

No. 753,183.

PATENTED FEB. 23, 1904.

W. D. WATKINS.
TELEPHONE SELECTING DEVICE.

APPLICATION FILED AUG. 29, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

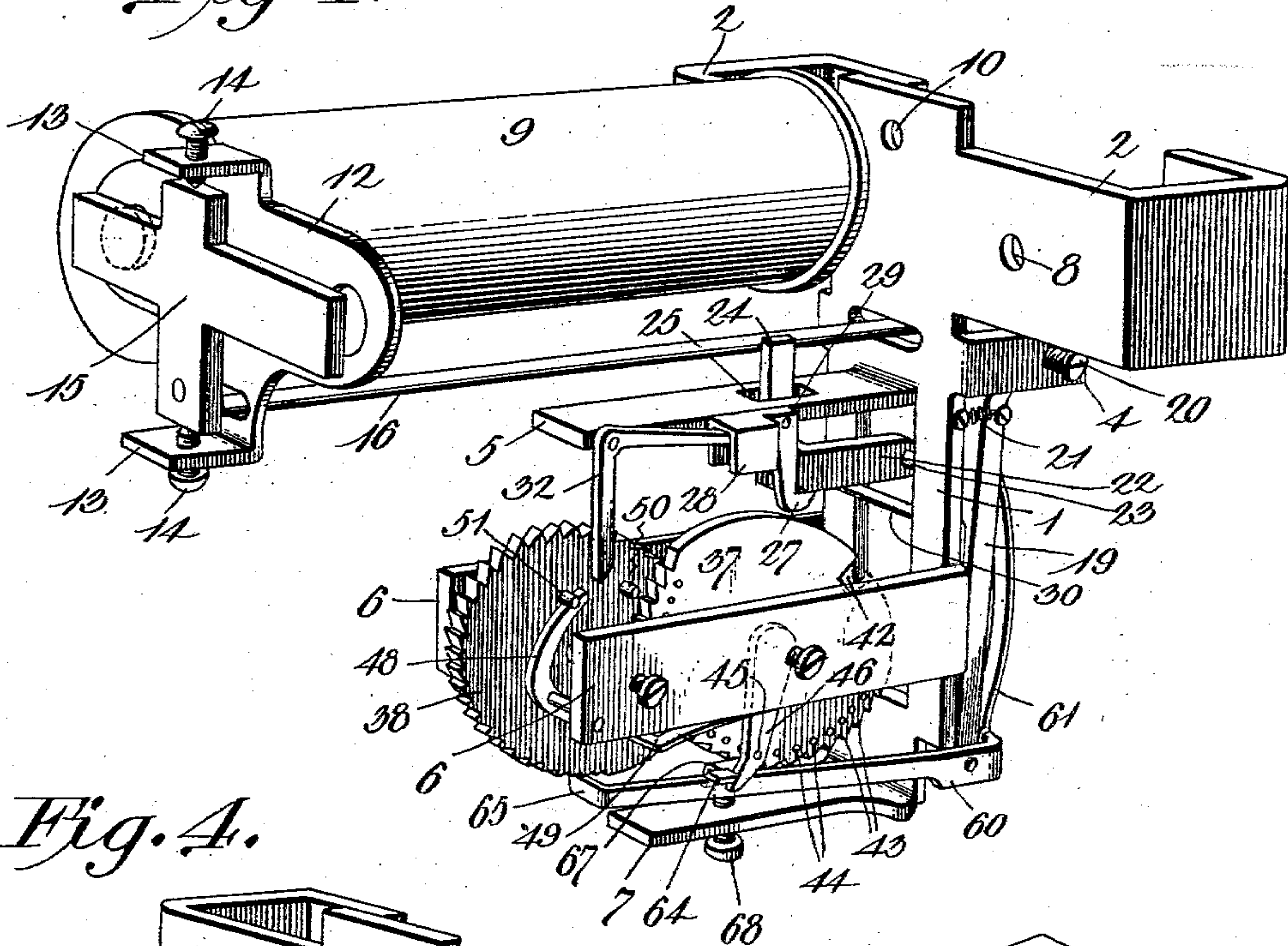


Fig. 4.

