(No Model.) 2 Sheets—Sheet 1.

J. HUNT.

PNEUMATIC ELEVATOR SIGNAL.

No. 307,049. Patented Oct. 21, 1884.

Fig. 1.

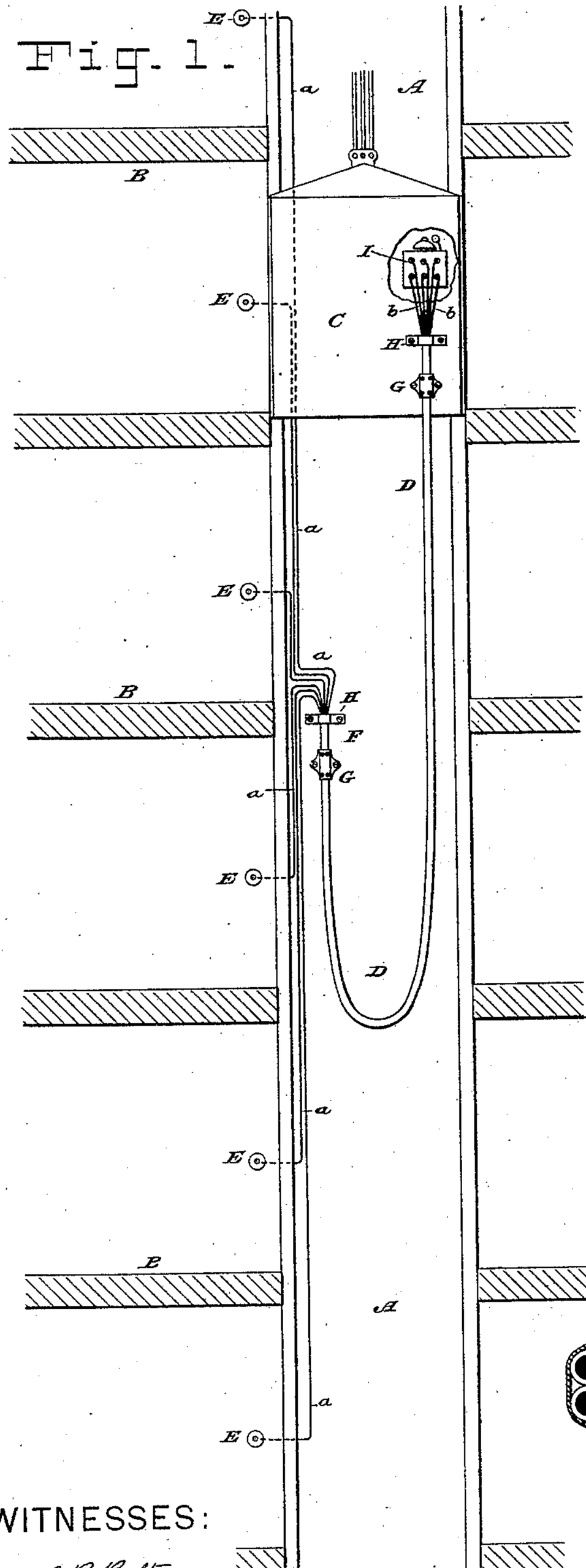


Fig. 2.

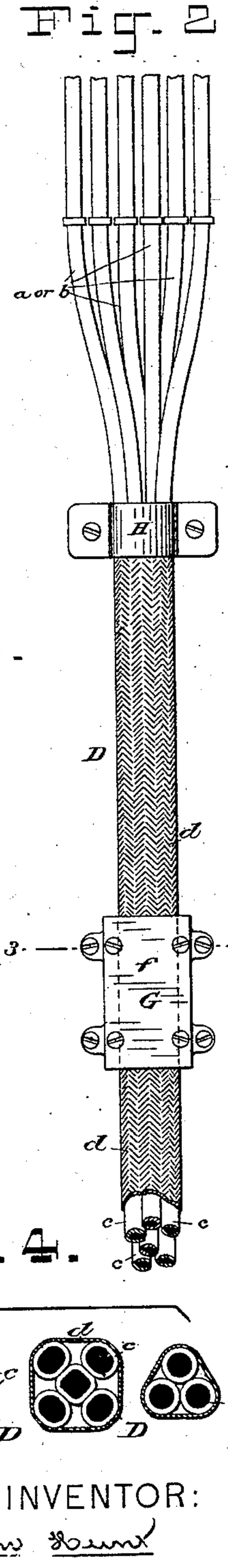


Fig. 3.

