 41 while the remaining pins 44, 46, and 48 are screwed in non-stop positions 42. The gearing between wheel 49 and the wiper shaft 75 is such that the distance between holes 41 is equivalent to one complete revolution of the wiper shaft and since the stop pins 43, 45, and 47 are screwed in alternate holes 41 the stop pins are set to cause two complete revolutions of the wiper shaft before the motor circuit is opened by the operation of arm 29 and springs 27 and 28.

The cover 2 is made of cast aluminum and has openings through which the dial pieces 16 and 18 and button 20 extend, as shown in Fig. 1. The lamp cap 99 is secured to another hole in cover 2 opposite a hole in the plate 4 and lamp 9. The lamp is illuminated whenever the motor springs 27 and 28 are closed. Dial plates 17 and 19 shown in Figs. 6, 1, and 2, are also mounted on the cover 2 and contain numbers indicating the code which will be sent when the small round pins, such as pins 17' and 19', are rotated opposite one of the numbers on the dial plates 17 and 19.

The rheostat 13 is mounted on the base plate 1 and is provided with a fixed terminal 15 and a

sliding terminal 14 in order to vary the speed of the motor.

The movable parts of the machine and their circuit connections are shown in Fig. 6. A three conductor cord extends from the machine to points A, B and C which indicates a three point plug and receptacle similar to the two point plug and receptacle used for extension cords or lamps. The points A and B are connected to the commercial power source which may be either alternating or direct current while the point C is connected to the code call wire which is connected to one terminal of the common signals such as B1, B2, H, and L. The other terminal of the common signals is connected to the lead terminating in point A. A number of receptacles such as the one designated by A, B and C, may be provided and a single machine may be plugged in one of the receptacles during part of the day and during the remainder of the day may be plugged into another receptacle at a different location.

In Fig. 6 the left and right hand dial assemblies are shown positioned to ring the code 1—1. The left-hand dial assembly was positioned by manually moving the pin 17' opposite the numeral 1 on the dial plate 17 and the right hand dial assembly was positioned by manually moving the pin 19' opposite the numeral 1 on dial plate 19. In this set position the wipers 56, 57, 58, 59 and 60 do not wipe over any segments while the wiper 61 wipes over a segment of disc 83 in the first half revolution of the wipers and in the second half revolution of the wipers wiper 56 alone wipes over a segment of disc 108, the other wipers having no segments in the rotary path of the wipers.

Assuming now that a certain party assigned the code call number 1—1 is desired, the dials 16 and 18 are rotated manually by the operator to position the pins 17' and 19' opposite the numerals 1 on the dial plates 17 and 19, respectively. After setting the dials for the desired code the operator will then push the button 20 to the left to close and lock the motor circuit and lamp circuit at springs 27 and 28, as previously described. The motor circuit extends from the A lead of the commercial power source, through the motor 11, movable terminal 14, rheostat 13, terminal 15, springs 27 and 28 to the B lead of the commercial power source. The lamp circuit extends from the A lead through the filament of lamp 9 and springs 28 and 27 to the B lead. The operator is instructed to move the dials 16 and 18 only when the lamp 9 is extinguished, otherwise the movement of any dial after the motor has started will produce a wrong code ring. The operation of the motor rotates the wipers 56 to 61, inclusive, the fibre wheel 72 and the stop wheel 49 in the direction indicated by the arrows. Contacts 96 are intermittently operated by the notches in wheel 72 to make and break contacts 96 during the rotation of the wipers. No circuit is completed until after wiper 61 engages the segment of disc 83 since the contacts 96 are open at this instance. Shortly after wiper 61 engages the segment of disc 83 contacts 96 are operated by the cam on wheel 72 to close the circuit for operating the signals B1, B2, H and L as follows: from the B lead of the commercial power source, springs 27 and 28, arm 97, interrupter contacts 96, spring 95, wiping spring 79 in engagement with the brass collar 71, wiper 61, segment and disc 83, through the brass collars 80 and discs 84 to 89, inclusive, centering spring 93 to the C lead, wiper W, contact 1, through the signals B1, B2, H and