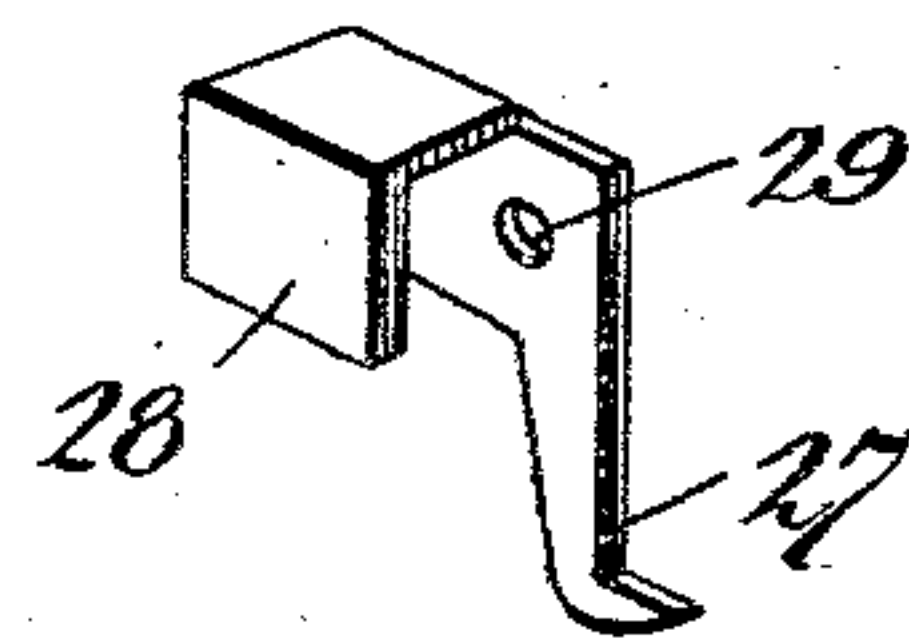
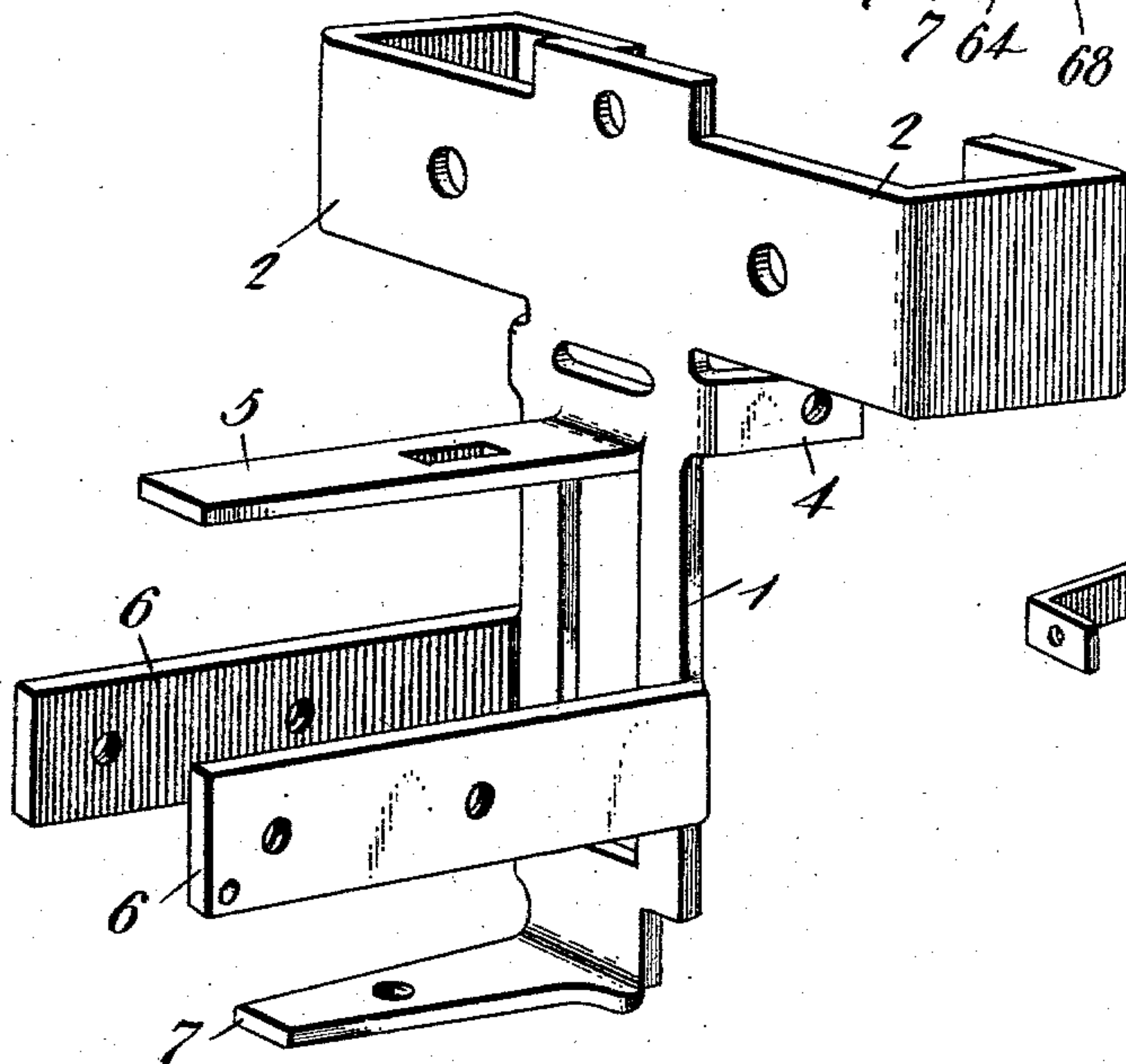


Fig. 6.

