

(No Model.)

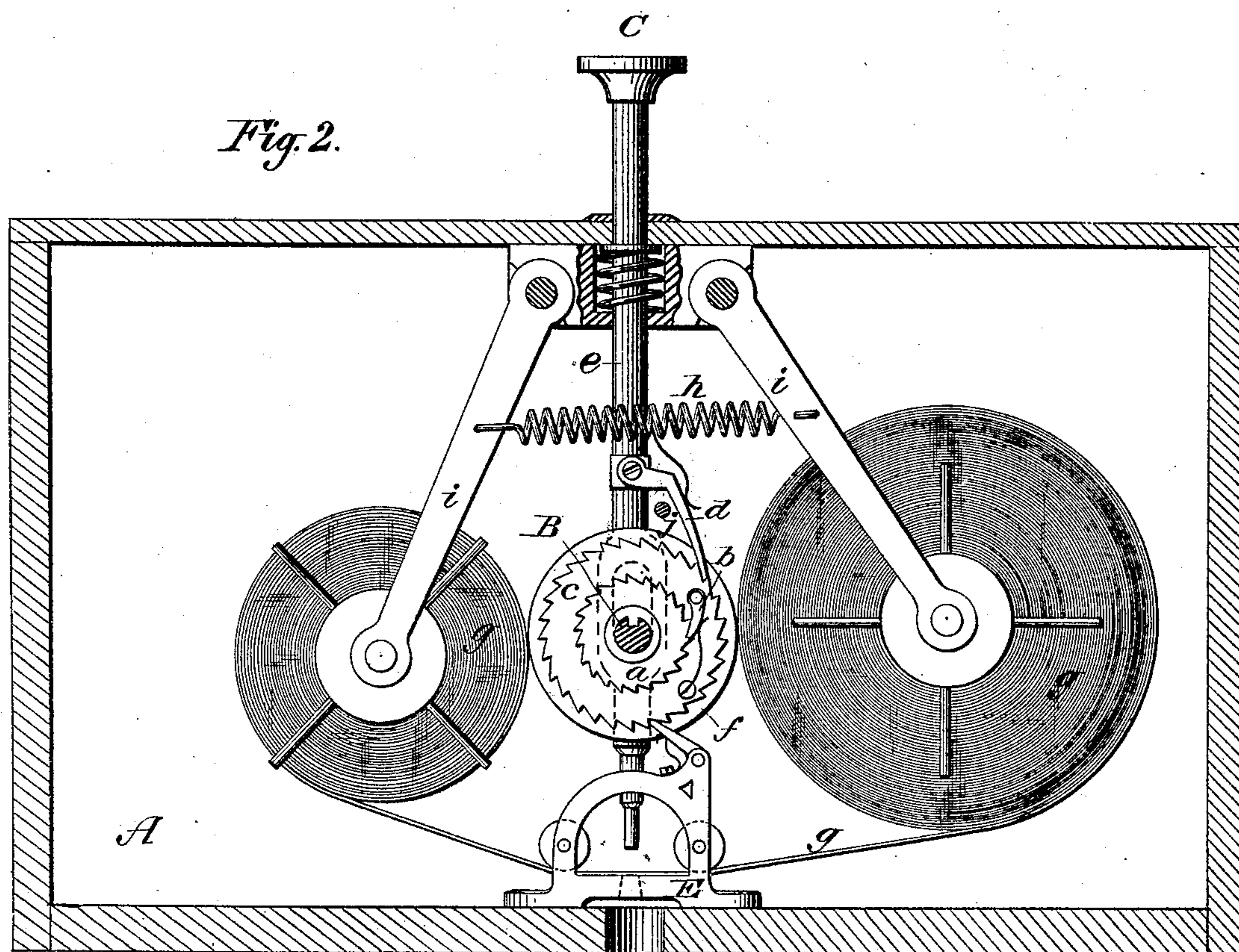
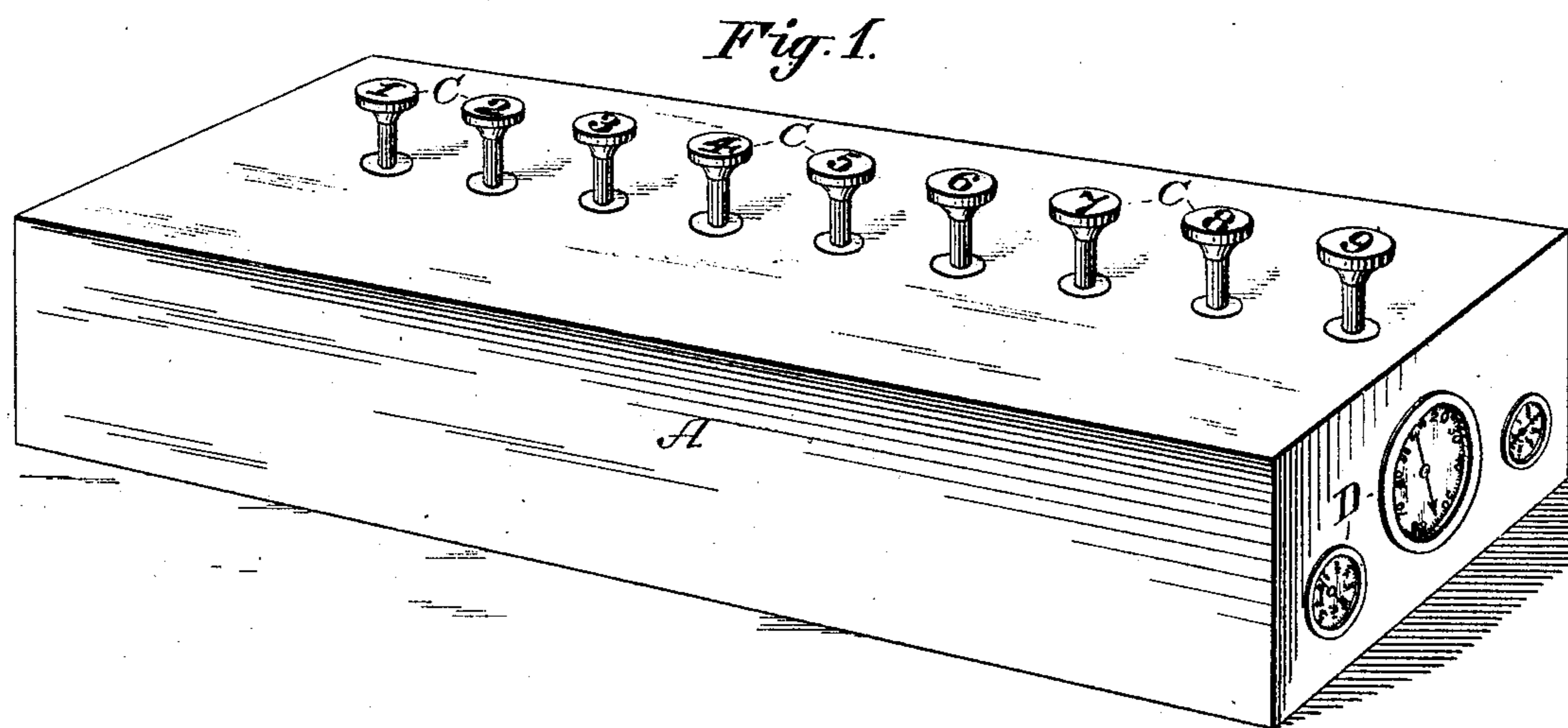
2 Sheets—Sheet 1.

