

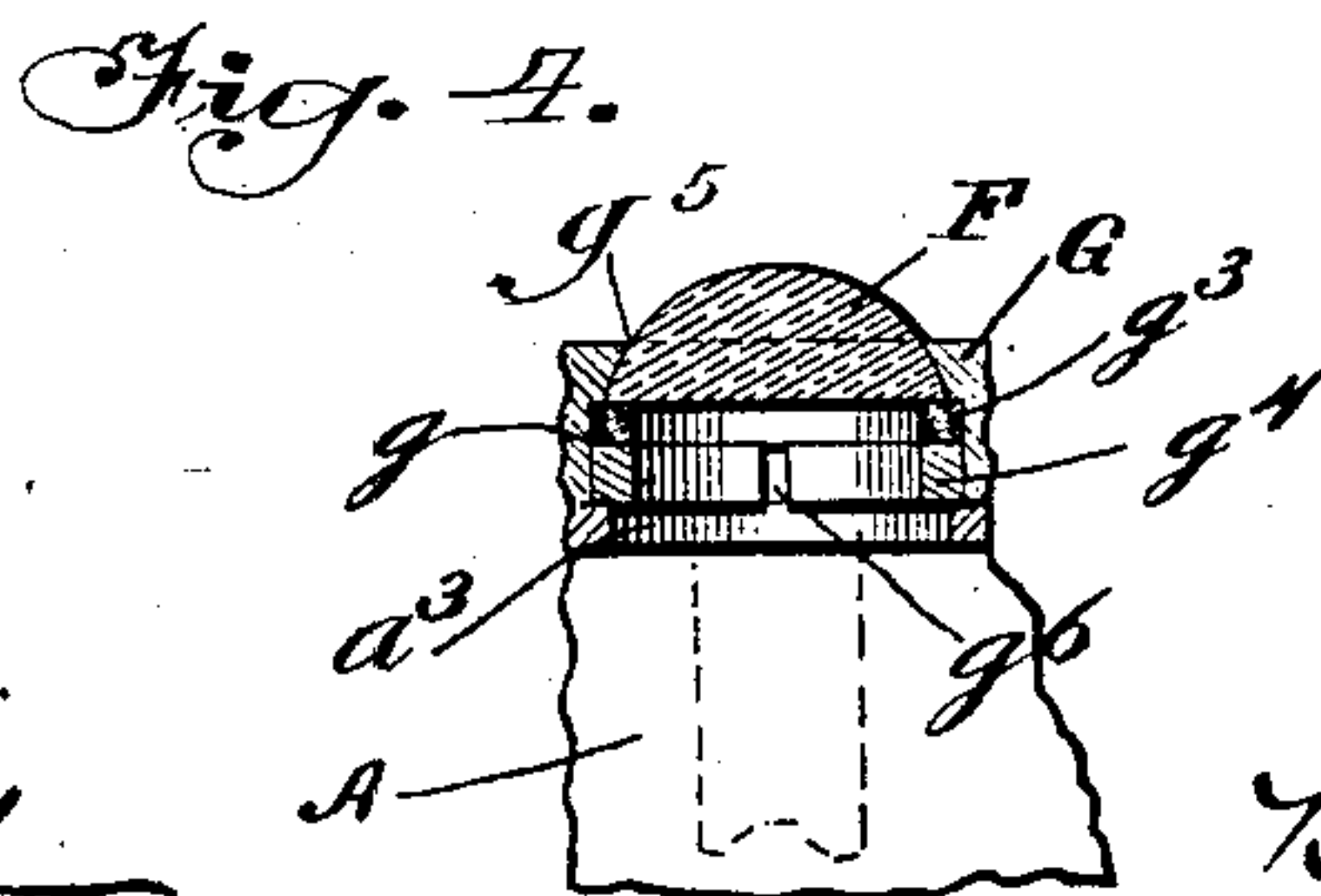
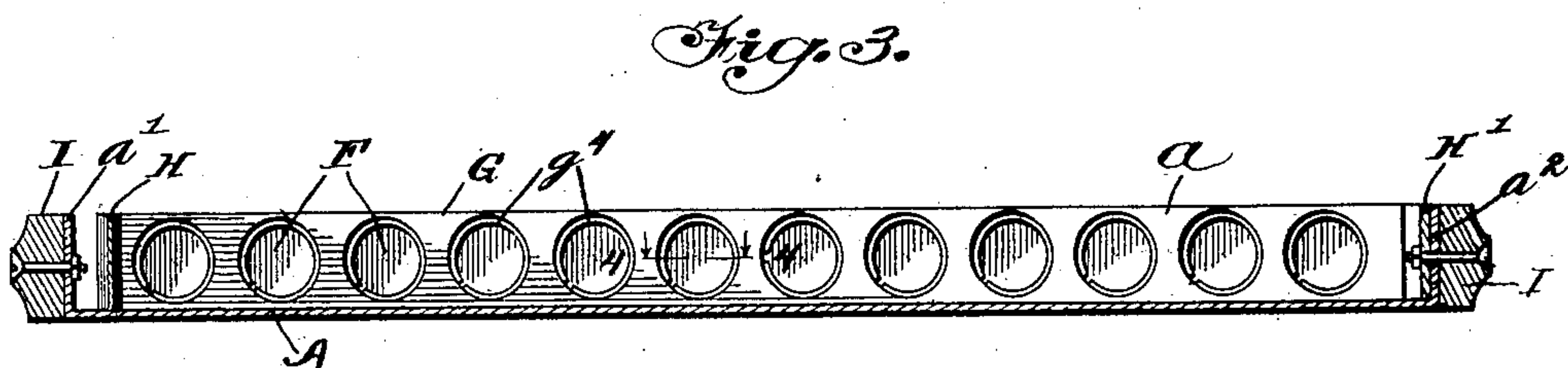
