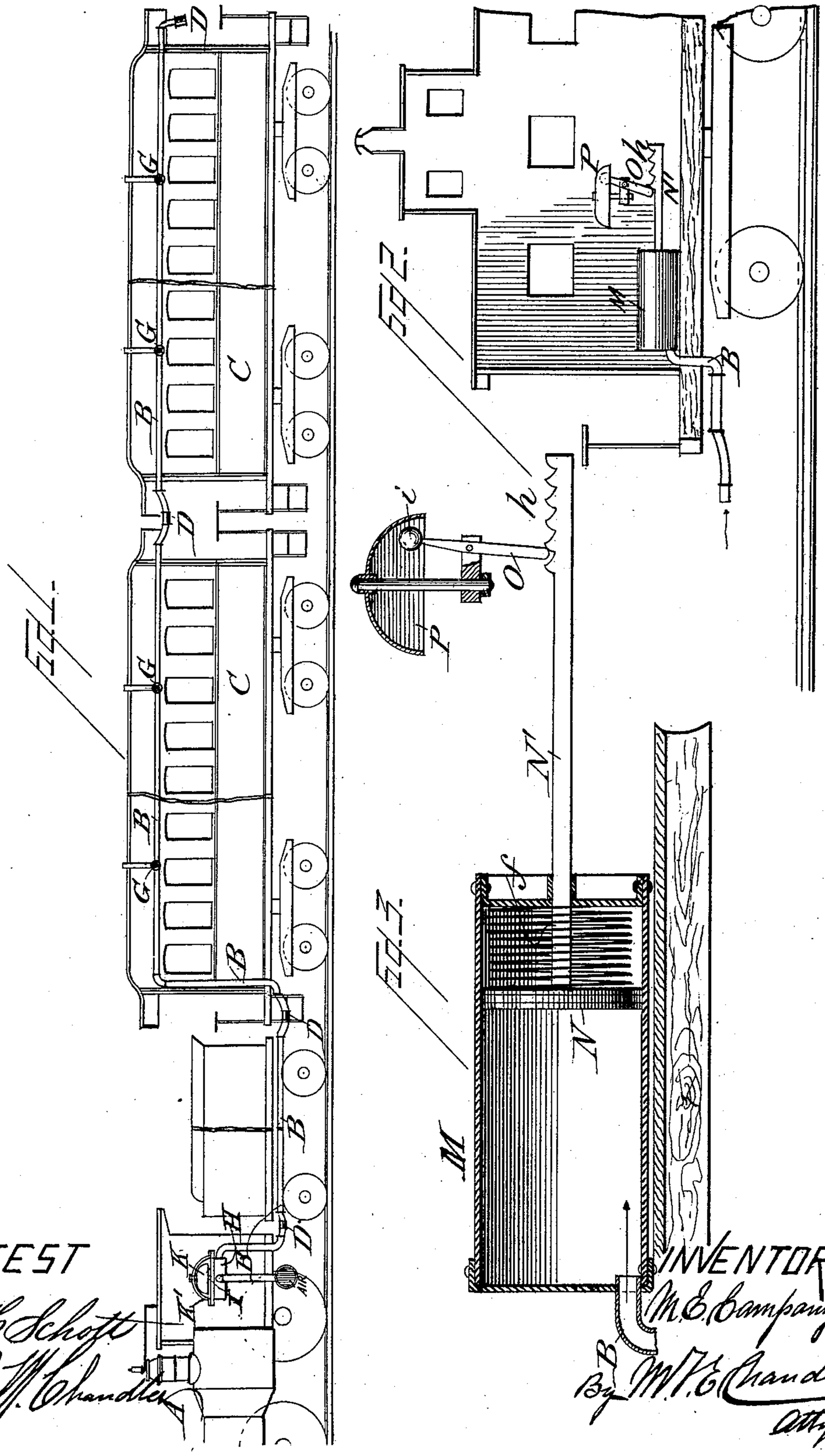
(No Model.) 3 Sheets—Sheet 1.

M. E. CAMPANY.

RAILWAY CAR SIGNAL.

No. 407,278. Patented July 16, 1889.



(No Model.) 3 Sheets—Sheet 2.

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Fig. 4.

