

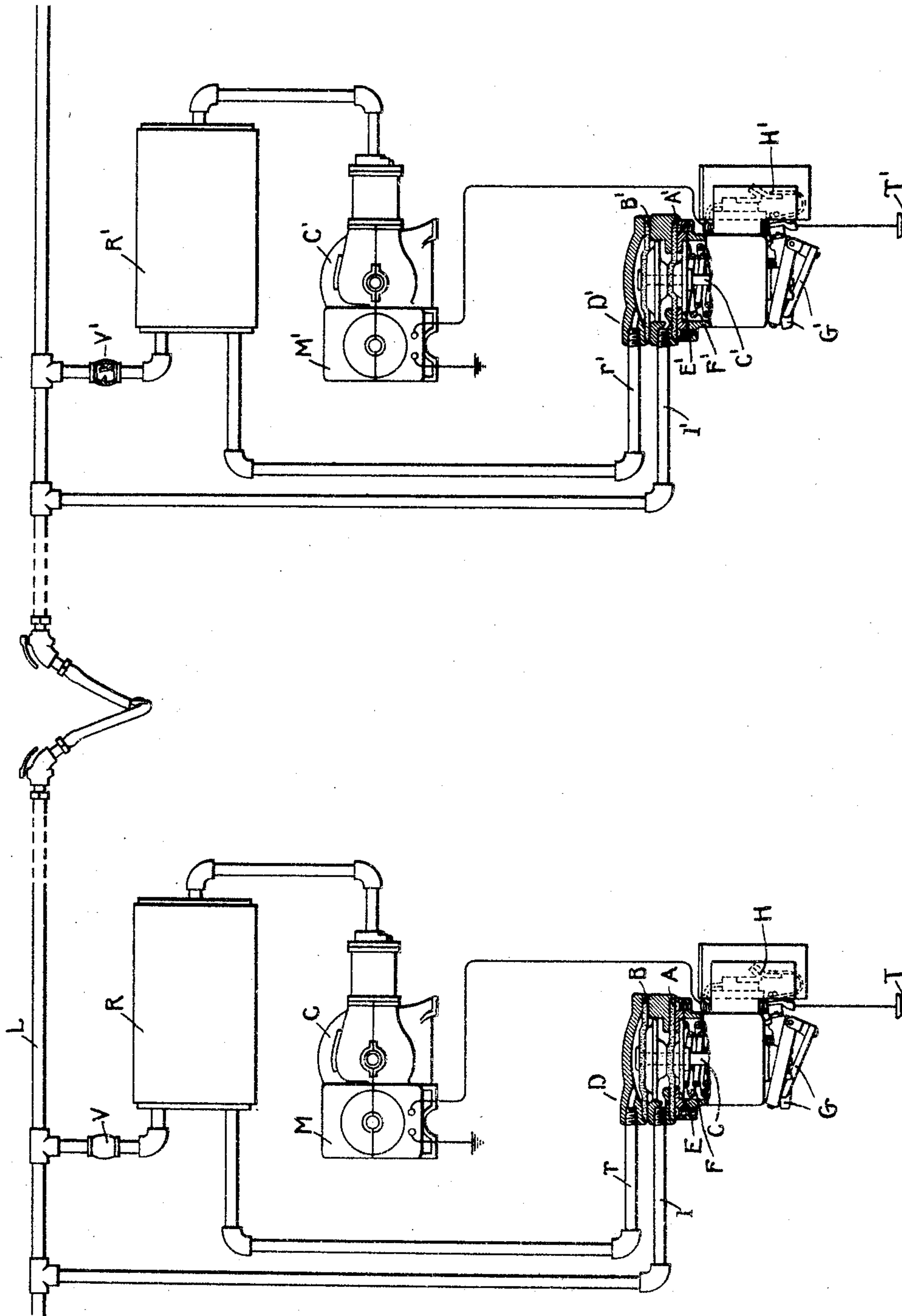
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G. MACLOSKIE.

DIFFERENTIAL GOVERNOR FOR FLUID COMPRESSORS.

APPLICATION FILED JUNE 9, 1904.



WITNESSES.

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DIFFERENTIAL GOVERNOR FOR FLUID-COMPRESSORS.

SPECIFICATION forming part of Letters Patent No. 779,952, dated January 10, 1905.

Application filed June 9, 1904. Serial No. 211,753.

To all whom it may concern:

Be it known that I, GEORGE MACLOSKIE, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Differential Governors for Fluid-Compressors, of which the following is a specification.

My invention relates to the control of pumps or fluid-compressors, and refers particularly to the control of a plurality of pumps or compressors supplying compressed fluid to a common receptacle.

The object of my invention is to provide a control system for automatically maintaining proper pressure and at the same time for dividing the work in proper proportions among the several compressors.

A case to which my invention is applicable is that of an air-brake system on a train in which a plurality of air-compressors at different points on the train supply air to a reservoir-line running the entire length of the train and in which constant pressure must be maintained. It is common practice to provide each air-compressor with an automatic governor which will start the motor driving the compressor whenever the pressure falls below the desired limit and which will stop the motor when the pressure is again raised to the proper amount. In order to distribute the work properly among the several compressors, it is necessary to adjust the several governors with care, so that they will respond simultaneously to variations in pressure. In an application for United States Letters Patent, Serial No. 211,261, filed by S. H. Libby June 6, 1904, is disclosed a novel form of governor and novel control system which render unnecessary a careful adjustment of the governors. This system comprises a novel form of governor, together with certain novel arrangements of the control system. The governor is connected both to the reservoir-line and to a point between the reservoir-line and the compressor—as, for instance, to the reservoir charged from the compressor controlled by the governor—and a check-valve is placed between the reservoir and reservoir-line. By

means of the check-valve air is prevented from flowing from the line to the reservoir, and the governor is arranged to respond not only to a fall in the pressure in both reservoir and reservoir-line, but also to a difference in the pressure between the two. Thus if one governor responds before the rest and starts its compressor at work, raising the pressure in the line, this pressure can have no effect upon the other reservoirs, and the difference in pressure created between the train-line and the other reservoir produces an immediate response of the other governors, which sets their respective compressors at work to charge their reservoirs. In this way the work is properly distributed among the several compressors without the necessity of carefully adjusting them.

