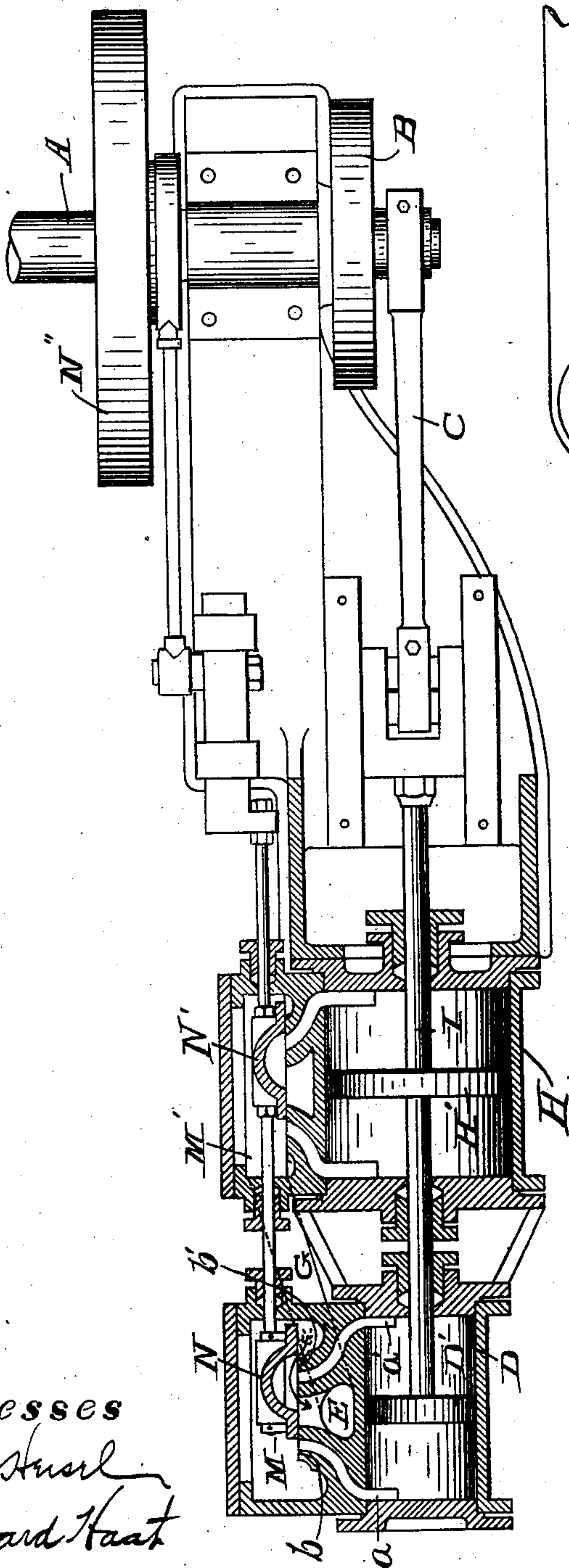


No. 754,620.

PATENTED MAR. 15, 1904.