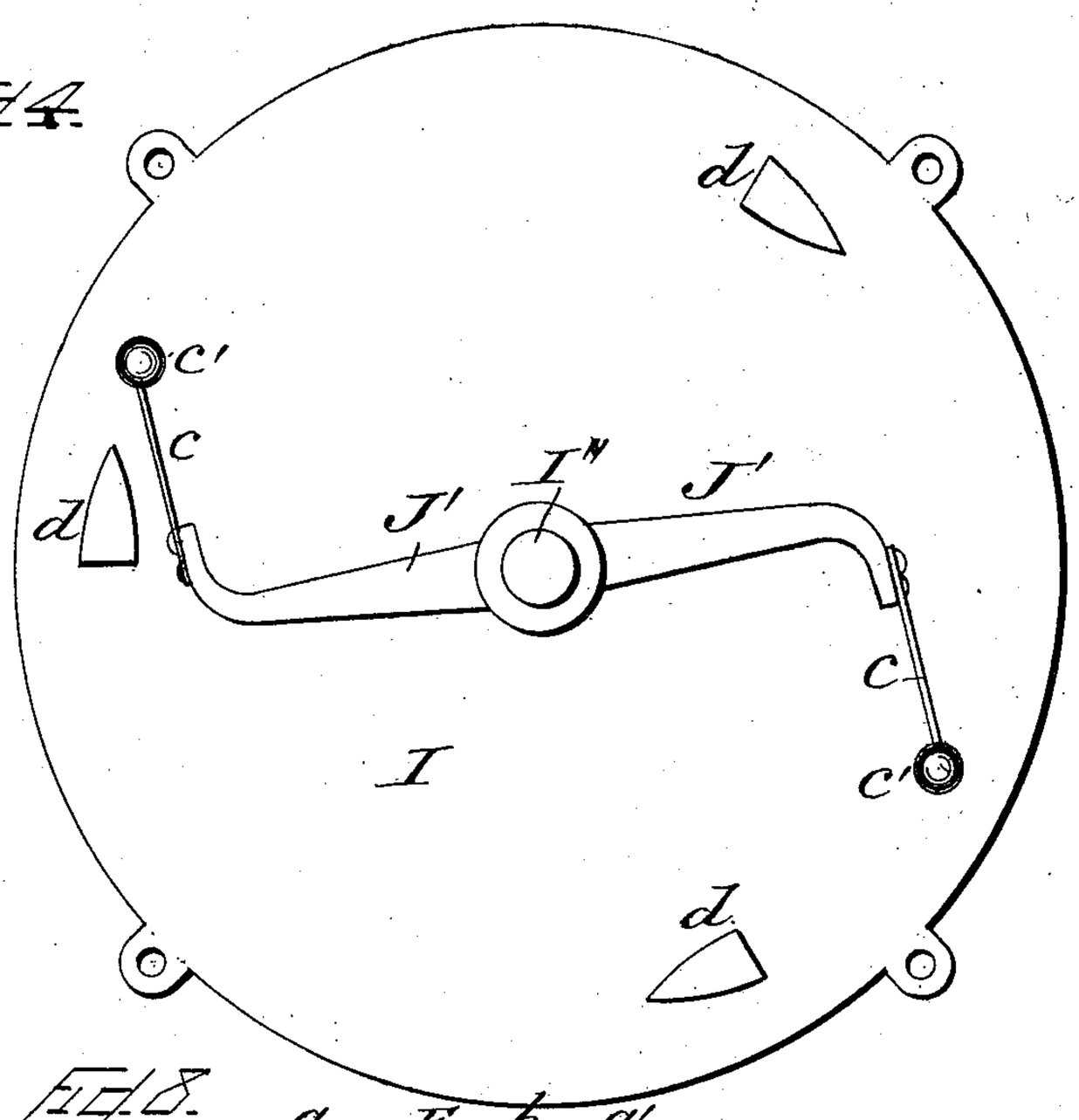


Fig. 8.