L in multiple to the A lead of the commercial power source. These signals are operated over this circuit until further rotation of wheel 72 breaks the contacts 96 to open the signal circuit. Shortly after the circuit is opened at interrupter contacts 96 wiper 61 disengages from the segment of disc 83. The wipers continue to rotate for a period of time equal to a segment of a disc after which wiper 56 engages one of the segments of disc 108. Shortly after this springs 96 again close to complete another circuit for operating the signals as follows: from the B lead through springs 27 and 28, arm 97, contacts 96, spring 95, wiping spring 79 in engagement with brass collar 71 through the wipers 61 to 57, inclusive, and intervening brass collars 70 to wiper 56 in engagement with a segment of disc 108, brass collar 110, to centering disc 109, centering spring 93, C conductor, wiper W in engagement with bank contact 1, through the signals L, H, B2 and B1 in multiple to the A lead. Since the remaining wipers do not engage any further segments of the discs no further circuits are completed for operating the signals until the wiper 61 again engages the segment of disc 83 shortly after the start of the second revolution of the wiper shaft. On the second half of the second revolution wiper 56 again engages the segment of disc 108 to again operate the signals. The signals have therefore been operated twice in accordance with the code 1—1. Shortly after the wiper 61 passes disc 103 the stop pin 45 on stop wheel 49 is rotated to engage the center cam of stop arm 29. Further rotation of pin 45 causes the stop arm 29 to be lowered so that the spring 27 leaves shoulder 30 and disengages from spring 28 to open the motor circuit and stop further rotation. The wiper shaft has made two complete revolutions to ring the code 1—1 twice and has rotated stop wheel 49 to cause the stop pin 45 to move the stop arm 29 to the position shown in Fig. 6 to allow spring 27 to separate from spring 28 and stop further rotation of the wiper shaft and wheel 49. In case the stop arm 44 had been screwed into hole 41 of stop wheel 49 the stop pin 44 would be in stop position and would have operated stop arm 29 after only one complete revolution of the wiper shaft to stop such rotation. In addition if only one stop pin is screwed in stop position then the wheel 49 would make one complete revolution before operating stop arm 29 and in this case the code would be repeated six times as the stop wheel 49 makes only one complete revolution for six revolutions of the wiper shaft.

From the foregoing description it will be understood that the stop pins can be set so as to cause the code to be sent once or to be repeated twice, thrice or six times.

It so happens that the code 1—1 can be sent from another setting of the dial assemblies and in this case the left hand dial 16 is rotated by hand to zero position where the pin 17' is opposite the blank space of dial plate 17, and the right hand dial 18 is rotated by hand until the pin 19' is opposite the numerals 1—1 on dial plate 19. In this position or zero position of dial 16 no segments are engaged by any of the wipers. In position 1—1 of dial 18 wipers 56 and 58 alone engage the segments of discs 108 and 106, respectively to complete the circuit for operating the signals. The circuits for operating the signals in this case extend through the interrupter contacts 96 to the wipers 56 and 58 and the engaged segments of discs 108 and 106 to disc 109 and centering spring 93 over the conductor C 75

and through the signals in multiple to the commercial source. The signals can, therefore, be operated in accordance with the code 1—1 from this setting of the dials and the code may be sent only once or repeated in accordance with the setting of the stop pins as previously described.

A single digit code may be sent by operating the left-hand dial 16 to its zero position and the right-hand dial 18 to any one of the single digit positions 1, 2, 3, 4, 5, or 6. For example, assuming that the single digit 5 is to be sent then the left-hand dial 16 is set in zero position and the right-hand dial 18 is set in position 5 with the pin 19' opposite the numeral 5 on the dial plate 19. In accordance with this setting of the dials 16 and 18 no segments of discs 83 to 88, inclusive, are engaged by wipers 56 to 61, inclusive, in their first half revolution but in their second half revolution wipers 56, 57, 58, 59, and 60 successively engage the segments on discs 108, 107, 106, 105 and 104, respectively, which have been positioned in the path of the wipers by the setting of the dial 18 to its fifth position. In the same manner as previously described the signals are operated in accordance with the code 5 for each revolution of the wiper shaft, that is, the signals are operated each time a segment is engaged by a wiper and in this case since five segments were encountered by five wipers in succession the signals were operated five times in accordance with the code 5.

