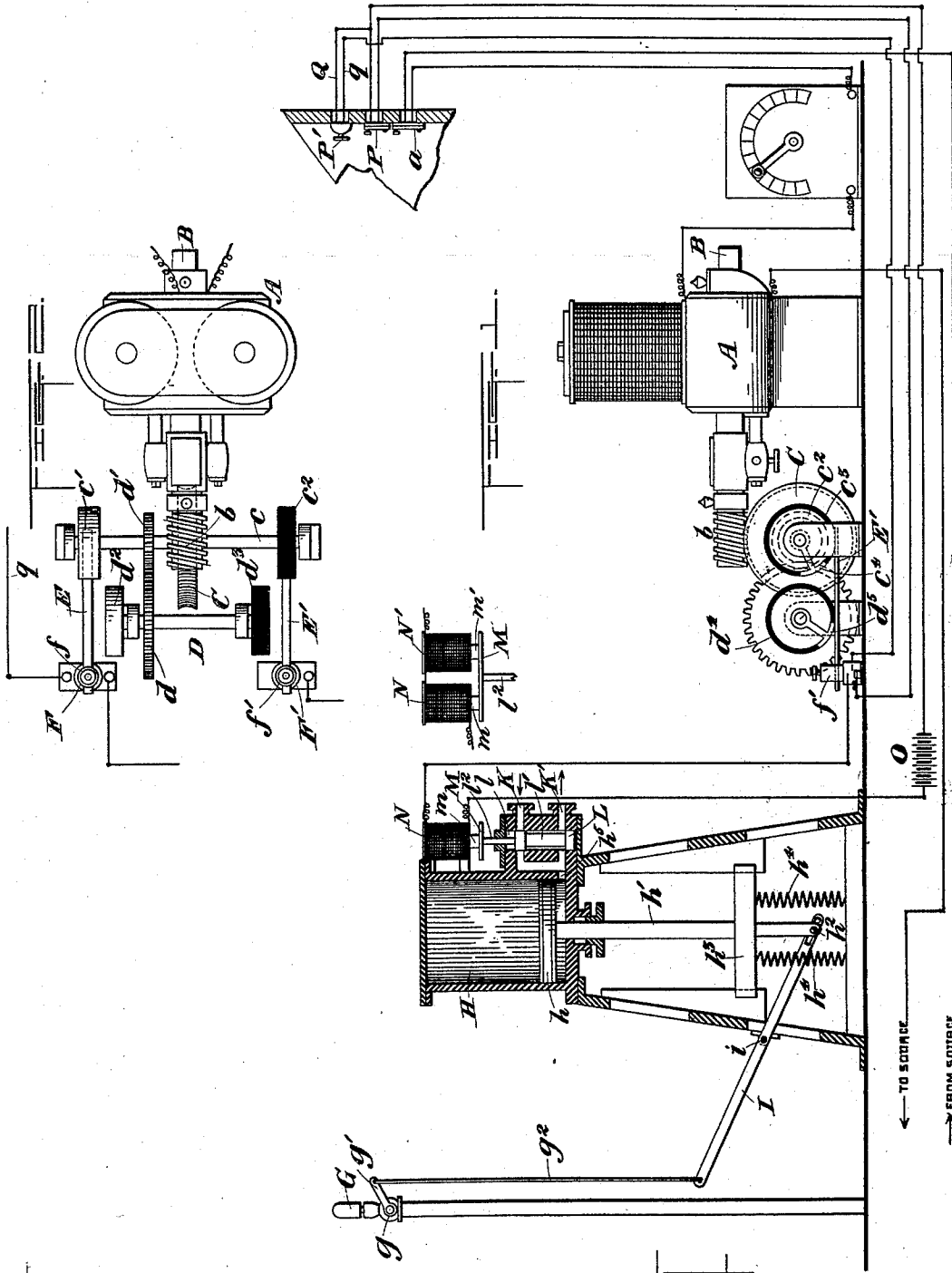


(No Model.)

G. McINTOSH.
SIGNAL APPARATUS.

No. 509,545.

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 ESSES.
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SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 509,545, dated November 28, 1893.

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To all whom it may concern:

Be it known that I, GEORGE MCINTOSH, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Signal Apparatus, of which the following is a specification.

My invention relates to an improvement in signal apparatus in which the signal operating mechanism is actuated by a piston under fluid pressure, the admission of the fluid to the cylinder in which the piston works being under the control of an electrically operated valve.

A practical embodiment of my invention is represented in the accompanying drawings in which—

Figure 1 represents a portion of the apparatus in vertical section, the electric motor and commutator being in side elevation, and Fig. 2 is a top plan view of the motor and commutator.

I have chosen, to illustrate my invention, an electric motor, for operating the commutator, to make and break the electric circuit which controls the valve for admitting the fluid (steam for example) into the cylinder to operate the signal, but other well known motive power might be utilized to mechanically operate said commutator if so desired.

A represents an electro motor of any well known or approved form, receiving its current of electricity from a suitable source (not shown). The motor may be started or stopped at pleasure by a switch *a* within convenient reach of the operator.

The motor shaft B carries a worm *b* which is adapted to engage a worm wheel C on a shaft *c*, mounted in suitable bearings and provided with disks *c'* and *c''*, the former of metal or other electric conductive material, and the latter having insulating material *c'''* at its rim alternating with electric conducting material *c''''*. The conductor or conductors *c''''* is or are in electric communication with the disk *c'*. A second shaft D is suitably mounted, parallel with the shaft *c*, and has a gear wheel *d* fixed thereon which intermeshes with a pinion *d'* on the shaft *c*, by which connection the shaft D is caused to rotate more slowly than the shaft *c*.