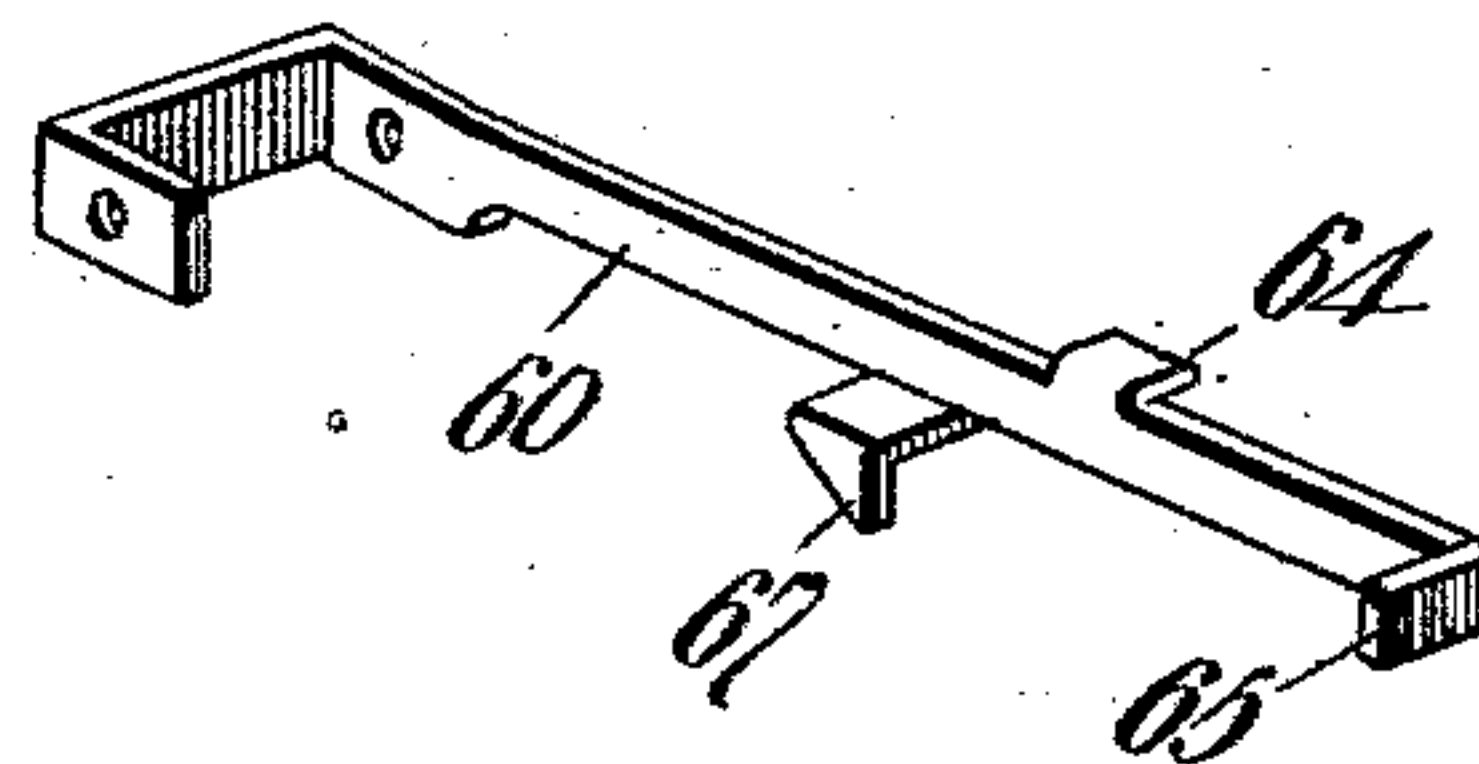


Fig. 5.

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2 SHEETS—SHEET 2.