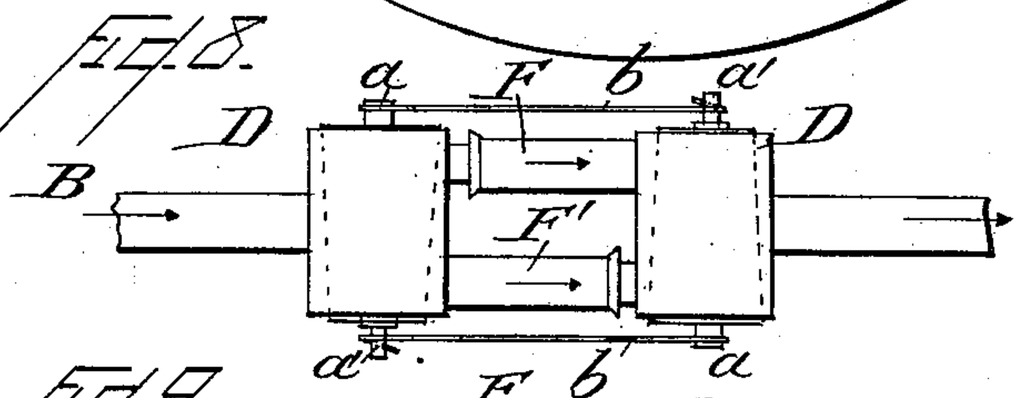


Fig. 9.

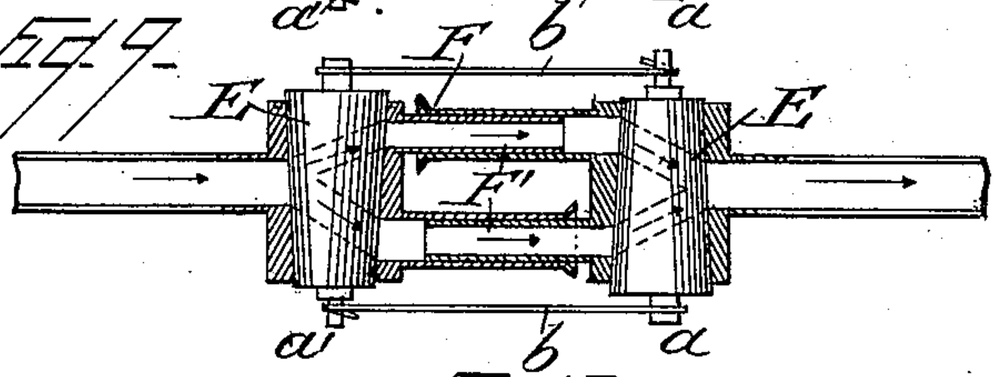


Fig. 10.

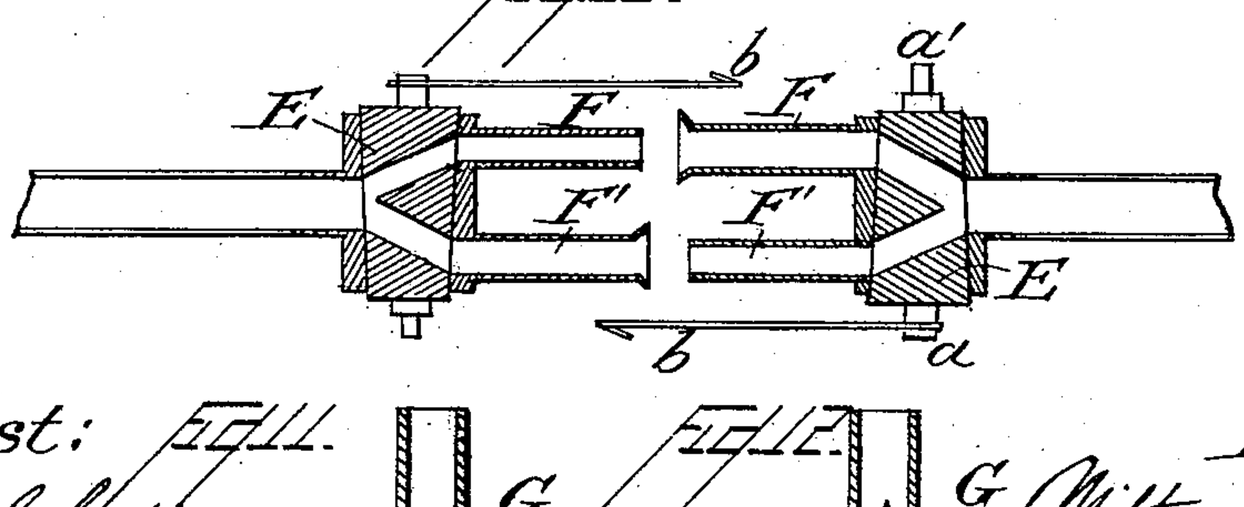


Fig. 11.