From the foregoing descriptions it can be seen that the codes are determined by the setting of the dials 16 and 18 which position segments in the path of the wipers in accordance with the code desired. One, two, three or four digit codes can be sent if desired. As previously described one digit codes are sent by positioning dial 16 to zero position and dial 18 to the desired code. For two digit codes both dials 16 and 18 are positioned opposite the two digits of the desired code or if the codes 1—1, 2—1, 3—1 or 4—1 are desired the dial 16 may be set to zero position while the dial 18 is set to the desired code. For three digit codes the dial 16 is set for the first, or for the first and second digits of the code while the dial 18 is set for the second and third, or for the third digits of the desired code. For four digit codes the dial 16 is set for the first and second digits of the code while the dial 18 is set for the third and fourth digits of the desired code. The following is a chart showing the various codes available.

The letter L indicates the position to which the left-hand dial 16 is set for such code and the letter R indicates the position to which the right-hand dial 18 is set for such code.

L-R	L-R	L-R	L-R	L-R	L-R	L-R	L-R
0-1	2-1	4-1	6-1	1-2-1	1-4-1	3-1-2	2-1-1-1
0-2	(0-2-1)	(0-4-1)	6-2	2-2-1	2-4-1	3-1-3	2-1-3-1
0-3	2-2	4-2	6-3	3-2-1	3-4-1	3-1-4	2-1-4-1
0-4	2-3	4-3	6-4	4-2-1	4-4-1	3-1-5	3-1-1-1
0-5	2-4	4-4	6-5	5-2-1	5-4-1	3-1-6	3-1-2-1
0-6	2-5	4-5	6-6	6-2-1	6-4-1	4-1-2	3-1-4-1
1-1	2-6	4-6	1-1-1	1-3-1	2-1-2	4-1-3	4-1-1-1
(0-1-1)	3-1	5-1	2-1-1	2-3-1	2-1-3	4-1-4	4-1-2-1
1-2	(0-3-1)	5-2	(2-1-1)	3-3-1	2-1-4	4-1-5	4-1-3-1
1-3	3-2	5-3	3-1-1	4-3-1	2-1-5	4-1-6	
1-4	3-3	5-4	(3-1-1)	5-3-1	2-1-6		
1-5	3-4	5-5	4-1-1	6-3-1			
1-6	3-5	5-6	(4-1-1)				
	3-6		5-1-1				
			6-1-1				

In some organizations it is found desirable to assign more than one code to a single person, the

code being used to indicate what action the person is expected to take. For example, the regular code may indicate that the person is expected to call the operator. The regular code with the digit 1 used as a suffix may indicate that the person is wanted in the office. When the suffix digit 1 is used the following codes may be used:—

-1	2-1	3-1	4-1	5-1	6-1
1-2	2-2	3-2	4-2	5-2	6-2
1-3	2-3	3-3	4-3	5-3	6-3
1-4	2-4	3-4	4-4	5-4	6-4

Additional suffixes, if desired, may be used on certain codes, each different suffix added to a person's code indicating a different action to be taken by such person.

Sometimes it is desirable to operate the signals by low voltage and in such instance a relay, such as R, is connected across the A and C leads to complete, at its armature, the circuit for operating the signals. For example, the wiper W would be moved to second position to connect the lower terminal of relay R to the C lead and the signals B1, B2, H and L will be operated through a step-down transformer (not shown) and the armature of relay R each time the relay R is operated; it being understood that relay R is operated by the code call machine in accordance with the code in the same manner as previously described for the signals.

Under some conditions it may be desirable to split the signalling circuits so that when calling or paging a certain individual the code will only be sounded in that portion of the system in which the individual wanted is generally found. When this feature is desired the code call machine may be equipped with a sub-base in which three keys, such as keys F, O, and Y, are mounted. The key F controlling the signalling circuit in the factory, the key O controlling the signalling circuit in the office, and the key Y controlling the signalling circuit in the yards. In this modification the operator would set the dials of the machine in accordance with the individual's code and would operate the key of the signalling line desired before operating the start button to start the motor. In case the key F was operated then the signalling circuit extends from the B lead over the previously traced circuit through the contacts 96, wipers and discs to lead C and from thence over wiper W, bank contact 3, key F and the factory bells FB to the B lead. The signals in the factory alone in this case are operated in accordance with the code. While a plurality of different types of signals, such as bells B1 and B2, horn H, and lamp L, are shown connected to the signalling lead C, it will be understood that all the signals may be of one type if desired.