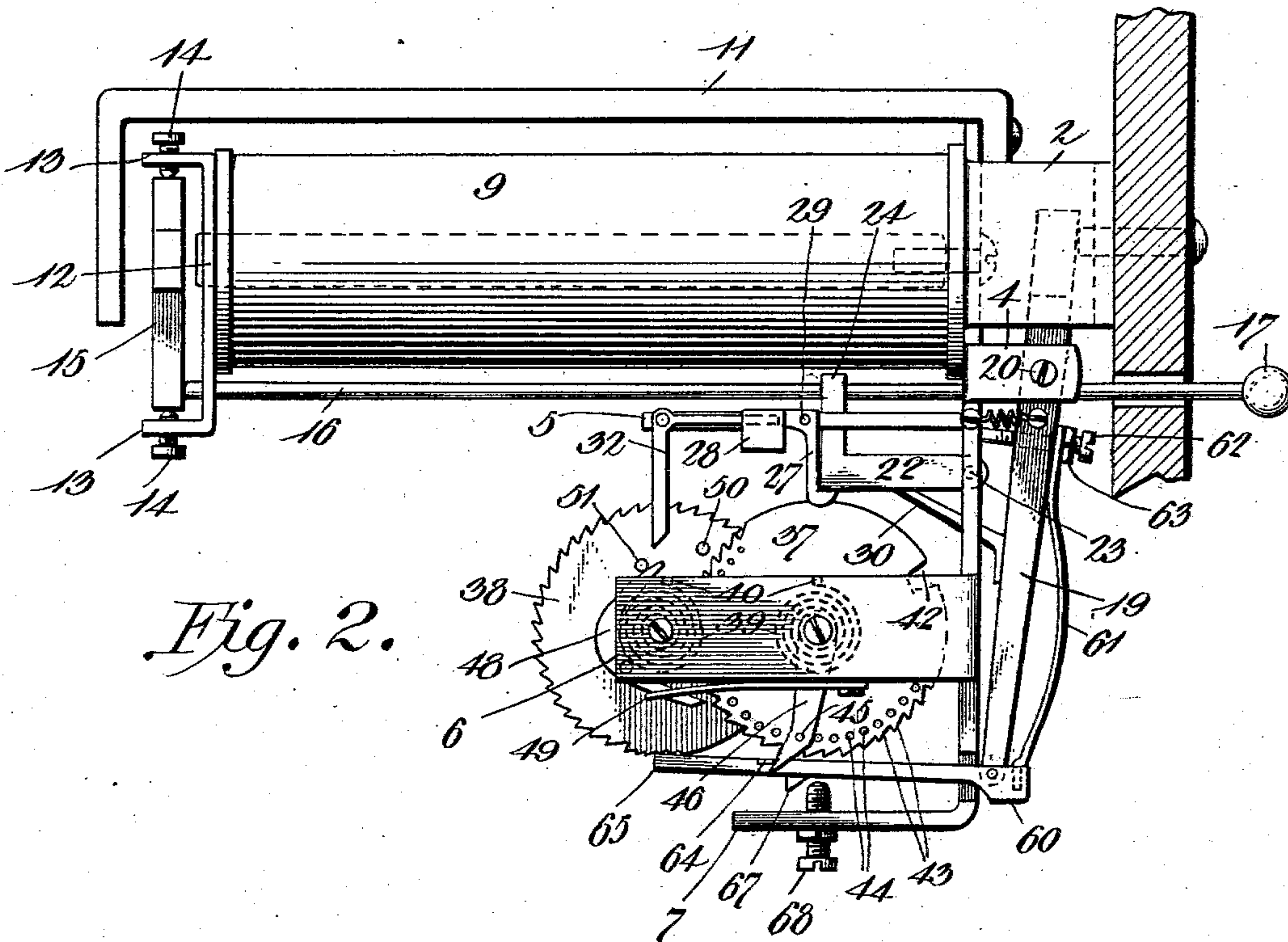


Fig. 2.

