

A. JAYNOR. Pneumatic Telegraphs.

No. 140,923.

Patented July 15, 1873.

Fig 6

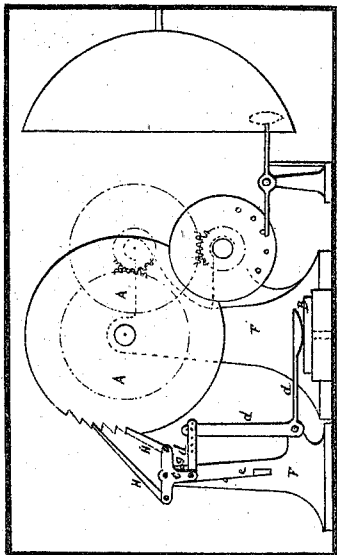


Fig 7

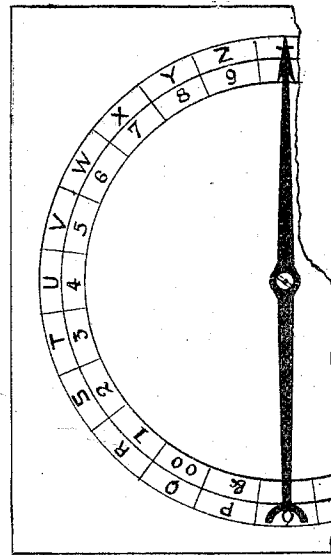
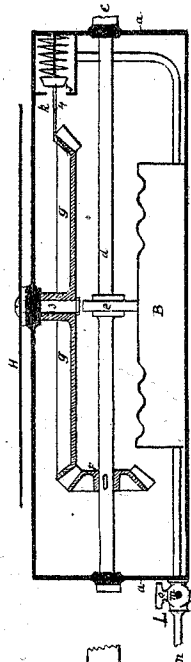


Fig 8

Fig 2

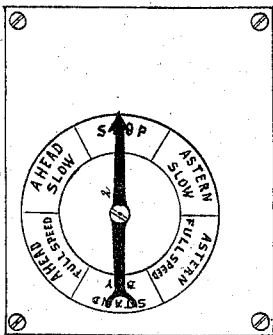


Fig 9

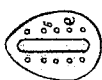


Fig 10

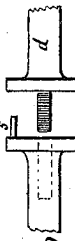


Fig 5

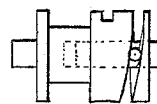


Fig 4

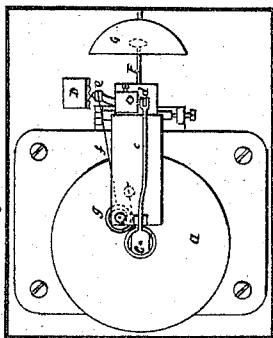


Fig 3

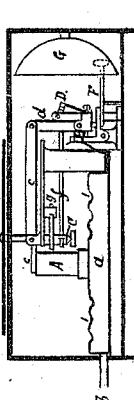
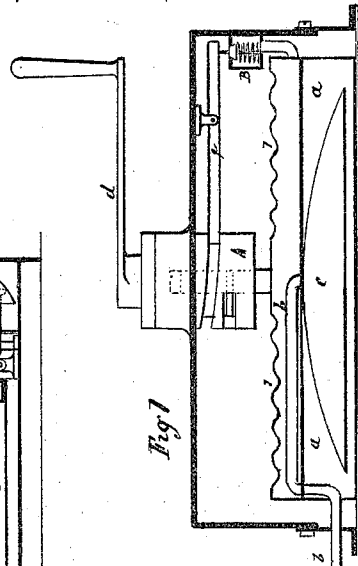


Fig 1



Witnesses:
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UNITED STATES PATENT OFFICE.

ALBERT JAYNOR, OF REGENT'S PARK, ENGLAND.

IMPROVEMENT IN PNEUMATIC TELEGRAPHS.

Specification forming part of Letters Patent No. **140,923**, dated July 15, 1873; application filed March 26, 1873.

To all whom it may concern:

Be it known that I, ALBERT JAYNOR, of Regent's Park, in the county of Middlesex, England, have invented certain Improvements in the Construction of Automatic Telegraphs to be worked by air, steam, or gas, of which the following is a specification:

This invention is designed to simplify the construction and working of automatic telegraphs worked by air, and at present employed for transmitting signals or orders on board ship; and, further, in rendering such said telegraphs more certain in their action and less costly than automatic telegraphs as heretofore constructed.

I propose to accomplish the above objects by the following means: The telegraph is composed of three principal parts common to all automatic telegraphs, namely, a transmitting and indicating instrument connected together by a small pipe or tube to contain the transmitting agent—air.