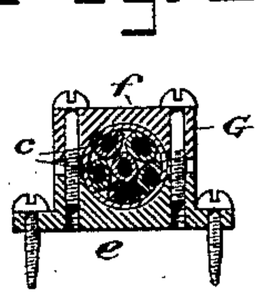
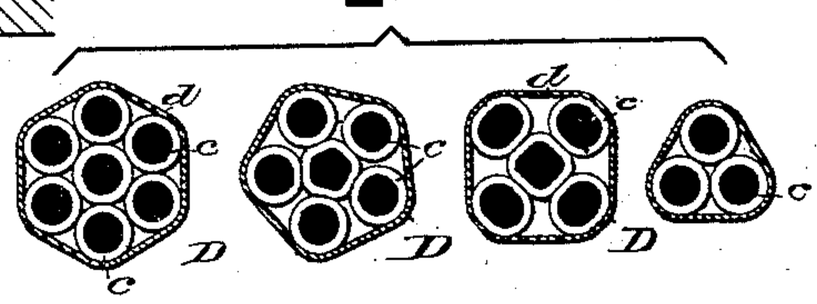


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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PNEUMATIC ELEVATOR SIGNAL.

No. 307,049. Patented Oct. 21, 1884.

Fig. 5.

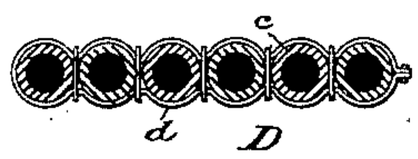


Fig. 7.

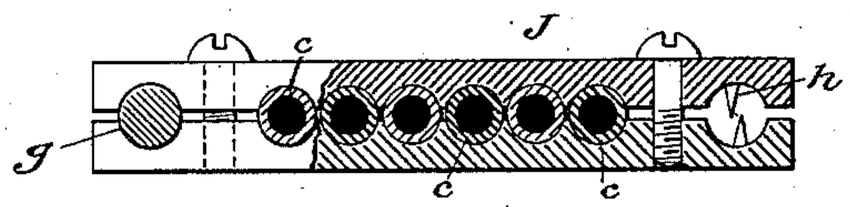


Fig. 6.