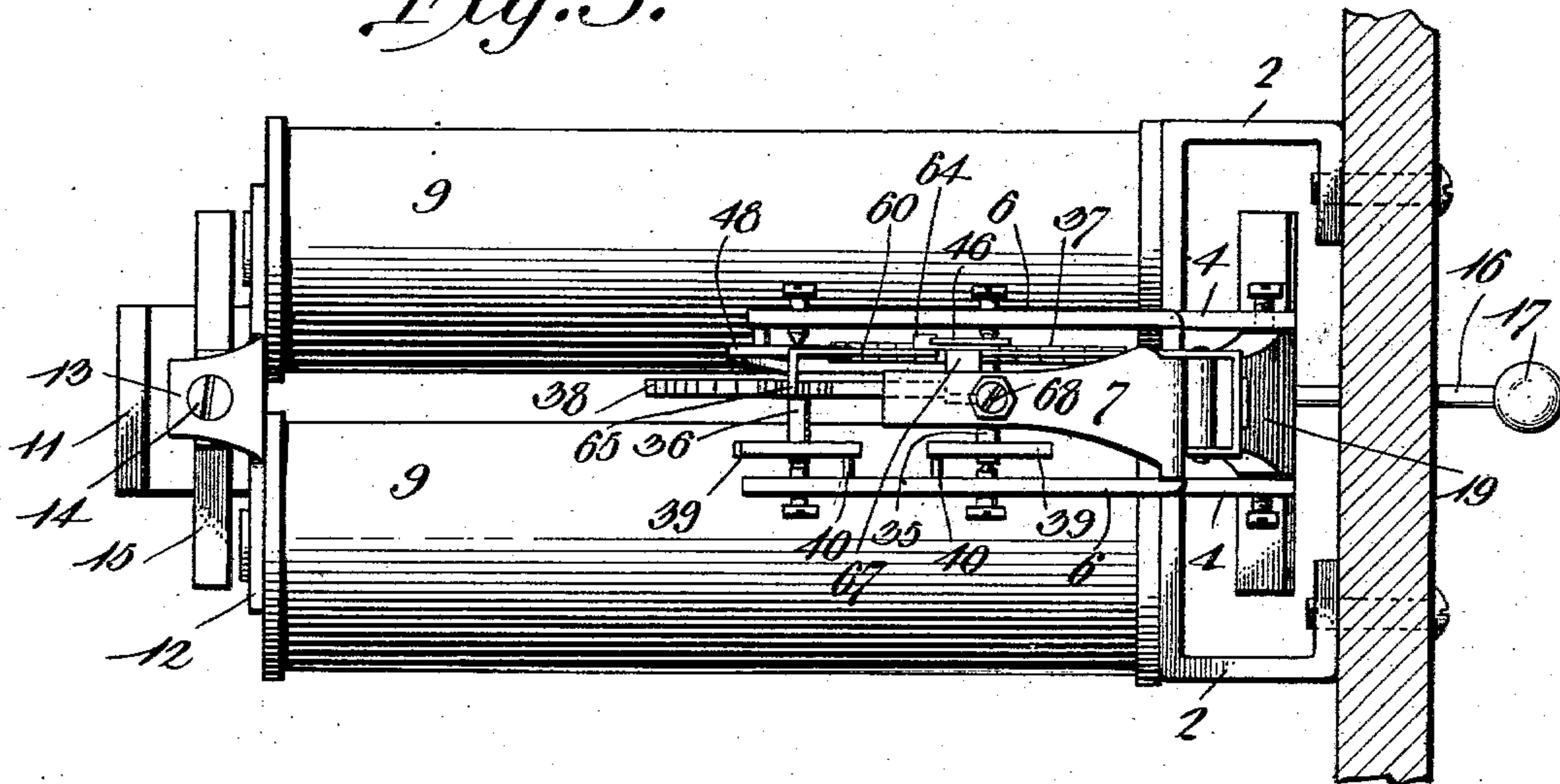


Fig. 3.

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UNITED STATES PATENT OFFICE.

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TELEPHONE SELECTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 753,183, dated February 23, 1904.

Application filed August 29, 1902. Serial No. 121,531. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. WATKINS, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented a new and useful Telephone Selecting Device, of which the following is a specification.

This invention relates to certain improvements in selecting devices for signaling systems, and particularly to telephone selecting devices for use on party-lines where it is desired to ring the call-bell of a selected subscriber without ringing any of the remaining bells on the line.

A still further object of the invention is to provide a selective signaling mechanism having a normally locked bell-clapper rod and in which a polarized armature is disposed at one end of a pair of electromagnets and carries the bell-clapper, while a soft-iron armature at the opposite end of said magnets controls the movement of the clapper-locking mechanism.

A still further object of the invention is to provide a novel form of supporting-frame for carrying the electromagnets and the several members of the selecting device.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a perspective view of a telephone selecting device constructed in accordance with my invention, one of the electromagnets and the permanent magnet being removed in order to more fully illustrate the construction. Fig. 2 is a side elevation of the apparatus. Fig. 3 is an inverted plan view of the same. Fig. 4 is a detail perspective view of the supporting-frame detached. Figs. 5 and 6 are detached perspective views of structural details more specifically referred to hereinafter.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The main supporting-frame of the device is formed from a die-cut sheet of diamagnetic material, such as brass or other suitable metal or compound, the sheets being cut out and then bent or stamped in the manner shown more clearly in Fig. 4. The central bar 1 of the frame is provided near its upper end with a pair of arms 2, bent rearwardly and thence inwardly to form attaching-feet having threaded openings for the reception of securing-screws which pass through the casing of the telephone. Below the arms 2 are a pair of rearwardly-bent arms 4, having openings for the reception of the pivot pins or screws of the soft-iron armature for actuating the disk of the selecting mechanism. The central portion of the main bar is cut out to form a tongue 5, which is bent forwardly at a right angle to the plane of the bar 1 and forms a support for some of the locking members. Near the lower end of the bar 1 are a pair of forwardly-bent arms 6, having suitable openings for the reception of the pivot-pins of the locking and guard disks, and the extreme lower end of the main bar is bent forwardly to form a horizontally-disposed arm 7.