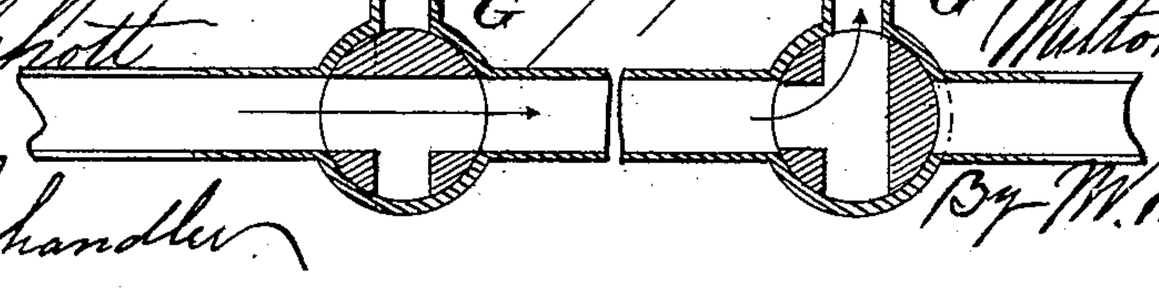
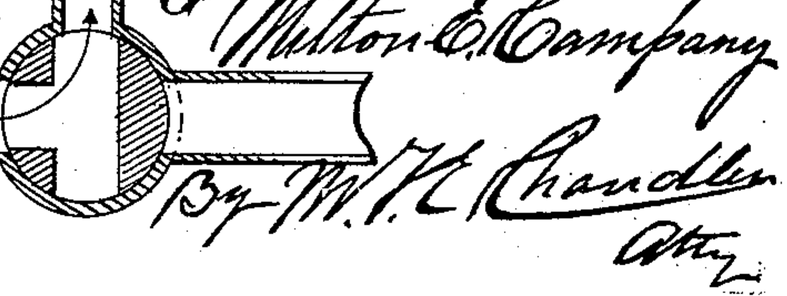


Fig. 12.



Attest:
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(No Model.) 3 Sheets—Sheet 3.

M. E. CAMPANY.

RAILWAY CAR SIGNAL.

No. 407,278. Patented July 16, 1889.

Fig. 5.