The transmitting instrument which I employ consists of an air-chamber with a flexible top, inclosed in a frame of brass or other material. Connected with this frame, and bearing on the aforesaid flexible top of the air receiver or chamber, is a screw-cut cam worked on a stop-nut and fitted with a spindle and index hand or lever to move the said cam either to the right or left, which motion turns round the cam, causing the aforesaid flexible top to move up or down as the motion is to the right or left. The aforesaid air-chamber has also on its side or other convenient part a valve acted upon by a lever, which, being connected with the cam, causes the said valve to be always open when the instruments are at rest. This movement is for the purpose of compensating for any rarefaction, expansion, or contraction of the air, so that one instrument may be in the hot engine-room of a ship, and the other may be on deck in the cold air without deviating at all from its accuracy and correctness.

The receiving instrument consists also of an air receiver or chamber of about one-tenth the size of the transmitting instrument, having also a flexible top with a pointed pillar in its center, on which rests the short end of a bell-crank lever, the long end of which is connected by an upright piece to a shorter horizontal

lever fixed in a socket having another lever placed at right angles to it. Affixed to this last-mentioned lever is a small winding-chain leading to the barrel of the pintle on which the indicating-hand is placed.

The air passing through the aforesaid tube from the transmitting instrument acts upon the flexible top of the receiving instrument, which, in its turn, acts upon the short arm of the lever projecting over it, and thus through the combined action of the mechanism causes the chain which is attached to the pintle on which the indicating-hand is affixed to be drawn transversely, thereby revolving the pintle in a given direction. The said pintle is revolved in the opposite direction by the action of a spring, which always keeps the winding-chain taut, and consequently the hand in its proper place and always on its proper order.

A bell movement is placed alongside of the aforesaid mechanism, and is acted upon by a straight wire laying across the flexible top of the receiving-chamber, the movement of which disengages a catch from a toothed wheel, so arranged as to strike the bell forcibly, or the regulation stroke or number of strokes corresponding to each respective order as may be desired and determined upon.

I would here remark that I do not intend to limit or confine myself to the use of air only as a transmitting agent, but reserve to myself the use of water, steam, or gas separately as the transmitting medium, which I consider new, in combination with my improved mechanism, and a great improvement in the mode of working automatic telegraphs; and, further, telegraphs constructed as above described are equally well adapted for transmitting signals or orders in private and public buildings, manufactories, warehouses, and such like places, or between one building and another as well as on ship board.

And in order to explain this invention more clearly, I now proceed to describe the manner of constructing telegraphs according to this invention as represented by the accompanying drawing, as follows:

Figure 1 represents a sectional elevation of an indicating ship's telegraph; Fig. 2 a top-plan view of the outside of a receiving instru-

ment to be used in conjunction with the aforesaid transmitting instrument. Fig. 3 is a sectional elevation of Fig. 2; and Fig. 4, a top-plan view of Fig. 3, the dial at Fig. 2 being removed to expose to view the mechanism beneath. Fig. 5 is a detached view of one of the parts of the instrument shown at Fig. 1. Fig. 6 represents an elevation of an alphabetical receiving instrument adapted for spelling words, and Fig. 7 is an elevation of a transmitting alphabetical instrument to be used in conjunction with the receiving instrument shown at Fig. 6. Fig. 8 is a top-plan view of a portion of the dial of these instruments.

Similar letters of reference are employed to denote corresponding parts of each of the aforesaid instruments.

As regards the indicating ship's telegraph represented at Fig. 1, *a a a* mark the air-chamber having a flexible top or diaphragm, 1, which can be moved up or down with facility, the receiving instrument being operated by forcing and withdrawing the air through the pipe *b b*.

Now, it will be seen that as the pressure of the air on the diaphragm 1 is very unequal I place a saucer, *c c c*, inside the air-chamber *a* just sufficiently raised to let the air pass around and under it to equalize the motion of the air, the air-pipe connection *b* being underneath the saucer *c* and centering in the saucer, as represented. The air being forced downward by the flexible diaphragm 1 is displaced equally and distributed by passing over and around the saucer *c*, and thus enters the pipe *b* in equal films. The diaphragm 1 is moved up and down by the screw-cut cam *A* having a hand or handle, *d*, securely fastened thereto. When the instrument is at rest the valve *B* is kept open by the lever *e'*, which fits in the cam *A*, and is moved up or down as represented in the drawing. This prevents condensation, and the instrument cannot be affected by changes in the temperature of the atmosphere.

The box inclosing the transmitting apparatus has the orders starboard, hard starboard, port-steady, &c., cut or printed on the top or dial to indicate where to place the hand, as represented in Figs. 2 and 8.

Figs. 3 and 4 represent the interior of the receiving instrument. *a a* is a small air-chamber, connected to the transmitting instrument by the pipe *b b*, having a flexible top also, in the center of which an upright pillar, *A*, is fastened. *c c* is a lever, one end of which rests on the pillar *A*, the other end being connected to the pivot *B* by the upright bar *d*, the pivot *B* having a rocking motion, and an upright bar, *e*, secured fast to it. To this bar *e* is fastened a chain, *f*, leading to the pinion *C*, on which the index-hand 2 is placed. The pinion *C* has a circular spring, *g*, which moves it in the opposite direction from the chain.