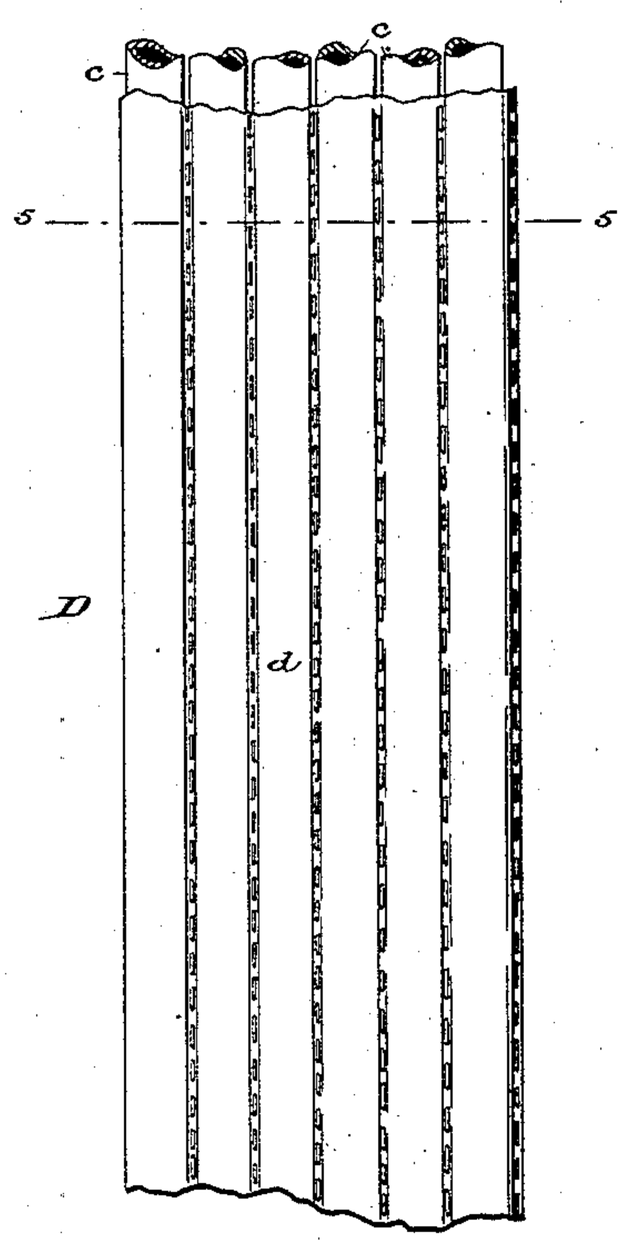
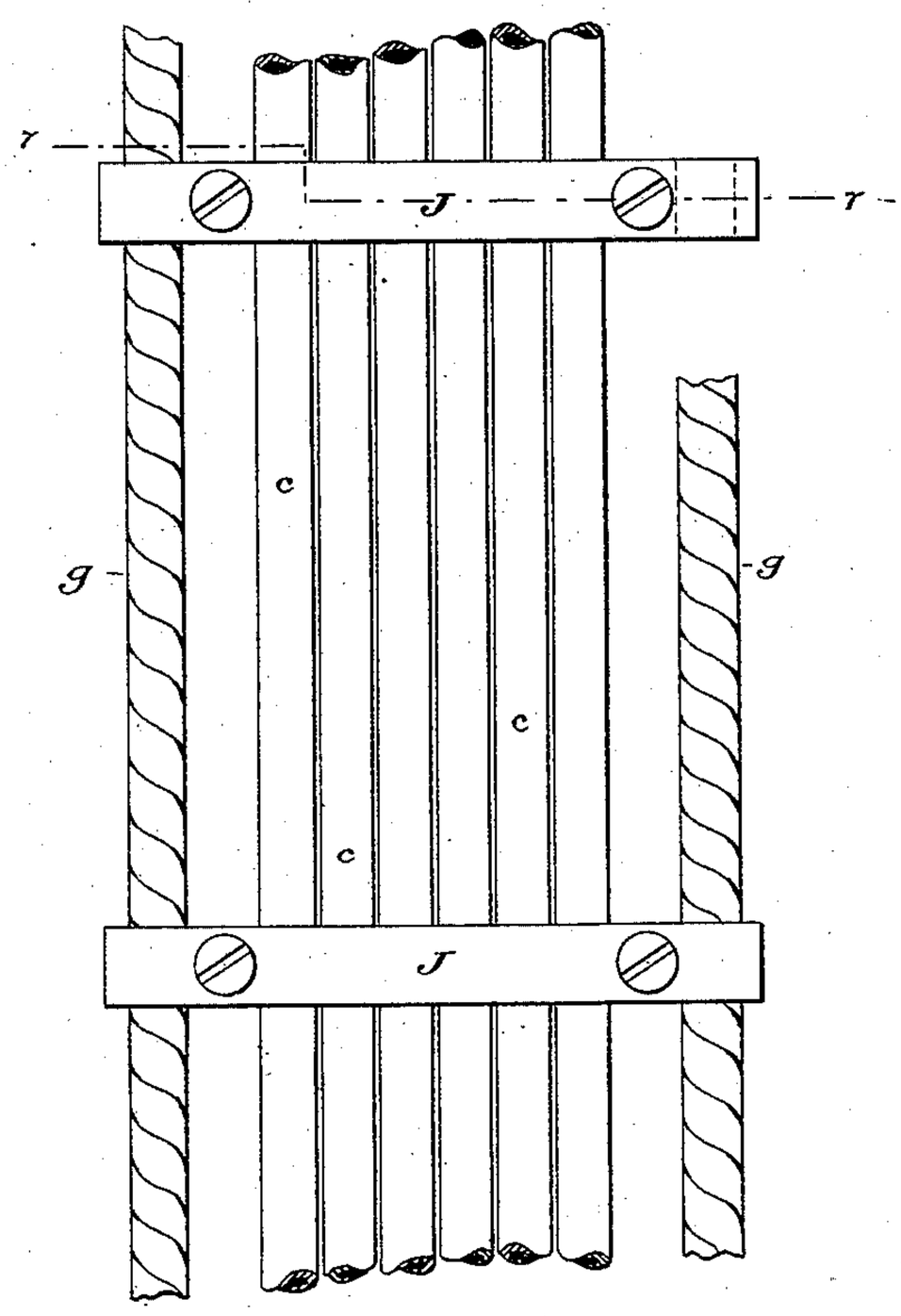


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN HUNT, OF NEW YORK, N. Y.

PNEUMATIC ELEVATOR-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 307,049, dated October 21, 1884.

Application filed April 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN HUNT, a British subject, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Pneumatic Conductors for Signaling in Elevators or Hoists, of which the following is a specification.