J. O. SHIRAS.

RECORDER FOR TELEPHONE CONNECTIONS.

No. 251,476.

Patented Dec. 27, 1881.



Attest:  
*William W. Dodge.*  
*Danl. Kelly.*

Inventor:  
*James O. Shiras*  
By *Parsons & Parsons*  
Attorneys.

(No Model.)

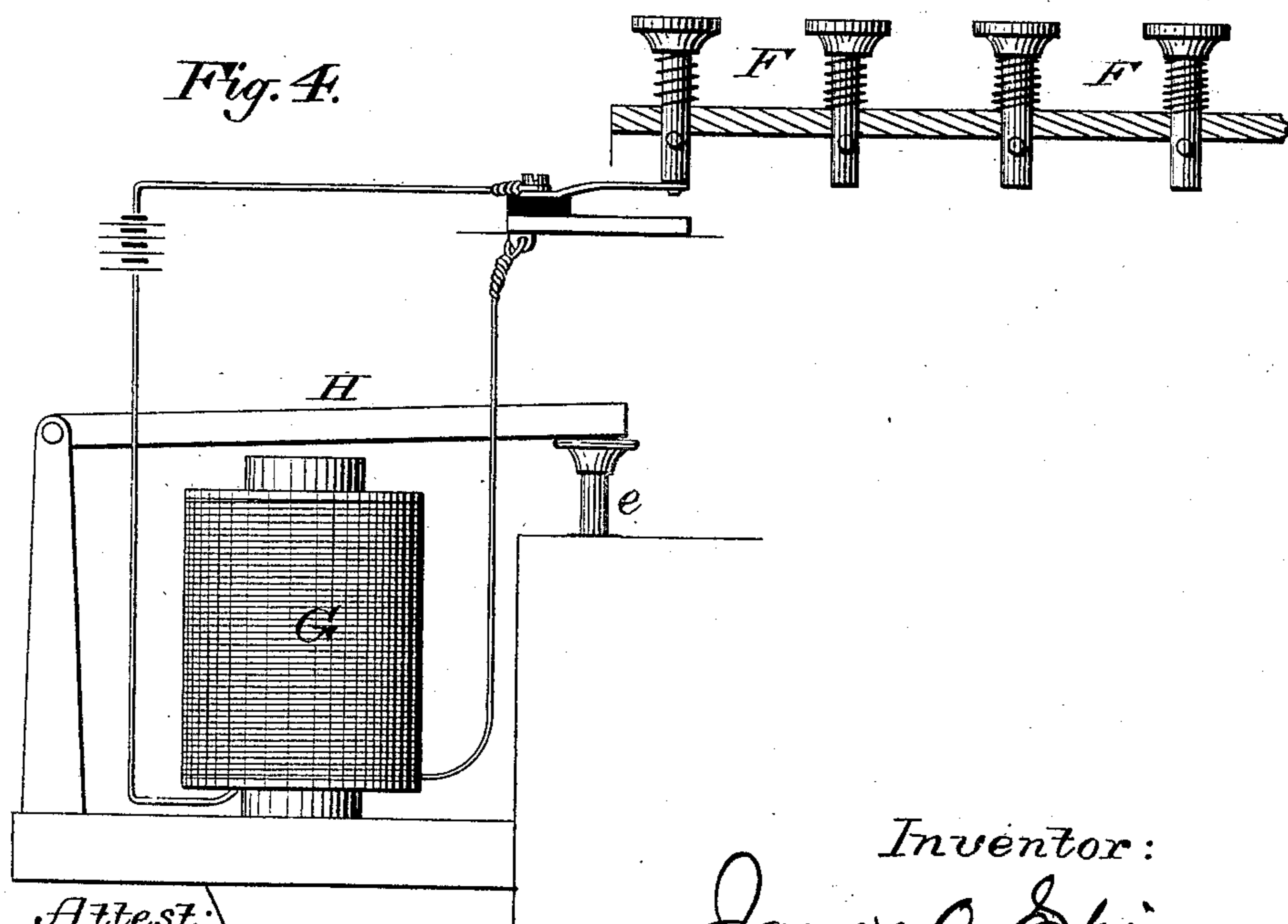
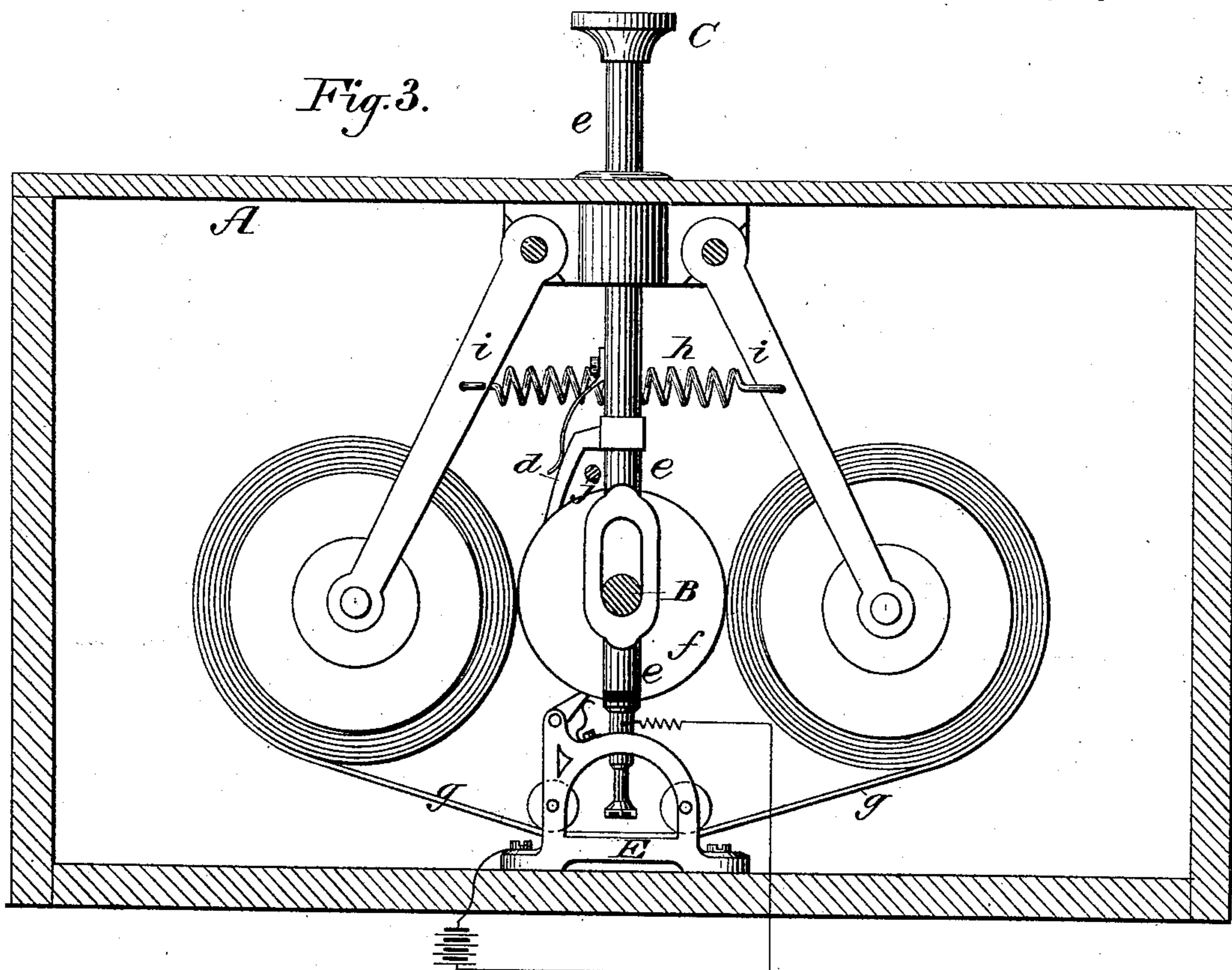
2 Sheets—Sheet 2.