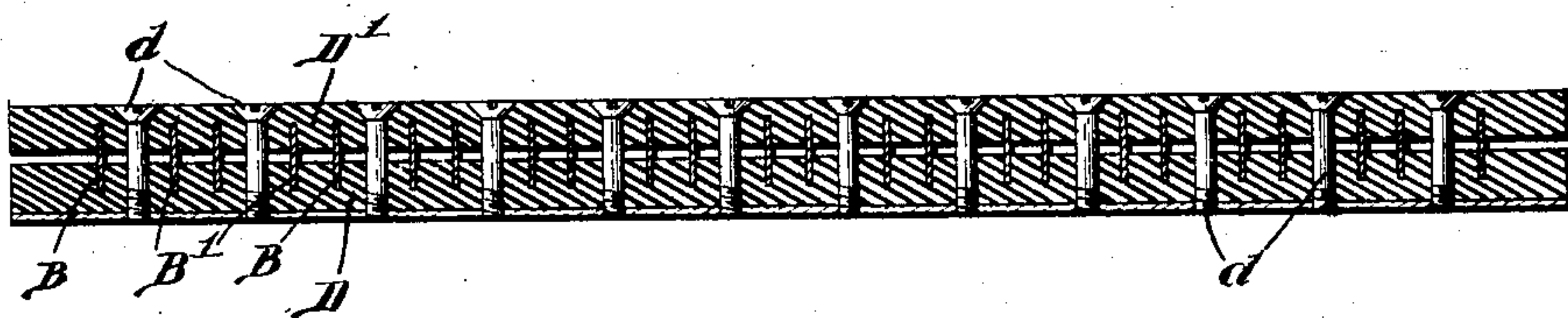
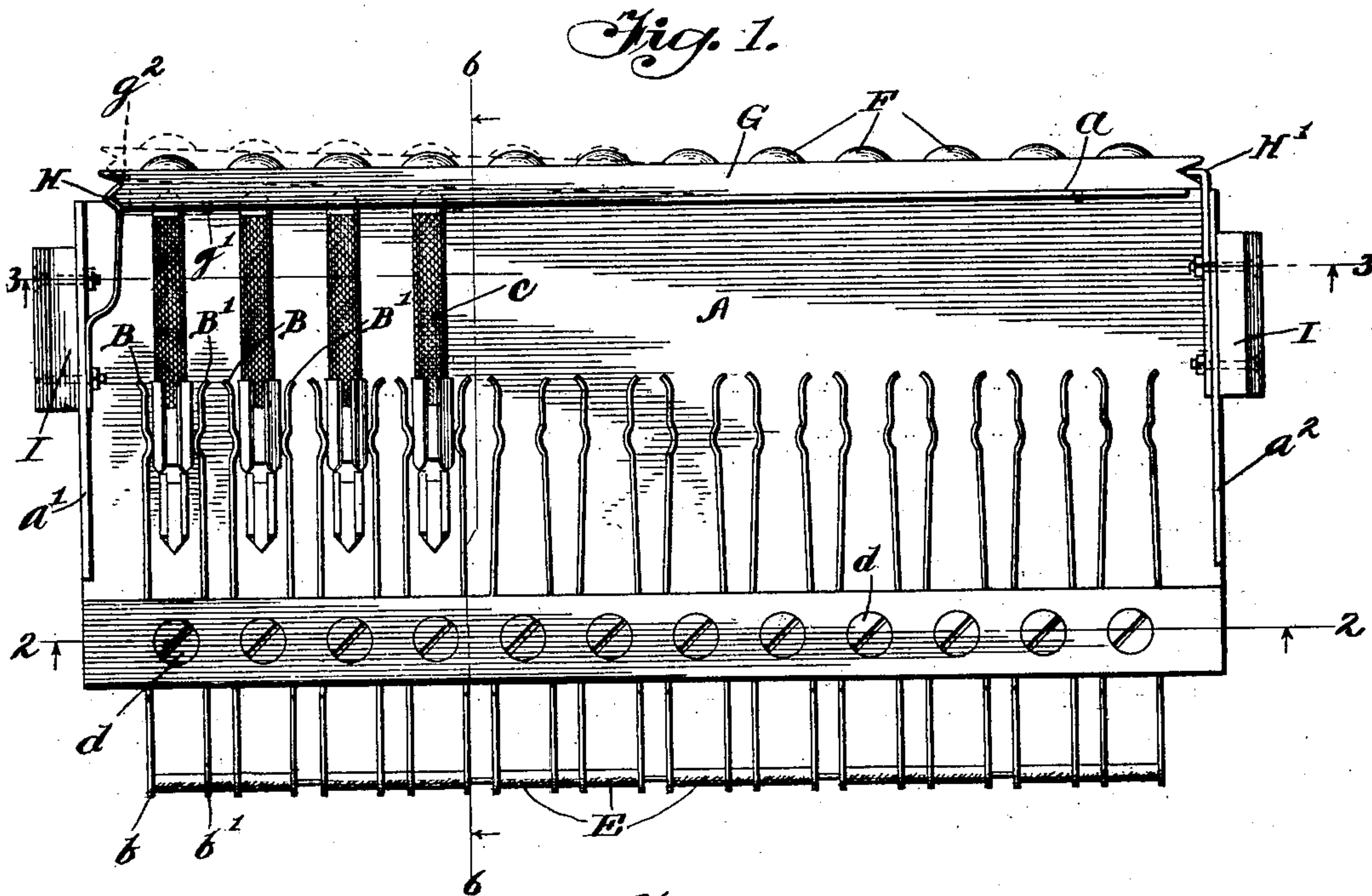
No. 762,279.