The arms 2 are provided with openings 8 for the passage of securing-screws, which extend into the cores of the electromagnets 9 and form the sole support for said electromagnets, and at the upper end of the main plate there is formed an opening 10 for the passage of a securing-screw, by which the permanent magnet 11 is secured in position. The outer ends of the cores of the electromagnets are connected to a plate 12, having suitable openings for the reception of the cores, and the upper and lower ends of said plate are bent forwardly to form a pair of ears or lugs 13, having threaded openings for the reception of the pivot-screw 14 of the polarized armature 15, said armature being actuated in the usual manner and carrying a clapper-rod 16, having at its outer end a clapper or hammer 17, there being suitable openings in the frame to per-

mit the passage of the clapper-rod. At the opposite end of the electromagnets is a soft-iron armature 19, supported on pivot-screws 20, passing through the threaded openings on the rearwardly-bent arms 4, said armature being attracted each time the magnets are energized and being returned to initial position by a spring 21 when the magnets are deenergized.

The clapper-rod is normally locked against movement by means of a bar 22, pivoted on a pinion 23 to the main arm 1 and having an upwardly-projecting tongue 24 passing through an opening 25 in the arm 5 and engaging one or other side of the clapper-rod and holding the same against movement, so that while the electromagnet is energized each time any subscriber on the party-line endeavors to call another subscriber the armature will be held from movement and the clapper-rod locked in position by the tongue 24 until said tongue is released by the closing of the circuit for a predetermined number of times. The arm 22 is engaged and held in locking position by a catch 27, formed of a strip of metal having an integral counterbalance portion 28, normally holding the catch in engaging position. This catch is pivoted on a pin 29 at one side of the arm 5, and its engagement with the clapper-locking arm is automatic, the clapper-locking arm being elevated to engaged position by the inward movement of the lower end of the armature 19 each time the electromagnets are deenergized, said armature having an inwardly-projecting finger 30 for engagement with the inner side of the clapper-locking arm. The arm 22 need only be elevated after an operation of the selecting device of which it forms a part, and while the finger 30 comes into contact therewith at each movement of the soft-iron armature the movement is only effected after the arm has been dropped to releasing position. To permit the return movement, the under side of the catch is curved or inclined, so that contact with the locking-arm serves to force the same upwardly until the arm reaches the locking position, after which the weight of the catch moves the latter to locking position.

The locking-catch is released by means of a bell-crank lever 32, pivoted near the outer end of the arm 5 and having a horizontal arm extending under the concaved end of the catch and a vertical arm adapted to be engaged and moved to release the catch by a projecting pin on the guard-disk.

The lower arms 6 of the main frame have threaded openings for the passage of pivot-screws, which engage the opposite ends of spindles 35 and 36, carrying, respectively, the locking-disk 37 and guard-disk 38, and on each of the spindles is a light spiral spring 39, connected at one end to the spindle and at the opposite end to a stationary pin 40, projecting from the frame, these springs serving to turn

the disks to an initial position after each operation of the selecting mechanism and, further, to act in connection with the armature to effect a rapid oscillatory movement of said guard-disk.

The locking-disk 37 is provided at one point in its periphery with a notch 42, which is adapted to receive the lower portion of the clapper-locking arm 22 when the notch has been moved to a position immediately under said arm. The disk is further provided with a number of peripherally-disposed ratchet-teeth 43, and within the line of teeth is a row of openings 44 of a number equal to the number of ratchet-teeth, said openings being adapted for the reception of a pin 45, carried by a radially-disposed arm 46, which is free to turn on the spindle 35 to any desired position and then locked by the engagement of its pin in one of the openings 44. The extreme end of the arm 45 is projected beyond the periphery of the locking-disk and forms an extension of the disk-tooth with which it is in alinement, and the position of this arm and its tooth determines the number of times which it is necessary to close the circuit to effect a movement of the locking-disk until the locking-arm 22 and the notch 42 are in alinement. The construction permits of the manufacture of the device by die-stamping, each telephone on the line being provided with a similar mechanism and the arm 45 being adjusted at an angle from the notch 42, dependent upon the number of the telephone. The locking-disk receives a step-by-step rotative movement and is locked in position at each movement by a pivoted pawl 48, carried by one of the arms 5, and held in locking position by a spring 49.

The guard-disk 38 has a toothed periphery and is provided with two laterally-projecting pins 50 and 51, disposed at different radial distances from the center of rotation of said guard-disk. This disk receives a comparatively rapid oscillatory movement, and at the beginning of the movement the pin 51 moves from contact with the tail of the pawl 48, which is normally held away from the locking-disk when the device is not in operation, and at the same time the pin 50 moves beyond the lower inclined end of the depending arm of the bell-crank lever 32 and is retained outside the arm until the locking-disk has been moved to releasing position, at which time the guard-disk will be returned to its normal position by the spring 39, and the bell-crank lever will be moved in such manner as to raise the catch 27 and remove the same from the clapper-locking arm, and after this the pin 51 will move to release the locking-disk holding-pawl 48.