J. O. SHIRAS.

RECORDER FOR TELEPHONE CONNECTIONS.

No. 251,476.

Patented Dec. 27, 1881.



Attest:  
William W. Dodge,  
Dan Kelly.

Inventor:  
James O. Shiras  
By *Pomcisen & Emerson*  
Attorneys:

# UNITED STATES PATENT OFFICE.

JAMES O. SHIRAS, OF CINCINNATI, OHIO.

## RECORDER FOR TELEPHONE-CONNECTIONS.

SPECIFICATION forming part of Letters Patent No. 251,476, dated December 27, 1881.

Application filed April 15, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES O. SHIRAS, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful  
5 Improvements in Apparatus for Registering Telephone-Connections, of which the following is a specification.

My invention relates to apparatus for registering the number of connections made at the  
10 switch-boards of telephone-exchanges and the number of connections of each individual subscriber; and the invention consists in a series of keys or buttons under control and adapted to be depressed by the operator or switch-board  
15 attendant, all arranged to act upon a common register and each arranged to feed and puncture or otherwise mark a strip of paper or like material, or to actuate individual registers of other form; in means for operating such regis-  
20 tering device from a distance; in the peculiar mechanism by which the several operations are effected, and in various details and combinations, hereinafter set forth.

Registering devices have hitherto been con-  
25 structed to be operated in the act of calling the operator at the central office or switch-station; but such arrangement is objectionable in that each call of this nature is registered regardless of failure or success in securing a con-  
30 nection with the desired party, and, further, in that the aggregate number of calls over all lines is not indicated. To overcome these difficulties I apply my registering apparatus at the operator's table or switch-board instead of  
35 at the call-bell, thus bringing all within convenient reach of the operator or attendant, and arrange each to actuate a common or general register, as well as its individual registering device.

40 In the accompanying drawings, Figure 1 represents a perspective view of my improved registering apparatus; Fig. 2, a vertical cross-section of the same; Fig. 3, a view showing the arrangement for discoloring or marking a chem-  
45 ically-prepared strip; Fig. 4, a view illustrating the apparatus for operating the register from a distance.