PATENTED JUNE 14, 1904.

H. P. CLAUSEN.
TELEPHONE LAMP JACK.
APPLICATION FILED OCT. 12, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



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NO MODEL.

2 SHEETS—SHEET 2.

Fig. 5.

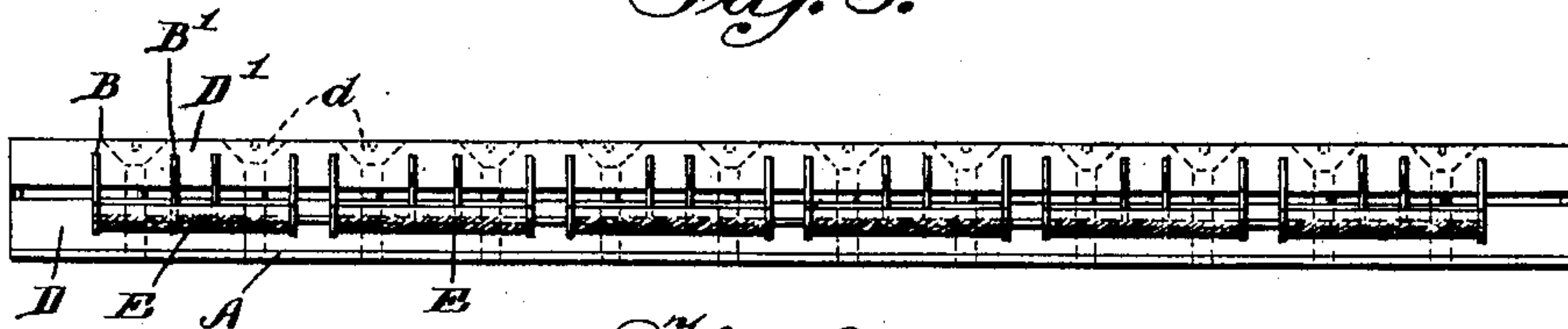


Fig. 6.

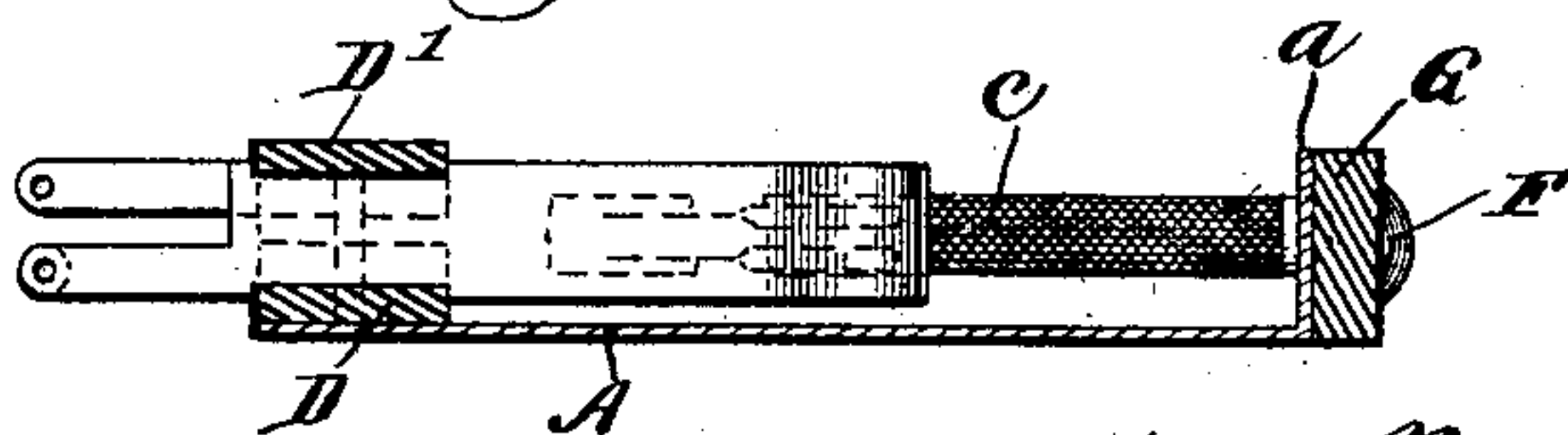


Fig. 7.

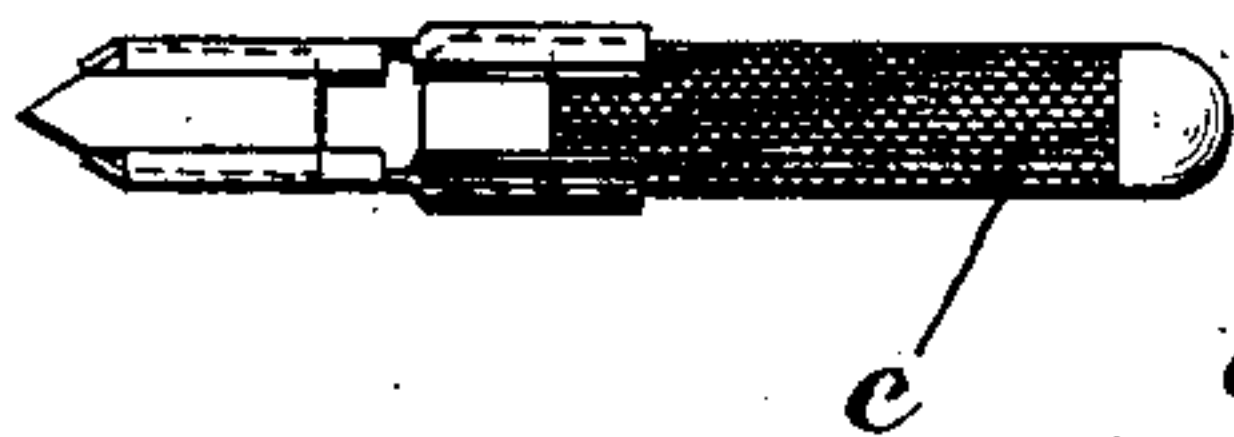


Fig. 9.