Indicators in elevator-cars for showing from which floor of the building a call has been sent are now operated according to one or other of two systems, either by electricity, requiring circuit-wires and a battery, or by pneumatic means, requiring the interposition of air-tubes extending from the push-buttons on the several floors of the building to the indicator on the car. It is to the latter system that my invention relates. It is essential to this system that the several push-buttons be made each to operate a bellows for compressing or rarefying air, that an air-tube extend from each bellows to the car, and that the car be provided with an indicator having as many bellows and drops as there are floors and air-tubes, and that each such bellows be connected with the corresponding air-tube. The several air-tubes, in order to reach the moving car, must be made flexible for a portion of their length, and be attached at one end to the elevator-shaft, preferably to the middle thereof, and at the other end to the car, their flexible portions hanging freely beneath the car. From the bellows behind each push-button a small lead pipe is carried, and these several pipes are conducted along the elevator-shaft to its middle, at which point they are connected to as many small rubber tubes, the opposite ends of which are fastened to the elevator-car and connected with a second set of small lead pipes which lead to the pneumatic indicator. These rubber tubes, prior to my invention, were supported only by the attachment of their ends to the wall of the shaft and to the car, and were all independently attached, and hung separately and independently from the car. As their length is necessarily somewhat in excess of half the height of the elevator-shaft, in order to accommodate the vertical movement of the car, it is obvious that when the car is at the bottom of the shaft almost their entire length hangs from their point of attachment to the middle of the shaft, and when the car is at the top of the shaft almost their entire length hangs from their point of attachment to the car. In either case a considerable weight of rubber tube has to be supported from the point of attachment and transmitted through the end portion of the tube, the effect of which is to stretch and strain the tube, which consequently rapidly deteriorates. By having, also, as many separate and independent rubber tubes hanging beneath the car as there are floors to the building, (often eight or more,) there is considerable liability of their becoming entangled, kinked, or knotted, and in their swinging of being caught against projecting parts and becoming injured.

My present invention was designed to obviate these defects, to which end it involves assembling or grouping all of the flexible rubber tubes into a cable, fastening them together, so that they shall not hang or swing independently, furnishing them with a flexible support, which shall relieve them of the strain of upholding their own weight, and wrapping or covering them, so as to protect them from injury. These results I attain in my preferred construction by the simple expedient of braiding around all of the tubes together a tubular textile covering or envelope.

Figure 1 of the accompanying drawings is a vertical section of an elevator-shaft, showing the car in elevation and illustrating the application of my invention. Fig. 2 is a fragmentary elevation, on a larger scale, of a portion of the cable and its terminal attachment and connections. Fig. 3 is a cross-section through the line 3 3 in Fig. 2. Fig. 4 includes cross-sections of the cables, having three, five, six, and seven air-tubes, respectively. Fig. 5 is a cross-section, and Fig. 6 an elevation, of a modification; and Fig. 7 is a cross-section, and Fig. 8 an elevation, of another modification.

Referring to Fig. 1, let A designate the elevator-shaft; B B, the several floors of the building; C, the elevator-car; D, my pneumatic cable; E E, the push-buttons, and I the the pneumatic indicator in the car. The push-buttons are of any suitable construction—such, for instance, as that fully disclosed in the patent to C. E. Zimdars, No. 222,343, dated December 2, 1879. It is only essential that some suitable air compressing or exhausting bellows or other device be arranged in connection with the push-button, and that an