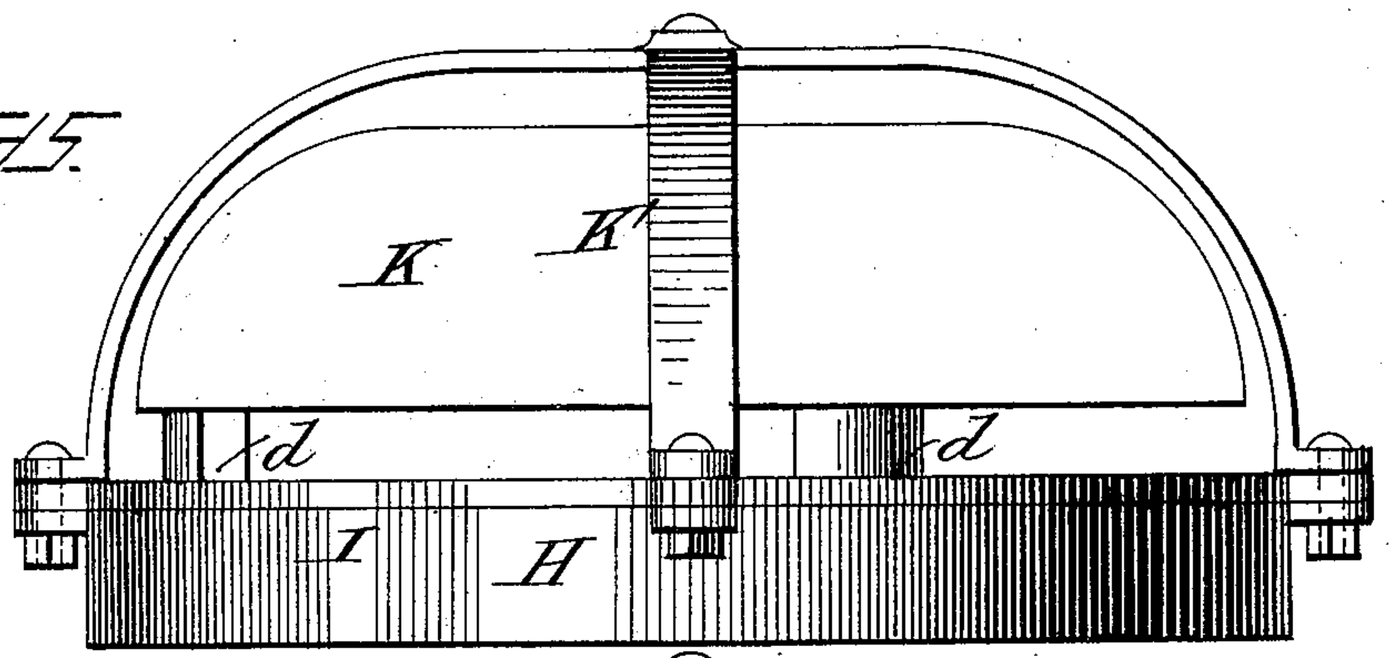


Fig. 6.