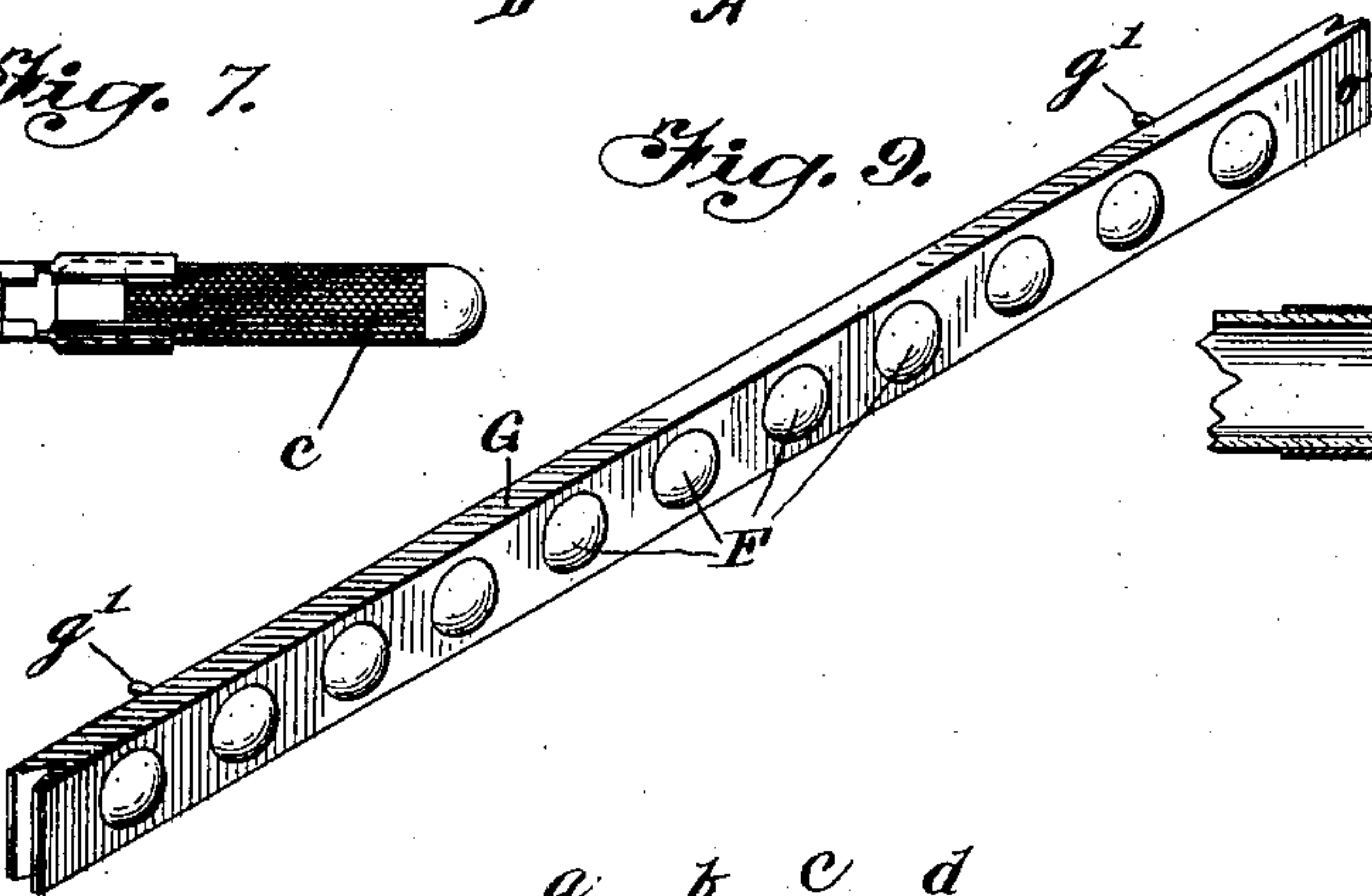
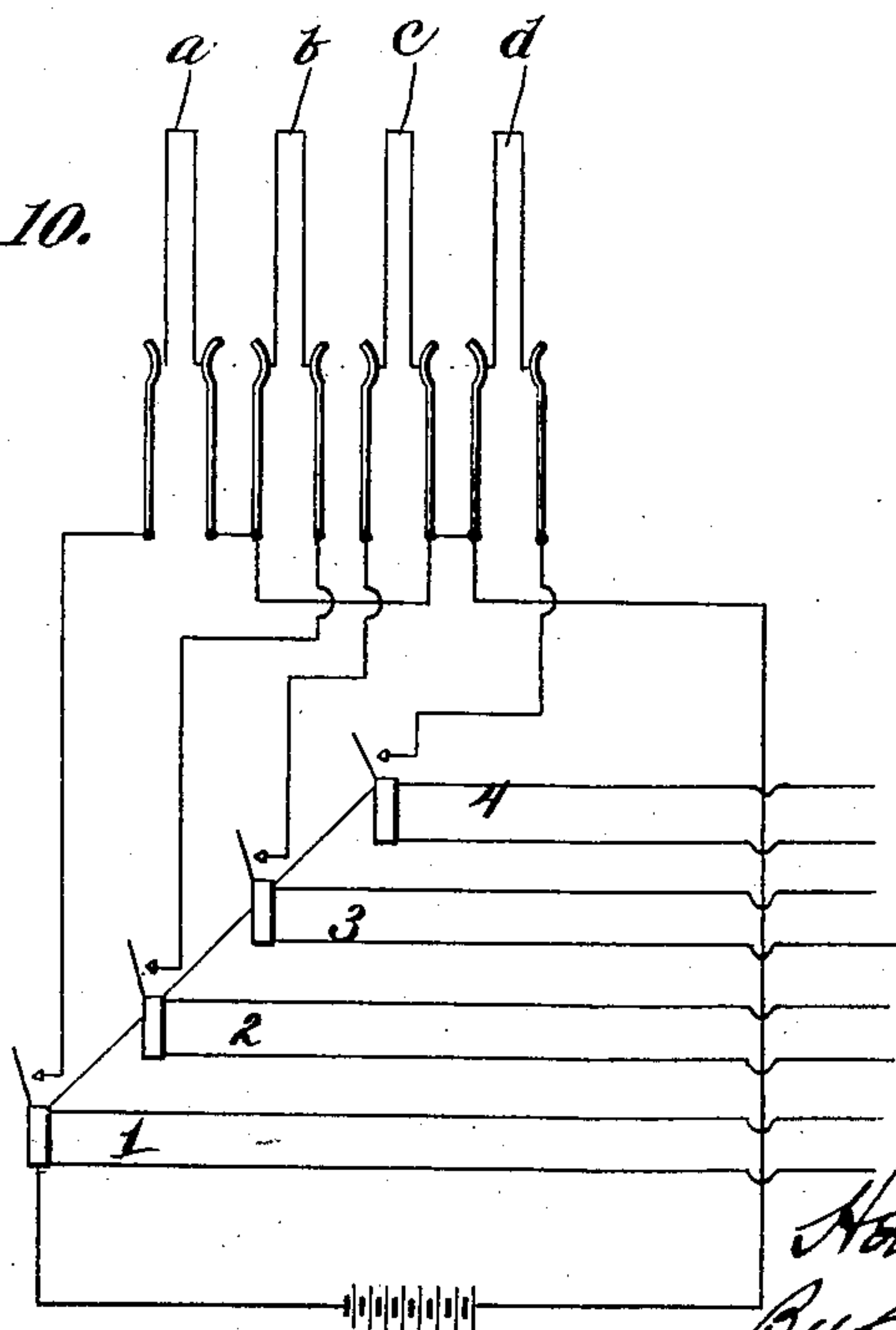


Fig. 8.