Referring first to Figs. 1 and 2, the mechanism employed where the apparatus is under the  
50 immediate control and management of the operator will be explained.

A represents a box or case of suitable form and dimensions, and B a horizontal shaft extending longitudinally through the same and furnished with a series of ratchet-wheels, *a*, fast thereon, 55 and each adapted to be rotated by a pawl or dog, *b*, carried by a loose ratchet-wheel, *c*, placed by the side of the first, and in turn arranged to be rotated by a pawl, *d*, upon a sliding stem or rod, *e*, passing out through the top or side 60 of the box, and provided with an elevating spring and a finger-piece or button, *C*, as shown. Under this arrangement it will be seen the depression of any button or stem serves to advance the loose ratchet-wheel, with which it 65 engages, one tooth, and this wheel in turn, through the engagement of its pawl with the teeth of the adjoining fixed ratchet-wheel, advances the latter and its shaft a like distance and causes one stroke to be recorded by the 70 register *D*, with which said shaft connects. It will also be observed that owing to the fact that one wheel in each pair is loose upon the shaft and connected with its companion by a forwardly-engaging spring-pawl, the shaft is 75 allowed to turn forward without moving the loose wheels of any set other than the one actuated by the finger-piece.

Each of the loose wheels *c* has secured to its side a friction-wheel, *f*, opposite both faces of 80 which are located reels or drums *D*, which carry a narrow strip of paper or like material, *g*, one drum serving to take up the strip as it is wound or reeled off by the other. The friction-wheel, being secured to the loose ratchet-wheel 85 in each set, is of course caused to move or rotate in unison therewith, and in doing so imparts motion to the paper-rolls, which are caused to bear with proper force against said friction-wheel by spring-pressure, weight, or 90 like means, a spring, *h*, being shown in the drawings arranged to draw toward one another the swinging arms *i*, in which the reels are mounted. This arrangement is peculiarly advantageous in that the tension of the spring 95 remains always the same. The arms *i*, being jointed or free to swing, adapt themselves to the varying diameters of the paper-rolls, occasioned by the winding of the strip from one reel to the other. 100

The stems *e*, by which the rotation of the paper-reels and the operation of the register

are effected, are arranged to continue their movement slightly after their pawls cease to advance the ratchet-wheels, and formed or provided each with a marking device of some kind at its end to act upon the paper strip at a point between the two reels and indicate each stroke or movement of its finger-piece or button thereby. A rod or bar, *j*, serves to limit the movement of the pawls *b*.

10 In Fig. 2 the stems are represented as adapted and arranged to puncture or perforate the paper strip, a block or plate, *E*, being arranged beneath each, over which the paper strip travels and by which it is supported while being per-  
15 forated, and rollers being arranged to hold the paper upon the block.

The foregoing construction causes the indi-  
cator to be operated by every stroke of a key or finger-piece, and each stroke of a particular  
20 key advances its strip and causes a mark to be made thereon or a perforation to be formed therein. In Fig. 3 the arrangement of parts remains the same, except that the rod or stem and the supporting-block form respectively  
25 the opposite electrodes of a battery-circuit, the paper or strip being in this case chemically prepared, so that upon the passage of the electric current through it a discoloration of such  
30 portion thereof shall take place in the manner well understood. Letters, dates, or other symbols may be thus formed upon the strip. Where the registering-strip is to be stamped with letters, figures, or other symbols a strip of carbonized paper or chemically-prepared  
35 ribbon may be arranged to pass under the stamping device, and so connected with the stamping mechanism of each individual register as to be advanced at each operation of it; or a broad strip may be extended under the  
40 series of registers and so connected with the shaft *B* as to be advanced by its operation, the successive registering-stems being slightly out of line with each other, so as to strike upon different portions of the surface; or the  
45 strip of carbonized paper may be wound in with or placed beneath the registering-strip; or any other convenient method of applying and feeding the carbonized paper or chemically-prepared ribbon may be used.

50 There are as many paper-rolls and buttons or keys, with their attendant mechanism, as there are subscribers' wires and consequent switch-connections, arranged and designated to correspond with said wires, respectively, thus  
55 permitting a record of the calls of each to be kept.

It is sometimes desirable that the registering apparatus shall be located in another room, or at a distance from the operator's table or  
60 switch-board attendant, in order that, although operating the same, the attendant shall be unable to tamper with the record, for the convenience of the book-keeper, or for the purpose of reducing the space occupied in the op-  
65 erating-room.