It is evident that by moving the diaphragm 1 up and down motion will be imparted to the pinion *C*, and therefore the index-hand 2, by the combined mechanism. This instrument

should be accurately adjusted to the transmitting instrument, and the accuracy is maintained by having the quadrant piece *D* lying by a gentle spring against the upright bar *e*. This quadrant has notches or corrugations on its inner edge corresponding to each order on the dial under the index-hand, and serves to always keep the hand in the center of the order until the transmitting-hand is moved again. Also, connected with the pivot *B* is a lever, *F*. The lever *F* has a hammer at one end adjusted so as to strike the bell *G* at any motion up or down of the pivot *B*. This serves to call attention to any order being given.

As regards Fig. 6, which represents the movement of the alphabetical receiving instrument, *A A* is the movement-wheel to which the index-hand and other machinery for striking a bell is attached, as hereafter described. *B* represents a flexible air-receiver, which may be made of either rubber or thin sheet metal. *c* is a piece having three arms with a rocking motion. *d d d* are the attachment pieces to the diaphragm *B*. *F F* are the pillars to which the movement is fastened, and *e* is a spring acting against the piece *c*. *g* is a screw-stop to prevent the piece *c* from being forced too far one way by the spring *e*. Now, to impart motion to the wheel *A A*, air must be forced into the receiver *B* from the connecting-pipe *X*. The air will inflate the flexible diaphragm *B*, raising the lever *d*, which, being an angle-piece, connected with the rocking piece *c*, will move it one way, say, to the left, as long as the air-receiver remains inflated. As soon as the air is withdrawn the spring *e* will act to move the rocking piece *c* the other way, say, to the right. Attached to the rocking piece *c*, are two straight bars or pawls, *H H*, pointing onto the teeth of the wheel *A A*, and held therein by small springs in their pivot-fastenings. As motion is imparted by *B* to the rocking piece *c*, one of the bars *H* is pushing on a tooth while the other is being withdrawn to the next tooth, and so on as fast as the pulsations are imparted to and withdrawn from *B*.

This motion may be regulated so as to move the wheel *A* half a tooth at each motion, either to the right or left. Thus, if you wish to indicate the letters of the alphabet, the twenty-six letters will require only thirteen teeth in the movement-wheel. By suitable gearing the dial can be made so that the instrument can indicate any number of letters, signs, or orders. As regards the alphabetical transmitting instrument represented at Fig. 7, *a a a a* mark the box in which the machine is placed. *B* is a large air-receiver with flexible top.

Now, to impart motion to the little diaphragm *B* in Fig. 6, it will be seen at a glance that nothing more is required than to move the flexible diaphragm in the large receiver *B* in Fig. 7 rapidly up and down, and to have both the sender and receiver register alike. To accomplish this, a horizontal spindle, *d*, shown at Fig. 10, is mounted in bearings over

the receiver B. Fitted with a crank-handle, *c*, is an eccentric-wheel, shown detached at Fig. 9; F, a pinion, cogged and geared into the large cog-wheel *g g g* pivoted at 3 to the frame-work *a a a*, and having an index-hand, H, attached to the pivot 3. Now, by taking hold of the crank *c* and turning round the eccentric-wheel *e* an up-and-down motion will be imparted to the diaphragm B. At the same time the pinion F will impart circular motion to the large cog-wheel *g g g* and index-hand H, under which is a dial, shown at Fig. 8, corresponding to that of the receiving instrument. J represents a valve, which is always opened at zero on the dial by a raised lump, *k*, on the large wheel *g g g*, acting on the point 4. By these means the instrument cannot be affected by the changes in the temperature of the atmosphere. L represents a two-way cock, *m* being the escape-pipe, and *n* the connection-pipe with the receiving instrument represented in Fig. 6. By turning the handle O the connecting-pipe *n* may be closed, and the air will then escape out of the waste-pipe at *m*.

This arrangement is for regulating the two instruments together.

The action of the wheel *e* may be regulated by a pin, 5, in the spindle *d* taking into one or other of the holes 6 in the wheel *e*, as at Figs. 9 and 10. By these means the wheel *e* can thus be made to act more or less on the diaphragm, as occasion and distance may require.

What I claim as my invention is—

1. The valve B, lever *e*, and cam A, in combination with the air-chamber *a* having flexible top, and with one or more air-pipes, *b b*, substantially as described.

2. The air-chamber *a* having flexible diaphragm 1, in combination with one or more air-pipes, *b b*, and the saucer *c*, substantially as described.

3. The corrugated quadrant piece D, arranged and operating in respect to the index-hand 2, as and for the purpose specified.

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