Fig. 10.



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UNITED STATES PATENT OFFICE.

HENRY P. CLAUSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN ELECTRIC TELEPHONE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

TELEPHONE LAMP-JACK.

SPECIFICATION forming part of Letters Patent No. 762,279, dated June 14, 1904.

Application filed October 12, 1901. Serial No. 78,415. (No model.)

To all whom it may concern:

Be it known that I, HENRY P. CLAUSEN, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Lamp-Jacks, of which the following is a specification.

My invention relates to electrical signaling devices, and particularly to lamp-signals adapted for use in connection with telephone-circuits. These lamp-signals are usually arranged in groups, each lamp being removably held by a spring device which in telephone practice is known as a "jack" and which in this particular case is known as a "lamp-jack." Each lamp is adapted to operate as a signal—for example, the calling-signal at a telephone-exchange. When employed for this purpose, these lamp-signals or lamp-jacks are, as stated, usually arranged in groups, each group being suitably mounted upon a holder and these holders being arranged one on top of the other. The lamp-jacks and their holders when thus arranged constitute what is known as a "bank" of lamp-signals.

The objects of my invention are to provide a simple and inexpensive form of lamp-jack holder involving in its construction certain details and features of construction tending to reduce the cost of manufacture; to provide a lamp-jack holder which can be readily removed from the switchboard and constructed in such manner as to afford ready and convenient access to the lamps and jacks; to provide an arrangement of the jack-spring terminals which will facilitate the connecting the terminals of the jacks in such manner as to insure against short-circuiting and as to insure the lighting of the lamps; to provide a construction of lamp-holder in which the support for the lamp-prisms can be readily removed from the front of the switchboard without necessitating a removal of the holder; to provide a construction and also certain features of improvement whereby the lamps of each holder may be inclosed in a common chamber without danger of false signaling—that is to say, without the light from one lamp

lighting up more than its allotted prism; to mount the prisms in such manner as to greatly lessen the possibility of their being broken when accidentally struck by the telephone operator, and to provide certain details and features of construction tending to not only reduce the cost of manufacture, but to also render a device of this character more efficient and satisfactory in use.

To the foregoing and other useful ends my invention contemplates a construction in which the top of the holder is open, so as to expose the lamps and jacks, and in which the latter are inclosed in a common chamber. In this way ready and convenient access is afforded to the lamps and jacks, and in order to prevent false signaling the bulb of each lamp is preferably and desirably provided with a heat-proof coating. This coating serves to exclude the light from one lamp to the other—that is to say, it confines the light of each lamp to its allotted prism—and in this way there is no danger of the light from one lamp extending to more than one prism. In other words, the lamps, although arranged within a common chamber, are each operative to illuminate but one prism. The said prisms are preferably and desirably mounted in a removable strip secured to the front of the holder. In this way all of the prisms can be removed together—that is to say, the prisms are given a common mounting which is readily removable from the front of the holder. In order to permit of its ready removal, this prism strip or mounting can be sprung or bent, so as to normally bow inward, and one of its ends can be held in place by a suitable spring-catch. With this arrangement a tool can be applied to said spring-catch, and when the catch is released the end of the prism strip or mounting springs outward, thereby facilitating its removal from the front of the holder. Each prism is preferably held in its socket by a split ring, which is sprung into the opening or socket in the strip, and in order to provide a yielding backing a ring of fiber is preferably and desirably interposed between the back of each prism and the said split ring.

With this arrangement a prism when accidentally struck is free to yield or move inward to a slight extent, a blow or impact upon the front of the prism being sustained by the fiber backing. This yielding action on the part of the prism is also due to the fact that the split rings are capable of slight movement in the prism-sockets. In other words, the prisms are preferably secured in their sockets by rings which are easily pushed out by applying pressure to the front of the prisms and which therefore constitute yielding backings for the prisms.

In use the terminals of the jacks are preferably connected in such manner as to insure against short-circuiting when the spring of one jack is accidentally brought into contact with the spring of the adjacent jack, the jack-spring terminals being arranged in pairs and the pairs being staggered along the back of the holder or strip, as hereinafter more fully explained. In this way with my improved arrangement accidental contact may occur between two jacks without rendering the device inoperative. In other words, I provide an improved arrangement for connecting the said terminals in such manner that the jacks can be arranged very close together in a common chamber without the danger of the device failing to give the desired signal as a result of accidental contact between two or more jacks. The nature and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a plan of a lamp-jack holder constructed in accordance with my invention, it being observed that only four of the jacks are provided with lamps. Fig. 2 is a longitudinal section on line 2 2. Fig. 3 is a longitudinal section on line 3 3 of Fig. 1. Fig. 4 is a detail cross-section through one of the lamp-prisms and adjacent parts or portions of the holder. Fig. 5 is a view of the back edge of the holder. Fig. 6 is a section on line 6 6 in Fig. 1. Fig. 7 is a view of one of the lamps. Fig. 8 is a longitudinal section through one of the lamp-bulbs, showing the heat-proof coating which is applied to the outer surface of the bulb for the purpose of excluding the light from the adjacent lamps. Fig. 9 is a perspective of the removable prism strip or mounting. Fig. 10 is a diagram illustrating the preferred manner of connecting up the jack-terminals with current-supply and relays, it being understood, however, that this figure is intended merely to illustrate one of the many applications of my invention.