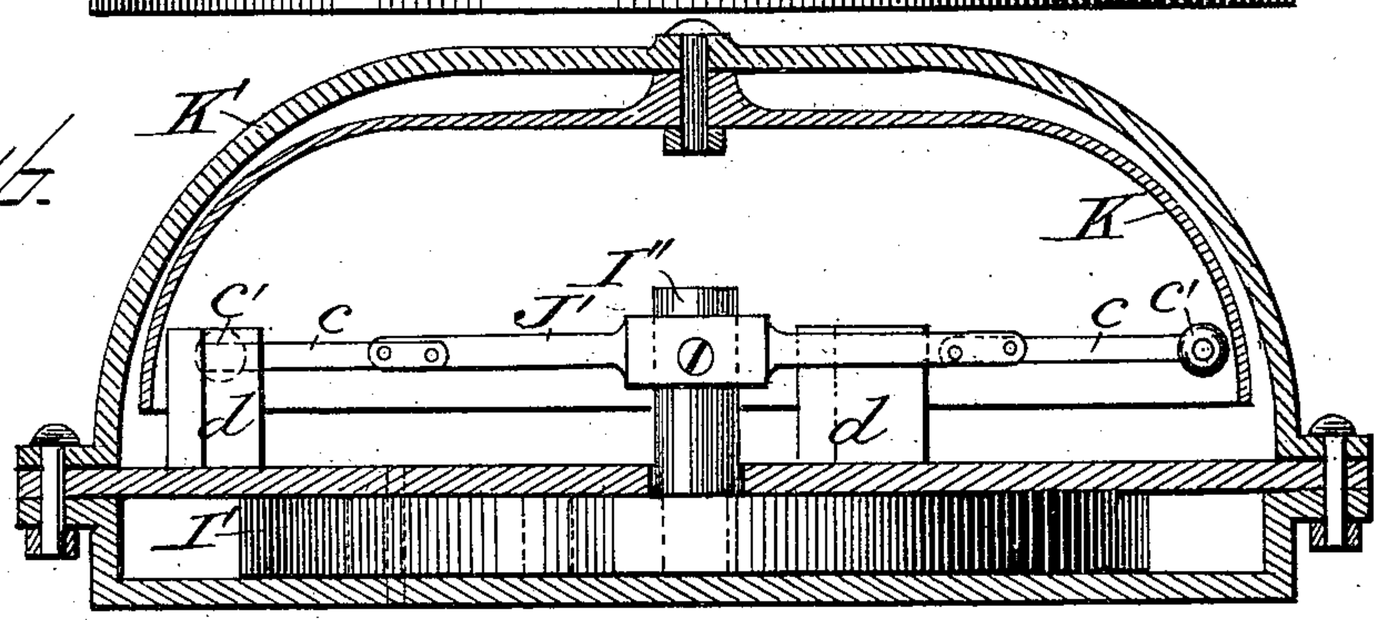
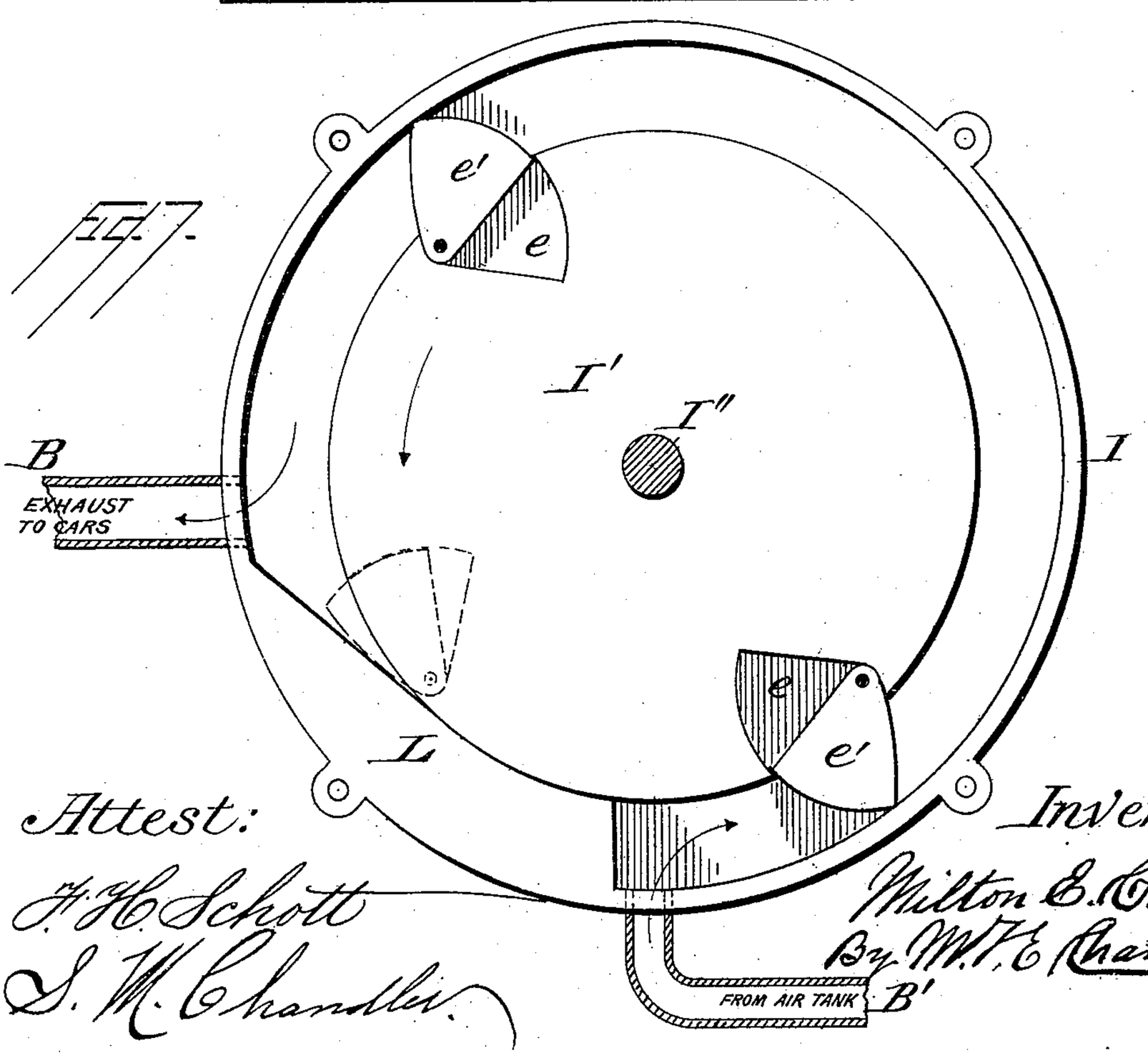