air-tube be connected with each such bellows and carried to the middle of the shaft. For this purpose small pipes *a a* are employed, their course being clearly denoted in this figure. These pipes are preferably made of lead, for convenience, but may be of other metal or material. All the pipes *a a* leading from all the push-buttons are carried along the elevator-shaft, being fastened at intervals, and terminate at F at the middle of the shaft. Here the pneumatic cable D is connected in the manner shown best in Fig. 2, and which will be described presently. The other end of the cable is connected to the car in like manner, and from it run a series of short lead pipes, *b b*, which extend to and connect with the indicator I. This indicator is shown in rear elevation. It consists, essentially, of a series of numbered drops—one for each floor of the building—and detents for releasing these drops, operated by a series of bellows, which are connected with the respective pipes *b b*. The particular construction of the indicator is immaterial to my invention, the construction set forth in the said Zimdars's patent being well adapted to the purpose. When any of the push-buttons is pressed, the air in the tube communicating therewith is compressed, and this compression reaches the indicator and expands the corresponding bellows therein, thereby releasing the drop and bringing into view the number of the floor from which the call was sent, at the same time sounding a bell. The cable D is best shown in Figs. 2 and 4. It consists of a series of small rubber tubes, *c c*, grouped together compactly, with a tubular covering, *d*, of textile material, inclosing them. This cover is best applied by braiding it around the tubes, the latter being held in the proper relative positions by suitable guides, through which they are drawn as the finished cable is fed out. This braiding is done on the well-known braiding-machines for applying tubular braided coverings. The covering *d* should be strong enough to hold together and protect the tubes, and also bear their weight, or the greater portion thereof, so as to relieve the tubes of undue strain. It may be somewhat elastic, but its stretch should be less than that of the tubes. There may be any number of tubes *c*, corresponding to the number of floors in the building from which it is desired to signal the elevator. Several different cables are shown in section in Fig. 4. The ends of the cable must be attached in such manner as not to materially reduce the area of the rubber tubes. For this purpose I provide a clamp, G, consisting of a base-plate, *e*, screwed to the wall, and a cap, *f*, screwed to the base-plate. The plate *e* and cap *f* have a cylindrical cavity formed through them, half in each, as shown in Fig. 3, the diameter of which is slightly smaller than the diameter of the cable. The cable is laid in this cavity, the cap applied, and its screws tightened enough to slightly compress and tightly grasp the cable, but not enough to close any of the rubber tubes, as clearly shown in Fig. 3. The cable is attached by the clamp G near its end, leaving its end portion projecting beyond the clamp. This is for convenience in connecting the rubber tubes *c c* to the metal pipes *a a* or *b b*. This connection is made by thrusting the ends of the metal pipes into the ends of the respective rubber tubes for a short distance. This connection is then concealed, and the parts kept in their places by fastening over the end of the cable a metal strip or shield, H. From this point the metal pipes spread out until they lie side by side against the wall, to which they are fastened by staples or otherwise. Instead of being round, the cable may be flat, as shown in Figs. 5 and 6. These figures show a covering of cloth or woven fabric, in which the rubber tubes are retained by rows of stitching sewed through the spaces between the tubes, so that each tube is in a pocket by itself.

Figs. 7 and 8 show a further modification. The several rubber tubes *c c* are arranged in a flat parallel row, and fastened at intervals by clamps J J, and parallel with the tubes are strong cords *g g*, which are fastened to the clamps. To prevent the slipping of these cords through the clamps, the latter may have spurs *h*, Fig. 7, to enter the cords. The advantage of covering the rubber tubes is lost in this construction; but the advantages of keeping them tied together and relieving them of the strain due to their weight are retained. The construction shown in Figs. 1 to 4 is, however, greatly to be preferred.

By my invention accidental injuries to the rubber tubes are almost wholly avoided, and they are rendered much more durable, in addition to being more sightly.

I claim as my invention—

1. The described improvement in pneumatic conductors for elevator signaling, which consists of the combination, with the elevator shaft and car, of the flexible air-tubes connected at their opposite ends to the car and the wall of the shaft, respectively, and all grouped together in connection with a parallel flexible supporter, combined with them, substantially as set forth, whereby the several tubes are retained in order and relieved of strain.

2. As an improvement in pneumatic conductors for elevator signaling, the combination, with the elevator shaft and car, of a flexible pneumatic cable connected at its opposite ends to the car and the wall of the shaft, respectively, and consisting of the several flexible air-tubes grouped together, and a textile covering inclosing the group of tubes, retaining them together, and relieving them of strain, substantially as specified.

3. The combination, with an elevator shaft and car and a pneumatic indicator on the car, of a flexible pneumatic cable consisting of a number of flexible air-tubes grouped together, and a tubular textile covering braided around

them and serving to hold them together and relieve them of strain, the opposite ends of said cable being attached, respectively, to the car and to the wall of the shaft, with its tubes in connection with said indicator, substantially as set forth.

4. The combination, with an elevator-shaft and elevator, of a pneumatic indicator in the elevator-car, a series of metallic pipes leading from said indicator to a fastening-point, a pneumatic cable there attached, with its several inclosed rubber tubes in connection with the respective metallic pipes, the other end of said cable fastened to the wall of the elevator-shaft, and a second series of metallic pipes in connection with the respective rubber tubes, and extending thence to the respective floors of the building, substantially as set forth.

5. In combination with a pneumatic cable consisting of a rotund group of rubber tubes inclosed in a tubular textile covering, the fastening for the end thereof, which consists of a screw-clamp having a cylindrical cavity for the passage of said cable, whereby the same may be clamped by pressure without closing its rubber tubes, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN HUNT.

Witnesses:
ARTHUR C. FRASER,
HENRY CONNETT.