The object of my invention is to provide a novel form of governor adapted for use in the system briefly outlined above.

My invention will best be understood by reference to the accompanying drawing, in which I have shown the equipment for two cars of a train.

L represents the reservoir-line extending the length of the train and supplied from the reservoirs R R', which are charged from the compressors C C', driven by the motors M M'.

D D' represent the differential governors controlling the compressor-motors M M' and connected to the reservoirs and to the reservoir-lines by the pipes r r' and l l', respectively.

V V' represent check-valves inserted between the reservoirs and the reservoir-line, which permit a free flow of air from the reservoir to the reservoir-line and prevent the flow in the opposite direction. The check-valve V' is shown in cross-section.

T T' represent the trolley, collector-shoe, or other source of current for the compressor-motors.

The differential governor D comprises two diaphragms A and B, the diaphragm B being larger than A. The diaphragms are rigidly connected and carry a rod C and piston E, which are pressed upward by the springs F. The rod C operates the levers G, which con-

trol the switch H in the circuit of motor M. The arrangement of the levers G and of the switch H is fully described in my former application, Serial No. 188,330, filed January 9, 1904, and forms no part of my present invention. It is sufficient to understand that the switch H is closed when the rod C reaches the upper limit of its travel and is opened when it reaches the lower limit, and any switch which accomplishes the above result may be substituted for the structure shown.

The operation of the governor is as follows: The diaphragm B is subjected on opposite sides to the pressure of the reservoir R and of the reservoir-line L. Since these pressures are normally equal, diaphragm B has no effect upon the normal operation of the governor. Diaphragm A is subjected only to the pressure of the reservoir-line L and corresponds to the single diaphragm usually employed in fluid-pressure governors. As the pressure in the reservoir-line L falls diaphragm A is pushed upward by the springs F. In the same manner diaphragm A' of governor D' is pushed upward by the springs F'. Assume the rod C' of governor D' reaches the upper limit of its travel before the rod C of governor D. The switch H' will then close, energizing motor M'. Compressor C' will start to work, raising the pressure in reservoir R' and reservoir-line L. Check-valve V will immediately close, preventing any rise in pressure in reservoir R. The pressure in the chamber between diaphragms A and B of differential governor D will consequently be raised, the pressure above diaphragm B remaining constant. Since diaphragm B has a greater area than diaphragm A, the result of the rise of pressure will be to assist the upward pressure of spring F. Rod C will thus be carried to the upper limit of its travel, closing switch H and energizing motor M to charge reservoir R. Thus the work is properly distributed among the several governors.

As has been said heretofore, the switch controlled by the diaphragms may be of any suitable form, and other modifications may be made without departing from the spirit of my invention, and I aim in the appended claims to cover all such modifications.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination, a plurality of fluid-compressors, a common receptacle supplied thereby, check-valves between the several compressors and said receptacle, and governors controlling the several compressors, each of said governors comprising two diaphragms, one of said diaphragms being arranged to respond to a difference between the pressures of

its compressor and of said receptacle, and the other diaphragm being arranged to respond to a variation in one of said pressures.

2. In combination, a plurality of fluid-compressors, a common receptacle supplied thereby, check-valves between the several compressors and said receptacle, and governors controlling the several compressors, each of said governors comprising two diaphragms, one of said diaphragms being subjected on opposite sides to the pressures of its compressor and of said receptacle, and the other being subjected to only one of said pressures.

3. In combination, a plurality of fluid-compressors, a common receptacle supplied thereby, check-valves between the several compressors and said receptacle, and governors controlling the several compressors, each of said governors comprising two rigidly-connected diaphragms arranged and connected to respond both to simultaneous and to relative variations in the pressures of its compressor and of said receptacle.

4. In combination, a plurality of fluid-compressors, a common receptacle supplied thereby, check-valves between the several compressors and said receptacle, and governors controlling the several compressors, each of said governors comprising two rigidly-connected diaphragms of different effective areas, the larger of said diaphragms being subjected on opposite sides to the pressures of its compressor and of said receptacle, and the smaller being subjected to only one of said pressures.

5. In a differential fluid-pressure governor, two rigidly-connected diaphragms of different effective areas, a connection from the space between said diaphragms to a source of fluid-pressure, and a connection from the other side of the larger of said diaphragms to a separate source of pressure.

6. In combination, a plurality of reservoirs, a common receptacle supplied thereby, a plurality of fluid-compressors for charging the several reservoirs, a plurality of governors for controlling the several compressors, each governor comprising two rigidly-connected diaphragms of different effective areas, connections from the space between the diaphragms of each governor to the common receptacle, and connections from the other side of the larger diaphragm of each governor to its reservoir.

In witness whereof I have hereunto set my hand this 8th day of June, 1904.

GEORGE MACLOSKIE.

Witnesses:

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HELEN ORFORD.