Fig. 7.



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UNITED STATES PATENT OFFICE.

MILTON E. CAMPANY, OF HAMILTON, MICHIGAN.

RAILWAY-CAR SIGNAL.

SPECIFICATION forming part of Letters Patent No. 407,278, dated July 16, 1889.

Application filed August 16, 1888. Serial No. 282,911. (No model.)

To all whom it may concern:

Be it known that I, MILTON E. CAMPANY, a citizen of the United States, residing at Hamilton, in the county of Allegan and State of Michigan, have invented certain new and useful Improvements in Railway-Car Signals; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in the system or method of transmitting signals upon railway-trains and to the apparatus employed in carrying out that system, the object being to place every car of the train in direct connection with the locomotive, so that a signal may be sounded upon the latter from any part of the train, and, further, to so arrange the apparatus that in case of a break or accidental separation of a portion of the train from the rest a signal will be automatically given not only upon the locomotive, but also upon the last car of the train, thus in the case of freight-trains at once notifying the engineer upon the locomotive and the conductor in the caboose at the rear of the train of the accident, so that both may take such steps as may be needed to prevent further injury. The apparatus which I prefer to employ in carrying out this system of signals consists, essentially, in supplying each car with a pipe or tube running longitudinally of the same and adapted for connection with a reservoir of compressed air, said tubes being provided at each end with a peculiarly-constructed coupling device which, while the several cars of the train remain properly coupled, retains its connection with the adjacent car; but should a car-coupling give way and the cars separate, dividing the train into two parts, then the two parts of the pipe-coupling between the cars also separate, and by the escape of air from the pipes cause a bell upon the locomotive to ring, as well as another in the caboose or rear car of the train.

For the purpose of ringing the bell upon the locomotive I prefer to employ a peculiarly-constructed rotary motor, which is put in operation by the passage of compressed air through it and gives to the bell a quick succession of strokes, producing a sound readily heard by the engineer, and not to be mistaken for any of the other noises so plentiful upon a locomotive in motion. The bell for producing an alarm in the caboose or other car may be rung by the movement of a spring-actuated piston inclosed in a cylinder and so connected with the air-pipe that the pressure of the air upon the piston shall compress the spring. It will be understood that when this air-pressure is reduced by the breaking of a coupling and consequent escape of air, or by other means, the spring will react, forcing forward the piston, and by its movement actuate the bell-ringing mechanism. When this apparatus is applied, the air-pipe is carried along the top of the coach or car, or beneath the car-floor, as it places it in more convenient position for access, and in passenger-coaches it may take the place of the ordinary bell-cord and be provided with devices at one or more points in the length of the car for operating escape-valves, the opening of one of which causes an air-current to flow through the pipe and at once puts the bell-ringing motor upon the locomotive in operation. The movement of this motor, however, instantly ceases the moment an escape-valve is closed and the equilibrium of air-pressure in the pipe is regained. It will be apparent that by repeating the opening and closing of an escape-valve the sound of the bell may be made at intervals or intermittent, so as to allow the conveyance of any preconcerted signal from the conductor to the engineer.

In the drawings accompanying this specification, Figure 1 is a side elevation showing a locomotive and two cars provided with apparatus suitable for carrying into effect this improved system of signals. Fig. 2 shows a caboose-car provided with the alarm or bell-ringing apparatus used thereon to notify its occupants of a break in the train. Figs. 3 and 4 are enlarged detail views of this apparatus, showing its construction. Fig. 5 is an enlarged side elevation of the motors employed to ring the bell upon the locomotive. Figs. 6 and 7 are sectional views of the motors and bell, illustrating the relative arrangement of the several parts. Fig. 8 is an enlarged side

elevation of the coupling used to connect the air-pipe between two cars. Fig. 9 is a longitudinal section through the same, showing the relative position of the parts when coupled. Fig. 10 is a similar longitudinal section showing the position of the parts when uncoupled. Figs. 11 and 12 are enlarged views of the valves placed at suitable points along the air-pipes to enable the engineer to be signaled from various points on the train.

In the drawings, A represents the locomotive provided with the usual air-compressor and reservoir to furnish air for working the brakes. Connected with this reservoir is a pipe B, that passes to the rear throughout the several cars or coaches C C of which the train is composed. This pipe is in sections corresponding to the length of said cars or coaches. These sections are united between the cars by short pieces of flexible tubing and couplings D, which couplings consist of a chamber containing a two-way valve or rotating plug E and two hollow cylindrical bifurcations F and F′, the bifurcations F′ being of the same external diameter as the internal diameter of the part F, so that when two of these couplings, as D D, are brought together the part F′ of one will just slip snugly into the part F of the other, where they are retained by the spring-hooks *b b*, one of which is attached to the projecting end *a* of each plug E and hooks over the projection *a′* at the opposite end of each plug. This connection is found sufficient to retain the parts in position under all ordinary circumstances; but when an extra strain is brought upon the pipe-coupling, as when the coupling between two cars gives way, the hooks break or slip off the projections *a′* and allow the parts D D to separate.