As thus illustrated my invention comprises a casing or body A, which is preferably made of sheet metal and provided at its front with an upturned wall a and at its opposite ends with similar upturned end walls a' a'' . The body or casing thus provided is adapted to provide a holder for the lamps and jacks, the

latter in each case consisting, for example, of a pair of contact-springs B and B'. The lamps c are adapted to be held between the contact-springs of the jacks, as shown in Fig 1, and at this juncture it will be understood that each lamp when properly adjusted in place has its filament in circuit with the two contact-springs composing the jack. These contact-springs are preferably held or clamped between a pair of yielding bars D D'. These bars are preferably secured to the back edge of the holder by means of screws d . With this arrangement the contact-springs constituting the jacks are readily removable for the purpose of repair or substitution. Furthermore, with the top of the casing open in the manner shown ready and convenient access is afforded to the lamps and jacks. Each contact-spring is provided with a rearwardly-projecting terminal, the contact-springs B having terminals b and the contact-springs B' having terminals b' . By referring to Figs. 5 and 6 it will be seen that these projecting terminals, to which, it will be understood, the electrical connections are attached, are arranged in pairs and the pairs staggered along the rear surface of the holder. In other words, the contact-springs, which are, it will be observed, arranged in an even row or series, have a number of their terminals arranged in one plane and have the balance of their terminals arranged in a plane below. With this arrangement the outer terminal of the first jack occurs in the lower plane. The other terminal of the same jack occurs in the upper plane, and the arrangement is then reversed in the next jack, so that the first terminal occurs in the upper plane, while the next one occurs in the lower plane. The lower terminals are preferably connected by insulated wires or conductors E. With this arrangement it will be seen that the lamps and jacks are inclosed within a common chamber. This permits the jacks and lamps to be brought near together, so as to reduce the length of the holder, and in order to prevent the light from one lamp penetrating to the lamps at each side a coating or jacket c is preferably provided for each lamp. In each case this coating or jacket extends, preferably, nearly to the end of the lamp-bulb, thereby cutting off the lateral rays of light and, as stated, excluding the light of one lamp from those at each side.

The prisms F are preferably mounted in a supporting strip or mounting G. This strip or mounting G is provided with a series of openings or sockets g , arranged to register with openings a'' in the upturned front wall of the holder-body. These prisms can be of any suitable form or material—for example, glass or porcelain or any other suitable transparent or translucent substance. While they are in telephone practice known as “prisms” and sometimes as “opals,” they are in this case preferably convex on their outer surface and

flat on their inner surfaces. When the lamp-jack holder is properly mounted in the switchboard, these prisms are in sight of the operator, and each one is adapted to be illuminated by its allotted lamp—that is to say, these prisms are adapted to be illuminated for the purpose of advising the operator of the call or signal, and it will of course be understood that the prism which is illuminated for this purpose depends upon the lamp which responds to the call.

As stated, the jacks are arranged in an even row or series and with the prisms arranged to register with them. Each lamp is arranged to light up a prism for the purpose of advising the operator of a call.

The strip or mounting G for the prisms is preferably and desirably notched at each end, as shown in Figs. 1 and 9, and, furthermore, this strip or mounting is preferably sprung or bent, so as to have a tendency to normally bow inward. As a simple and effective arrangement for securing the strip or mounting in place the notches in the ends thereof can be adapted to engage projections H H, which, it will be observed, are located at the forward or front corners of the holder, and it being also observed that the projection H is provided by the end of a spring which is capable of flexing or bending away from the notch in the end portion of the strip or mounting. In order to prevent displacement, the back of said strip or mounting can be provided with pins g' , adapted to engage openings in the upturned front wall a of the body or casing A. It will be understood that when the holder is arranged in place in the switchboard nothing but the front of the holder and the prisms are exposed, and for this reason no access can be had to the spring which provides the lock or projection H. In order, therefore, that this strip or mounting G may be readily removed from the face of the switchboard, the end of the said strip G can be provided with an opening g^2 , arranged in such manner as to permit a tool to be inserted and applied to the end of said spring. The application of a tool in this manner causes the said spring to flex or bend away from the end of the strip or mounting G, thereby disengaging it from the notch in the end of the strip or mounting and leaving the latter in condition to be removed from the front of the holder. At this juncture it will be seen that the aforescribed normal curvature or bow of the strip or mounting G facilitates the removal of the strip or mounting from the holder. When the tool is applied and the spring locking device operated in such manner as to release the end of the strip or mounting G, the spring or bow of the latter causes its end portion thus released to spring outward, as shown in Fig. 1, thereby causing it to project slightly from the preferably flush surface of the switchboard and bringing it into position to be grasped and

readily removed. This, as will be readily seen, insures ready and convenient removal of the prism strip or mounting from the front of the holder and at the same time renders the front of the holder, and consequently the front of the switchboard, free from objectionable projections or devices.

The "prisms," as they are commonly called, are, as stated, arranged in the openings or sockets g . Each prism is preferably backed by a pair of rings $g^3 g^4$. The outer end of each socket g is preferably reduced so as to provide a shoulder g^5 , against which the outer surface of the prism bears, and in this way the retaining-ring g^4 in each socket serves to effectively hold the prism in place. Interposed between this retaining-ring g^4 and the back of the prism is, as stated, the ring g^3 , which for the purpose of relieving or counteracting the blow or impact upon the face of the prism is preferably of fiber or some non-metallic substance. The retaining-ring g^4 is preferably split, as at g^6 , and in this way each ring is capable of being compressed or sprung into the socket of the prism. With this arrangement the prisms are removably mounted in a common mounting, which is removably secured to the face of the holder. To remove any one of the prisms, it is only necessary to disengage the catch, so as to allow the end of the strip or mounting G to spring outward, and to then remove this strip or mounting and push the prism and the rings out backward. This is possible for the reason that the rings g^4 are only sprung into the sockets with sufficient force or tension to keep the prisms from dropping out while the strip or mounting G is being handled. Furthermore, the rings $g^3 g^4$ constitute a yielding backing for the prisms, whereby should a prism be accidentally struck by the operator a yielding action will take place—that is to say, the two rings will shift slightly under the force of the blow or impact—thereby lessening the liability of the prism being broken. In this way the feature of the removable common mounting for the prisms, together with the removable yielding backings for the prisms, not only tends to reduce the cost of manufacture, but also renders the device more easily repairable and accessible and in addition much more satisfactory and serviceable in use.