In such cases a series of buttons, *F*, will be

placed in convenient position to be manipulated by the operator or attendant, each arranged to perfect or complete a battery-circuit when depressed, and thereby to throw into ac-  
70 tion an electro-magnet, *G*, at the desired point, causing its armature *H* to be attracted and to depress the corresponding stem or rod of the registering apparatus, which latter will be of the construction already described.

75 It is obvious that the keys or finger-pieces may be made to operate by an upward instead of a downward stroke by arranging the pawls connected with the operating-stems at the op-  
80 posite side of the center. Such latter arrangement may be found desirable under some circumstances; but ordinarily the other plan will be preferred.

It will also be seen that other forms of regis-  
85 ter may be employed for recording the calls of individual subscribers—as, for instance, a train of gear-wheels provided with indicators or pointers to travel over dials, as in the general or aggregate registering device herein shown. The arrangement shown and described is, how-  
90 ever, deemed best, as it is cheap and simple, and as it admits of the strip or the perforated portion thereof being severed from the roll and attached to the bill rendered a subscriber as an evidence of its correctness.

95 A pinion and gear-wheels may be substituted for the friction-wheel bearing directly upon the paper-rolls, for imparting motion to the paper-reels; but the above-described construction is considered preferable.

100 If desired, the two plans of marking the strip—that is to say, by perforating and by discoloring the same—may be combined and the discoloration made to record the day and hour, the name of the subscriber, or other  
105 matter, while the perforations record the number of calls.

Where several independent switch-boards are employed the individual registering de-  
110 vices of each may be connected by any suitable intermediate mechanism with a register common to all, to indicate the aggregate of all the switches or connections.

The register-keys may be so arranged with reference to the connecting end of the oper-  
115 ator's wire as to be automatically operated in the act of making the switch-connection.

I claim—

1. In an apparatus for registering the calls or connections of subscribers over telephone-  
120 lines, the combination of a register to indicate the aggregate number of connections, one or more recording devices to indicate the individual subscribers to whom the connections are chargeable, and intermediate devices, sub-  
125 stantially such as described, adapted and arranged to simultaneously actuate one of the individual recorders and the aggregate reg-  
ister.

2. In combination with a series of recording  
130 devices adapted to be independently actuated and keep a running record with individual sub-

scribers, a register adapted to be operated by each of said recording devices to indicate the aggregate number of actuations thereof.

5 3. A recording device consisting of two drums or rolls carrying a paperstrip, an intermediate wheel adapted to impart motion thereto, and a reciprocating stem adapted to impart motion to said wheel and to bear upon and mark the paperstrip, substantially as described.

10 4. In a recording device, the combination of two rolls or drums adapted to feed a paper strip, an intermediate friction-wheel adapted to rotate said drums and provided with a ratchet-wheel, and a sliding stem adapted to engage said ratchet-wheel and to bear upon and mark the paper strip.

20 5. In combination with a register-shaft carrying a series of fixed ratchet-wheels, a series of loose ratchet-wheels mounted by the side of the first and carrying pawls to engage with the fixed wheels, independent recording devices connected with and actuated by the loose wheels, and independent movable stems adapted to actuate the individual recording device, substantially as shown and described.

30 6. In a recording registering device, the combination of a friction-wheel, two rolls adapted and arranged to feed a strip of material from one to the other, held against opposite faces of said friction-wheel and rotated thereby, a stem adapted to rotate said friction-wheel, and a marking device adapted to act upon the strip, as and for the purpose explained.

7. In a recording device, a friction-wheel, two paper-reels located respectively on opposite sides of said wheel, adapted to transfer their contents from one to the other and mounted in movable supports, and a spring extending from one of said supports to the other, whereby a uniform pressure is maintained between the friction-wheels and the strip upon the reels. 35 40

8. In combination with a recording mechanism substantially such as described, a series of electro-magnets controlling the operating-stems thereof and a series of buttons or equivalent devices for throwing the electro-magnets into action, whereby each operating-stem may be controlled from a distance. 45

9. A series of register-keys corresponding with and representing a series of subscribers' switch-connections in a telephone-exchange, each key actuating an independent recording mechanism representing a single subscriber, arranged and adapted, substantially as described, for use in connection with the switch board or table under the immediate control of the operator, whereby he is enabled to make and simultaneously to record against the calling party any switch-connection. 50 55

JAMES O. SHIRAS.

Witnesses:

J. OELERING,  
DANL. KELLY.