Secured to the lower end of the armature 19 is a pawl-bar 60, preferably formed of a sheet of stamped metal having one end pivoted to

the armature and maintained in proper position by a spring 61, carried by the armature and extending inside the bent portion of the pawl-bar. As a convenient means for holding the spring in position the armature stop-screw 62 is provided with an auxiliary nut 63, which confines the spring in place and at the same time acts as a jam-nut to hold the stop-screw in adjusted position. The pawl-bar carries two pawls 64 and 65, adapted, respectively, to engage the teeth of the locking and guard disks and is further provided with a downwardly-bent inclined lug 67, which is adapted to engage with the upper end of a screw 68 when the soft-iron armature is attracted and the pawl-bar is moved outwardly. The screw 68 is carried by a threaded opening in the lower horizontal arm 7 of the frame.

In the operation of the device, the parts being in the normal position, the electromagnets are alternately energized and deenergized, the circuit being closed by the calling subscriber in accordance with the number of the selected telephone. The polarized armature and clapper-rod are locked by engagement with the tongue 24 of the arm 22 and cannot move to sound the call-bells; but the soft-iron armature 19 is attracted each time the electromagnets are energized and is released and restored to normal position each time the magnets are deenergized. At the first movement of the pawl-bar the guard-disk 38 is rotated until the pins 50 and 51 are moved to proper position, the pin 50 passing beyond the depending arm of the bell-crank lever and the pin 51 being moved to release the locking-disk holding-pawl. It will be noted that the lower end of the depending arm of the bell-crank lever is inclined to permit the free passage of the pin 50 when the guard-disk is actuated by the pawl-bar, and during this movement the horizontal arm of the bell-crank lever swings from contact with the weighted arm of the catch 27 and then returns to initial position after the pin 50 passes, so that at the completion of the selecting movement the arm will be in position to receive the impact of said pin and raise the catch from the locking-arm 22. The further movement of the pawl-bar moves the pawl 64 into engagement with the extended tooth of the arm 46 and the alining-tooth of the locking-disk and rotates the latter for an angular distance equal to one tooth. As the pawl-bar is about completing its movement the inclined lug 67 engages the upper end of the screw 68 and forces said pawl up against the locking-disk, preventing any further movement of said locking-disk. At this time the outer pawl 65 has moved from engagement with the guard-disk, and the latter seeks to return to its initial position under the impulse of the spiral spring 39; but before this position can be assumed the electromagnets are deenergized, the pawl-bar returned to its initial position,

and the magnets reenergized for a second movement, the guard-disk being kept oscillating, while the locking-disk receives a steady step-by-step movement. To effect this result, the calling subscriber closes the circuit rapidly for a number of times equal to the number of the subscriber which he wishes to call, and the selecting devices on the whole system are simultaneously operated. If the subscriber's number be "5," the circuit will be closed four times in rapid succession and at the fifth closing movement will be held closed for a short period of time. The notch 42 of the locking-disk of subscriber No. 5 after the fifth movement will be directly under the locking-arm 22, while the corresponding notches of the remaining subscribers are out of alignment with the respective locking-arms. When the circuit is maintained closed, the last movement holds the soft-iron armature against the poles of the latter, while the guard-disk being free from the pawl is restored to its initial position by the action of the spring 39. On the return movement of the guard-disk the pin 50 strikes the depending arm of the bell-crank lever 32 and raises the horizontal arm of said bell-crank lever until the catch 27 moves out of engagement with the locking-arm 22 and permits the latter to fall into the notch 42. The further movement of the guard-disk brings the pin 51 into contact with the pawl 48 and moves the latter to releasing position; but at this time the locking-disk is held partly by the engagement of the locking-arm 22 in the notch 42 and partly by the contact of the pawl 64 with the teeth of the disk. As soon as the tongue 24 of the locking-arm drops the clapper-rod is released and the polarized armature 15 is vibrated and rings the call-bell. When the calling-circuit is again opened, the electromagnets will be deenergized, and the bell ceases to ring. At the same time the soft-iron armature 19 is restored to its initial position by the spring 21, and the finger 30 elevates the locking-arm 32 until the latter is engaged by the catch 27, and the tongue 24 locks the clapper-rod. The locking-disk is now free to return to initial position on the impulse of the spiral spring, and when this position is reached the extended tooth of the bar 45 comes into contact with the pawl 64 and stops the disk in proper position.

Having thus described my invention, what I claim is—

1. In a telephone selecting device, a toothed locking disk having a notch, a clapper-locking arm adapted to enter said notch to effect the release of the clapper, a catch for holding said arm in locking position, and a toothed guard-disk having means for releasing the catch and permitting the locking-arm to enter said notch.