With further reference to the manner of connecting up the terminals of the lamp-jacks, so as to insure against any short-circuiting which would be likely to prevent the lighting of a lamp, I have shown in Fig. 10 a circuit arrangement involving four of the jacks, four relays for closing the circuit through said jacks, so as to light the lamps and effect the desired signal, and also a battery for supplying current. It will be understood that the said relays can be connected up in any suitable manner, whereby the armature of any relay can be actuated for the purpose of closing the circuit through any

particular lamp. For example, should relay 1 be energized its armature would close the circuit through lamp *a*, and, again, should relay 2 be energized the circuit will then be closed through lamp *b*. It is desirable, however, that the lamp-jacks be arranged as closely as possible together, so as to reduce the cost of manufacture and also the size of the device, and for this reason there is a possibility of the spring or contact-piece of one jack making contact with the adjacent spring of the next jack. Ordinarily and with certain prior arrangements this would cause a short-circuit to be formed in such manner as to cut out the lamp which should respond to the signal, and, in fact, to prevent either this lamp or one of the adjacent lamps from lighting up. It is then, as stated, with a view to overcoming this difficulty the terminals of the jacks are connected up in the manner shown in Figs. 1, 5, and 6, and as previously described. For example, with the circuit arrangement thus shown the adjacent contact-springs of the jacks for lamps *b* and *c* may accidentally come together without doing anything more than to cause two lamps to glow instead of one. For example, should relay 2 be energized the current would with the contacts of lamps *b* and *c* together be divided between these lamps *b* and *c*, the lamp *b* thereby effecting the correct signal, while lamp *c* in lighting up or glowing effecting a false signal. It will be seen, however, that the operator will at least be advised of a call and that it can then be readily determined over which line the call came by inserting the telephone-plug in either one of the two jacks corresponding to these two lamps. For example, if the operator after inserting the telephone-plug in the spring-jack corresponding to lamp *b* receives a response it is then evident that the correct subscriber's line has been selected and that the glowing of lamp *c* was a false signal, and, vice versa, should the operator not receive a response after inserting the telephone-plug it is then evident that lamp *c* is the one properly responding to the call and that the glowing of lamp *b* is a false signal. In this way the circuit arrangement insures a response to a call, even though certain of the lamp-jacks are improperly in contact with each other, and it does not, therefore, leave any substation of a telephone system in such condition as to be inoperative to effect a call. This particular circuit arrangement is, however, claimed in my other patent, No. 726,215, of April 21, 1903, while in this application I have claimed, among other things, the particular arrangement of the terminals.

With further reference to the general construction it will be seen that the lamp-jack holder thus constructed principally of sheet metal is simple and inexpensive to manufacture and also that it is comparatively light and compact. The parts are all readily removable and the open top of the holder af-

fords ready and convenient access to the lamps and jacks. The method of removably mounting the prisms in a removable common mounting is calculated to greatly reduce the cost of manufacture. It is also a feature which, as stated, renders the device much more satisfactory and serviceable in use. As stated, a lamp-jack holder of this character is adapted for use in connection with telephone-switchboards of any known or approved construction or arrangement, and in order to permit the holder to be properly inserted and secured in the casing of the switchboard the ends of the holder can be provided with blocks I.

By dispensing with partitions and inclosing the lamps in a common chamber they can be arranged much closer together, and with the provision of the jackets or coatings each lamp is prevented from illuminating more than one prism. It will also be seen that with this arrangement the holder can be made extremely light and compact and can be of the simplest construction. By "jackets" is meant anything which fits snugly over the bulb of the lamp and which is opaque or substantially opaque and removable from the holder with the lamp. The forward wall *a* acts as a fulcrum in springing the strip *G* in place. When the holder is in place in the switchboard, the spring *H* is inaccessible except through the opening *g*. As explained, the staggered arrangement of the terminals along the back of the holder permits the like terminals of the alternate jacks to be connected up in common with the opposite terminals of the intermediate jacks. It will be readily understood that by "like terminals" is meant those which occupy like relative positions in the jacks and that by "opposite" terminals is meant those which have opposite positions relatively to those stated to have like positions.

By referring to the drawings, and particularly to the diagram, it will be seen that the alternate jacks have their like terminals connected up in common with the opposite terminals of the intermediate jacks. In this way half of the terminals are made common, but at the same time the circuit arrangement is such that short-circuiting between the jacks cannot cut out any one of the lamps.

It will be readily understood, however, that the various details and features of improvement can be modified or changed without departing from the spirit of my invention. For this reason I do not limit myself to the construction shown and described.

By providing a framework or holder having a comparatively shallow chamber, which chamber is open at one side and closed at the other side by a thin horizontal wall—that is to say, preferably open at its top side and closed at its bottom side—and by permitting the jack-springs and lamps to occupy this chamber in common with each other, each lamp having an opaque jacket excluding the light from the

other lamps, it will be seen that an exceedingly compact, economical, and efficient bank or strip of incandescent lamps is obtained adapted for use in a switchboard, as described.

5 Furthermore, by mounting all of the opals or light-transmitting members in a removable front plate, or "cover-plate," as it may be called, a further advantage is gained, as the construction is not only thereby simplified and rendered more economical and satisfactory in use, but in addition the said light-transmitting members or opals can all be quickly and readily removed from the front of the framework or holder. These features also facilitate in the manufacture of the device and tend to facilitate installment of the switchboard, repair, and substitution of parts. The feature of providing the lamps with opaque jackets is an important and desirable one, as it obviates the necessity of employing a holder or framework having partitions for separating the lamps from each other. Also it will be seen that with this construction all material which might possibly be injured by heat is far removed from close proximity to the lamps.

What I claim as my invention is—

1. A lamp-jack holder, a plurality of jack-springs and lamps arranged close together within a common chamber in said holder, and opaque jackets for the bulbs of said lamps, whereby the light from one lamp is excluded from the adjacent lamps, said chamber being of a shallow character and open at one side and closed at the other side by a thin flat horizontal wall.