Suitable outlet-valves, as G G, are placed at desired points along the air-pipe B, so as to be accessible from each car. These valves, when either of them is opened, allow the escape of air from the pipe, and consequently cause a flow of air through the same, reducing the pressure; and as this pipe B is connected directly to the exhaust-pipe of the motor H, attached to the locomotive, and the induction or supply pipe of said motor connects directly with the air-reservoir, it is evident that opening one of these escape-valves at any point in the length of the train will put the motor in motion, causing it to ring the bell attached thereto. This motor H, as preferably constructed, consists of a cylinder I, with a rotating disk I′ placed therein, its shaft I″ passing through an opening in one of the cylinder-heads and carrying an arm J′, to the opposite ends of which are attached the springs *c c*, each provided at its outer end with a hammer *c′*, that when the shaft is rotated are caused to strike the bell K (suitably mounted upon a support K′, attached to the cylinder-head) by coming in contact with the cams or inclined projections *d d*, attached to the cylinder-head, and which give a vibratory motion to the hammers.

In order to give the compressed air an opportunity to exert its power on the disk I′, it is formed of less diameter than the internal diameter of the cylinder I, within which it revolves, and has formed in its periphery at points diametrically opposite each other recesses *e e*, in which are pivoted the vibrating pistons *e′ e′*. These pistons are retained in contact with the internal surface of the cylinder by the pressure of the air against them and the centrifugal force generated by their revolution. At a point on the inner surface of the cylinder between the openings of the induction-pipe B′, coming from the air-reservoir, and the eduction-pipe B, leading to the cars, is an inward projection of the cylinder, extending to the periphery of the disk and forming an abutment L, against which the air reacts in forcing around the disk. The hinges of the pistons allow them readily to conform to this change in the form of the cylinder, and as the ends of the abutment are formed with a gentle slope they pass it without materially retarding the rotation of the disk.

The mechanism preferred for sounding an alarm in the caboose or other car at the end of a train consists of a cylinder M, attached to any suitable part of the car and connected at one end with the train air-pipe B. This cylinder contains a piston N, the rod N′ of which passes through the cylinder-head opposite the air-inlet, and is surrounded between the pistons and head of the cylinder by coiled springs *f*. The outer extremity of the rod may be furnished with a series of cam-like projections *h h*, which, when the piston moves, come in contact with one end of a swinging lever O, the opposite end of which is provided with a hammer *i*, that when the lever is vibrated comes in contact with a bell P and sounds the alarm.

It is evident that the pressure of the air against the piston N will force it back, compressing the spring *f*, but that when said piston is relieved from the air-pressure, as by a break of the train, it will be forced inward by the spring, and the projections on the piston-rod, coming in contact with one end of the lever O, will vibrate the same and cause the hammer to ring an alarm upon the bell.

I am aware that a whistle operated by compressed air upon the locomotive has been connected with a pipe through the train and arranged in such a manner as to be set in action by the opening of a valve in said pipe upon either car or by the breaking of the same.

I am also aware that signal-bells have been operated by compressed air, and do not, therefore, broadly claim such devices.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. As an improvement in train-signals, the combination of an air-pipe extending through

the train, a compressed-air receptacle upon the locomotive with which said pipe is connected, a cylinder placed in the rear car of the train, also connected with said pipe, a piston in said cylinder actuated in one direction by a spring and in the opposite direction by compressed air, and a bell or gong arranged to ring by the movement of said piston, all the parts arranged to ring the bell upon the escape of air from the pipe through a suitable valve or upon the breaking of a pipe-coupling, substantially as set forth.

2. As an improvement in train-signals, the combination of an air-pipe extending through the train and provided with suitable escape-valves, a compressed-air receptacle attached to the locomotive and with which said pipe is connected, a rotary motor also connected with the air-pipe and mounted upon the locomotive, and a bell and bell-ringing devices put in motion by the motor upon the escape of air from the pipe to convey signals from any car in the train to the engine, as specified.

3. As an improvement in train-signals, the combination of a rotary motor mounted upon the locomotive, a bell and bell-ringing devices put in motion by said motor, an air-pipe extending through the train and connected with said motor, a cylinder placed in a car of the train and also connected with said air-pipe, a piston in said cylinder actuated in one direction by a spring and in the opposite direction by compressed air, and a bell or gong arranged to ring by the movement of said piston, all arranged to give signals upon the locomotive and also upon the train upon the escape of air from the pipe through a suitable valve or upon the breaking of a pipe-coupling, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

MILTON E. CAMPANY.

Witnesses:
J. B. STREETER, Jr.,
HIRAM C. STREETER.