The shaft D is provided with a pair of disks *d''* and *d'''*, the former of some suitable elec-

tric conducting material and the latter having interposed in its periphery insulating material *d''''* alternating with electric conducting material *d''''''*, the conductor or conductors *d''''''* being electrically connected with the disk *d''*.

Brushes E and E' are mounted in rotary caps *f, f'* on the binding posts F, F' so as to swing into contact either with the disks on the shaft *c* or with the disks on the shaft D, as may be desired.

The signal which I have chosen to illustrate my invention is a steam whistle denoted by G, the admission of steam to operate the whistle being under the control of the valve *g* provided with an operating lever *g'*. The piston *h* for operating the valve *g* to sound the whistle, is adapted to reciprocate within a cylinder H, the piston rod *h'* extending through a suitable stuffing box in one end of the cylinder H, in the present instance the lower end and having a loose connection as at *h''* with one arm of the lever I, pivoted to a fixed support as at *i*, the opposite arm of said lever being connected by a rod or other suitable connection *g''* with the lever *g'* of the valve *g*. The piston rod *h'* is provided with a cross head *h'''* connected by springs *h''''* with a fixed support, the tension of the springs tending to draw the piston *h* to the bottom of the cylinder or in a direction to shut off the steam from the whistle G. The steam is admitted to and discharged from the cylinder H through a port *h''''* at one side of the bottom of the cylinder, the said port *h''''* separating after leaving the cylinder H into two branches K and K' extending substantially parallel with each other, the former being the port through which steam is admitted to the cylinder and the latter K', the port out of which steam is discharged from the cylinder. The piston valve L has a reciprocating movement within a bore *l* extending transversely across the inlet and outlet branches K, K', the heads of the valve L being of such size as to substantially fill the bore *l*, and, when opposite either the inlet or outlet branches, serving to effectually shut off either the inlet of the steam or the exhaust of the steam, as the case may be. The valve, intermediate of its ends or heads, is provided with a reduced portion *l'* which, when opposite either the inlet or outlet branches, will permit the free inlet or escape

of the steam past it. The heads or enlarged portions of the valve are so arranged with respect to the inlet and outlet branches K, K' that when the valve is at the lowermost limit of its stroke, as shown in Fig. 1, the inlet of steam is cut off and the exhaust is free to take place through the outlet K'. When, however, the valve is lifted a short distance, it will close the port K' and leave a free passage for the inlet of the steam through the inlet branch K past it into the cylinder H underneath the piston *h*. The valve stem *l*² is connected to a bar M which bar also has fixed thereto the cores *m* and *m'* of a pair of electro magnets N, N'. The coils of the magnets N, N' are connected through a battery O and switch P with the binding posts F, F' and thereby with the brushes E, E' which, when in contact with the disks *c'*, *c*² or *d*², *d*³, will complete the circuit for energizing and de-energizing the magnets N, N'. When the magnets N, N' are energized, they will draw the valve L upwardly and will thereby admit steam beneath the piston *h*, the upward movement of which will open the valve *g* and sound the whistle. When the magnets are de-energized, the valve L will drop back to its position, shown in Fig. 1, cutting off the entrance of steam to the cylinder H and permitting the steam beneath the piston *h* to escape through the exhaust K'. The downward movement of the piston *h* will serve to close the valve *g* and hence stop the sounding of the whistle.

The battery force required to work the valve L is very small, and may be brought into action at pleasure by the manipulation of the switch P.

If short or more frequent blasts are desired, the brushes E, E' may be made to engage the disks *c'*, *c*² and if longer or less frequent blasts are desired, the said brushes may be turned to engage the disks *d*², *d*³.

When it is found desirable from any cause to work the valve L independently of the commutator, it may be done by a push button P', arranged to close contact between two contact pieces, one connected by a branch wire Q with the part of the battery circuit leading to one pole of the electro magnet, and the

other connected by a branch wire *q* with the post F and hence with the opposite pole of the magnet.

What I claim is—

1. In combination, a steam whistle, a valve for controlling the admission of steam to the whistle to sound it, a fluid actuated piston connected with the said valve to operate it, a valve for admitting the actuating fluid to the cylinder in which the piston moves, an electric circuit including an electro magnet for operating the said valve, a commutator for making and breaking the said electric circuit at intervals, and means for operating the commutator, substantially as set forth.

2. The combination with a signal, a fluid actuated piston connected with the signal to operate it and the cylinder, of inlet and outlet fluid conduits in communication with one end of the cylinder, a valve having a sliding movement across the conduits to simultaneously close one conduit and open the other, an electromagnet for controlling the movements of the valve, an electric circuit including the said electromagnet, a commutator for making and breaking the said electric circuit at intervals, and means for operating the commutator, substantially as set forth.

3. The combination with the signal, of a plurality of commutators connected to move at different rates of speed, means for operating the commutators, an electric circuit for controlling the operation of the signal, and means for introducing one or another of the said commutators into the circuit at pleasure, substantially as set forth.

4. The combination with the signal and the fluid actuated piston for operating it, of a plurality of commutators connected to move at different rates of speed, a motor connected with one of the commutators, adjustable brushes for engaging one or another of the commutators, and an electric circuit including the brushes and adapted to control the movements of the said fluid actuated piston, substantially as set forth.

GEORGE MCINTOSH.

Witnesses:

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