2. In an electrical signaling device, a holder or casing, a plurality of signaling-lamps arranged within a common chamber in said holder or casing, each lamp having two contact-pieces, a plurality of pairs of jack-springs arranged in a horizontal row at the back of said chamber, each pair being adapted to removably receive the contacts of a lamp, and opaque coatings for the bulbs of said lamps, whereby the light from one lamp is excluded from the adjacent lamps.

3. A lamp-jack holder, a plurality of lamps and spring-jacks arranged within a common chamber in said holder, and opaque heat-proof coatings applied to the outer surface of the lamp-bulbs, whereby the light from one lamp is excluded from the adjacent lamps.

4. A lamp-jack holder, a plurality of lamps and jackets suitably mounted on said holder, and a plurality of light-transmitting members mounted in a common support which is removably secured to the front of said holder, each light-transmitting member being arranged opposite one of said lamps.

5. The combination of a suitable holder, a plurality of lamps arranged close together in a row within a common chamber in said holder, opaque jackets for the bulbs of said lamps, a removable strip or mounting removably secured to the front of said holder and a plu-

70 rality of light-transmitting members removably mounted in said strip or mounting, each light-transmitting member being arranged opposite a lamp, said chamber being of a shallow character and open at one side and closed at the other side by a thin flat horizontal wall.

6. The combination of a plurality of lamps, a holder for said lamps, a strip or mounting removably secured to the front of said holder, and a plurality of light-transmitting members 75 removably secured in sockets in said strip or mounting.

7. The combination of a bank of incandescent lamps, a framework for mounting said lamps, contact-springs provided in said framework, a cover-plate for said lamps provided with apertures registering with the said lamps, light-transmitting members provided in said apertures, split rings holding said members in place, and means for removably securing said 85 cover-plate to said framework.

8. The combination of a holder comprising a body portion formed from a piece of sheet metal, a plurality of contact or jack springs removably clamped or held between a couple 90 of insulating-bars secured to the rear marginal portion of said holder, lamps for said contact or jack springs, and light-transmitting members removably mounted in the front of said holder and arranged opposite said lamps. 95

9. The combination of a metal holder, a plurality of contact or jack springs clamped or held between a couple of insulating-bars secured to the rear marginal portion of said holder, lamps for said contact or jack springs, opaque jackets or coatings for said lamps, the said lamps and contact or jack springs being inclosed within a common chamber in said holder, and light-transmitting members removably secured to the front of said holder 105 arranged opposite the ends of said lamps.

10. The combination of a flat holder with an open top and closed bottom, a plurality of lamps suitably mounted in a row upon said holder, a metal strip removably secured to the front of the said holder, and a plurality of light-transmitting members arranged opposite the ends of said lamps and mounted in said metal strip, whereby the said light-transmitting members can all be removed together. 115

11. A holder provided on its front with projections, said holder having an open top and a bottom closed by a thin horizontal wall, a plurality of lamps and spring-contacts suitably mounted upon said holder and arranged close together in a row, a removable front for said holder, said front having its opposite ends adapted to engage projections on the said holder, one of said projections consisting of a spring-catch adapted and arranged for holding 125 said front in place.

12. The combination of a casing or body adapted to provide a holder, a plurality of lamps and jacks suitably mounted upon said holder, a removable front for said holder, said 130

front being sprung or normally bowed inward so as to cause its end to spring outward when released, and a spring-catch device for holding said front in place in a straightened condition.

13. The combination of a plurality of lamps, suitable spring-contacts therefor, a suitable holder for said lamps and spring-contacts, a removable front for said holder, and an internally-arranged spring-catch for holding said front in place, said front being provided with an opening affording access to said spring-catch.

14. A holder constructed with an open top, and a sheet-metal bottom, a plurality of lamps and spring-contacts suitably mounted upon said holder and arranged close together in a common chamber, a removable front for said holder, and a plurality of light-transmitting members removably mounted in said front and arranged opposite to said lamps each lamp having an opaque jacket excluding the light from the other lamps.

15. A suitable holder, said holder providing a chamber of a shallow character open at one side and closed at the other side by a thin horizontal wall, a plurality of lamps, spring-contacts therefor suitably mounted upon said holder, the said spring-contacts and lamps occupying the said chamber in common with each other, and each lamp having an opaque jacket excluding the light from the other lamps, said holder having projections at its front, a removable front for said holder, said front having its opposite ends notched or recessed to engage said projections on said holder, one of said projections consisting of a spring-catch adapted and arranged to engage one of said notches.

16. The combination of a suitable holder, a plurality of lamps and spring-jacks suitably mounted upon said holder, the terminals of said jacks being arranged in pairs, each pair consisting of the terminal of one jack and the adjacent terminal of the next jack, and the

pairs of terminals having a staggered arrangement along the back of the holder.

17. In an electrical signaling device, a plurality of spring-jacks, lamps in said jacks, the alternate jacks having their like or similar terminals connected up in common with the opposite or dissimilar terminals of the intermediate jacks.

18. A holder, a lamp mounted thereon, a removable front having an opening or socket opposite the lamp, a light-transmitting member in said opening, a fiber ring in said opening back of said member, and a split metal ring in said opening back of said fiber ring, the member and rings being easily removed or pushed out of the back of said front.

19. The combination with a bank of incandescent lamps, of a framework for mounting said lamps a cover-plate for said lamps, provided with apertures registering with the said lamps, opals provided in said apertures, and means for removably securing said cover-plate to said framework.

20. The combination with a bank of incandescent lamps, of a framework for mounting said lamps, contact-springs provided in said framework, a cover-plate for said lamps provided with apertures registering with the said lamps, opals provided in said apertures, and means for removably securing said cover-plate to said framework.

21. The combination with a bank of incandescent lamps, of a framework for mounting said lamps, contact-springs provided in said framework, a cover-plate for said lamps, provided with apertures registering with the said lamps, opals provided in said apertures, and spring-clasps for securing said cover-plate to said framework.

Signed by me at Chicago, Cook county, Illinois, this 9th day of October, 1901.

HENRY P. CLAUSEN.

Witnesses:

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HARRY P. BAUMGARTNER.