2. In a telephone selecting device, a pair of

toothed disks, means for imparting a step-by-step movement to one disk and an oscillatory movement to the second disk, a locking-arm for engaging the clapper-rod of the telephone call-bell, a catch for holding said locking-arm in position, and means carried by the oscillating disk for releasing said catch and permitting the locking-arm to move from engagement with the clapper-rod.

3. A selecting system comprising electromagnets, a call-bell or alarm, a clapper-rod, an armature carrying the clapper-rod and adapted to be actuated by the electromagnets, a locking-arm for engaging and holding the clapper-rod in inoperative position, a locking-catch adapted to engage the locking-arm, a toothed locking-disk having a notch for the reception of said arm, a guard-disk having means for effecting a releasing movement of the catch, and an electromechanical means for imparting a step-by-step movement to the locking-disk and an oscillatory movement to the guard-disk.

4. A selecting device comprising a toothed disk, an electromechanical means for effecting a rapid oscillatory movement of said disk, a clapper-rod, a locking-arm for holding the clapper-rod in inoperative position, a counterweighted lever or catch normally maintaining the locking-arm in clapper-rod-engaging position, a bell-crank lever for moving the catch to releasing position, and a pin carried by the disk and adapted to engage said bell-crank lever to effect a releasing movement of the catch.

5. In a telephone selecting device, an electromagnet, an electromechanically-actuated clapper-rod, a clapper-rod locking-arm, an armature for moving said arm to locking position, a catch for engaging and holding said arm, a pivoted bell-crank lever for moving the catch to releasing position, a toothed disk having peripheral teeth, a pin projecting from the disk and adapted to engage said bell-crank lever, and a pawl carried by said armature and engaging the teeth of the disk.

6. A telephone selecting device comprising an electromagnet, an electromechanically-actuated clapper-rod, a locking-arm for engaging the clapper-rod, an armature for moving said arm to locking position, a catch for maintaining the arm in its locked position, and means operable by the movement of said armature for releasing said catch.

7. A telephone selecting device comprising an electromagnet, an electromechanically-actuated clapper-rod, a locking-arm adapted to engage said clapper-rod, a catch adapted to maintain the locking-arm in clapper-rod-engaging position, a finger carried by the armature and adapted to move said arm to operative position, a locking-disk having a notch for the reception of said arm, peripheral teeth on

the disk, a guard-disk having peripheral teeth, a pawl-bar carried by said armature and provided with pawls for engaging the teeth of both disks and for imparting a step-by-step movement to the locking-disk and an oscillatory movement to the guard-disk, a bell-crank lever having one arm adapted to engage the catch, a pin carried by the guard-disk for engaging with and moving the bell-crank lever to effect a releasing movement of the catch, and pawls actuated by the armature for engaging with and rotating said disk.

8. A telephone selecting device comprising an electromagnet, an electromechanically-actuated clapper-rod, a locking-lever for engaging the clapper-rod, an armature for moving the locking-lever to clapper-rod-engaging position, a catch for holding the locking-lever in position, a bell-crank lever having one arm disposed adjacent to the catch, a locking-disk having a notch for the reception of the locking-lever, peripheral teeth on said disk, a pawl pivoted on the fixed stud and engaging the teeth of the disk, a guard-disk having a pin for engaging the bell-crank lever and a second pin for engagement with the pawl, a pawl-bar carried by the armature and having pawls for engaging the teeth of both disks, and means for interlocking one of the pawls and the locking-disk at the completion of a single tooth movement of the latter.

9. In a device of the class specified, a supporting-frame formed of a single piece of diamagnetic material having a plurality of arms bent to form supports for the various portions of the device, a pair of electromagnets carried by said frame, a plate carried at the opposite ends of the electromagnets, a polarized armature supported by said plate, a clapper-rod carried by the armature, a locking-arm pivoted to the frame and serving to release and hold the clapper-rod in inoperative position, a soft-iron armature pivotally mounted on the frame at that end of the electromagnet opposite the polarized armature, a pair of toothed disks supported by the frame, a pawl-bar carried by the soft-iron armature and having pawls for engaging both disks, a notch formed in one disk for the reception of the locking-arm, a catch for holding the locking-arm in clapper-rod-engaging position, a pivoted lever for moving the catch to inoperative position, and a pin carried by the second toothed disk for engaging said pivoted lever, substantially as specified.

10. The combination in a telephone selecting device, of a pair of electromagnets, a polarized armature disposed at one end thereof, means carried by said armature for effecting the sounding of an alarm, a soft-iron armature arranged at the opposite ends of said electromagnets and serving when attracted to bridge the magnet-cores for a more effective

operation of the polarized armature, a locking device normally holding the alarm-sounding mechanism from movement, and means actuated by the movements of the soft-iron armature for effecting the movement of the locking device to releasing position.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM D. WATKINS.

Witnesses:

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W. H. BRUNDIDGE.