Having described the invention, what is considered to be new and is desired to protect by Letters Patent will be set forth in the following claims:

What is claimed is:

1. In a code sending machine, a dial shaft, a plurality of discs, a plurality of projecting segments on said discs, notches between certain segments on said discs, said discs longitudinally spaced on said shaft with the segments and notches spaced to form a plurality of different codes, one for each rotary position of the shaft, a code sending position contacting means having wipers each cooperating with a corresponding disc and staggered in the plane of their movement so that only one wiper will cooperate with its corre-

sponding disc at a time, means for positioning the segments used in sending a selected code to code sending position by manually operating the dial shaft to select the desired code, a code sending circuit including said discs and said contacting means, means for operating said contacting means to engage the segments in code sending position to transmit a code of impulses determined by the number and position of the notches and segments in code sending position.

2. In a code sending machine, a dial shaft assembly comprising a plurality of discs spaced longitudinally on said shaft, projecting segments and receding notches on said discs, each disc having a corresponding number of spaces in which either only one segment or only one notch is located, each different disc having a different number of segments and notches, some of said segments on a disc being adjacent and others separated by one or more notches, said discs assembled on said shaft with the segments and notches spaced to form as many different codes as there are spaces on a disc, means for selecting a desired code by rotating said dial shaft to position only one of the segments of certain discs in code sending position, and wipers each cooperating with a corresponding disc and staggered in the plane of their movement so that only one wiper will cooperate with its corresponding disc at a time to transmit the selected code, the code consisting of one impulse for each disc having a segment in code sending position.

3. In a code sending device, a shaft carrying a plurality of wipers spaced along said shaft and staggered in the plane of their movement, a pair of code selecting shafts mounted parallel to the first shaft and each having a contact disc for each wiper, said contact discs spaced along their shafts corresponding to the spacing of said wipers, means whereby each code selecting shaft may be manually rotated to any of a plurality of code positions in each of which certain contacts on the discs of each shaft are brought into the path of its associated wiper, and means for there-after rotating the wiper shaft to transmit a code of impulses consisting of not more than one impulse per disc.

4. In a code transmitter, a wiper shaft carrying a plurality of wipers spaced along said shaft and staggered in the plane of their movement, a shaft carrying a plurality of code discs one for each wiper fixed thereto, each disc having a plu-

rality of contacts on its periphery and a plurality of spaces, said discs spaced along their shafts corresponding to the spacing of said wipers, said code shaft having a plurality of code positions in each of which either only one of the contacts of each disc or a space thereof is brought into the path of its associated wiper, and means for rotating the wiper shaft after the disc shaft has been manually moved to one of its code positions to transmit a code of impulses, the number of impulses depending on the number of discs having a contact in the path of its wiper, and the spacing of said impulses determined by the particular discs having no contacts in the path of their wipers.

5. In a code transmitter, a shaft carrying a plurality of wipers spaced along said shaft and staggered in the plane of their movement, a pair of code setting shafts one on each side of the wiper shaft, each code shaft carrying a plurality of discs one for each wiper, said discs spaced along their shafts corresponding to the spacing of said wipers, and each shaft having a number of code setting positions, each disc having contacts in certain of its positions movable as the shaft is rotated to bring only one of its contacts at a time in the path of its wiper, each code shaft manually settable into one of its code positions, means for then operating the wiper shaft to rotate the wipers, each wiper transmitting an impulse only when it wipes over a contact of a disc having a contact in the path of the wiper, the particular discs having contacts in the path of the wipers determining the number of impulses in a code and the spacing thereof.

6. In a code sending device, a shaft carrying a plurality of wipers spaced along said shaft and staggered in the plane of their movement, a code selecting shaft, discs on said code selecting shaft spaced corresponding to the spacing of said wipers, means whereby the code selecting shaft may be manually rotated to any of a plurality of code positions, contacts on only certain of said discs brought into the path of their corresponding wipers dependent upon the manual rotation of said code selecting shaft, and means for rotating the wiper shaft to transmit a code of impulses consisting of an impulse for each contact encountered by a wiper.

HERBERT F. OBERGFELL,
EDWARD S. PETERSON.