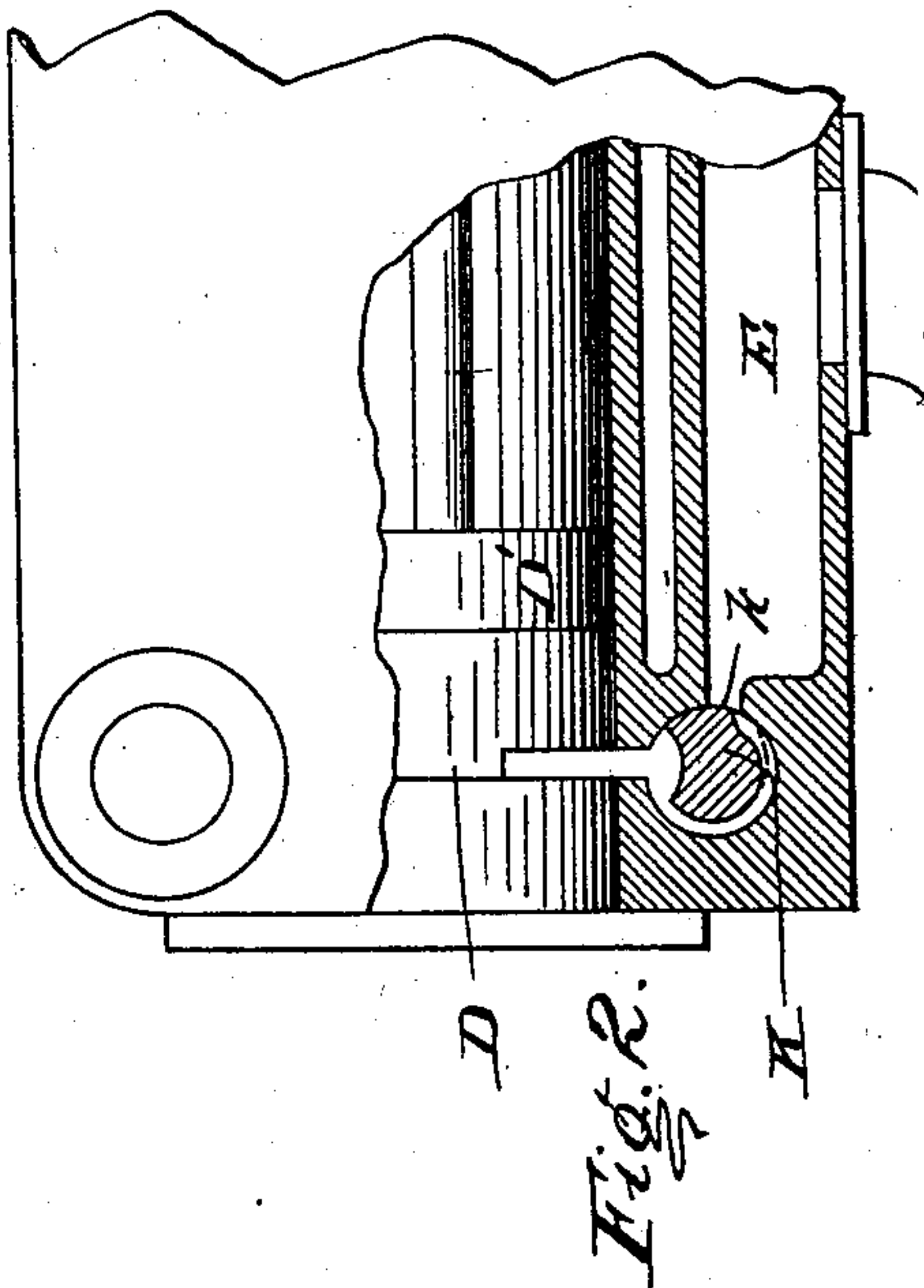
J. B. STANWOOD.
VALVE GEARING FOR STEAM ENGINES.
APPLICATION FILED AUG. 30, 1902.

NO MODEL.



Witnesses

Yrs. A. Huel
Edward Haat



Inventor
James B. Harwood
by Humphreys & Wicks
his Attorneys

UNITED STATES PATENT OFFICE.

JAMES B. STANWOOD, OF CINCINNATI, OHIO.

VALVE-GEARING FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 754,620, dated March 15, 1904.

Application filed August 30, 1902. Serial No. 121,613. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. STANWOOD, a citizen of the United States, residing in the city of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a certain new and Improved Valve-Gearing for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of my specification.

My invention relates to the valve-gearing of multicylinder expansion steam-engines of that class in which the steam distribution is controlled by varying the length of travel of the distributing valve or valves.

The object of my invention is to increase the power or capacity of such engines by short-circuiting the first or high-pressure cylinder when the distributing valve or valves are in long travel, thereby producing a more economical operation under light loads by bringing the range of maximum economy lower in the scale of the engine capacity.

Multicylinder engines have heretofore been constructed in which it was possible to short-circuit the high-pressure cylinder by means of hand-valves or by-passes, particularly in marine engines, where such short-circuiting has been accomplished by hand-valves for the purpose of warming up the cylinders before starting and also for increasing the power. In such cases, however, the action was not automatic, but depended upon the will of the operator. As now constructed the most economical power of such an engine is, especially when working non-condensing, nearly identical with its maximum power; but with unexpected overloads and unavoidable reductions of boiler-pressure it is inexpedient to operate at the maximum economy, as there is not sufficient reserve to meet such emergencies, which sometimes actually incapacitate an engine and prevent the performance of its duty. Great care on the part of the engineer and fireman is required to prevent these emergencies, and even then they are unavoidable.

My invention consists more particularly of an improvement in the valve-seat face or of the valve-face of the distributing valve or valves of the high-pressure cylinder.

In carrying out my invention I so proportion the length of the valve-seat face or of the valve-face itself that when the valve is in long or extreme travel by overtraveling the valve-seat it opens up a communication between the steam-chest of the high-pressure-cylinder and its exhaust-chamber, and (as the latter is in communication with the cylinder of next lower pressure) the second cylinder in the series. Steam at high pressure is thus introduced into this second cylinder and allowed to act on its piston.

In the drawings, Figure 1 is a plan view of a two-cylinder expansion steam-engine with the cylinders, valves, and valve-chambers shown in section; and Fig. 2 is a section showing a modification of my invention.

A is the shaft; B, the crank; C, the connecting-rod; D, the high-pressure cylinder; H, the low-pressure cylinder; I, the piston-rod; D' and H', the pistons working in the respective cylinders.

M is the steam-chamber of the high-pressure cylinder, connected by passages *a a'* with the high-pressure cylinder.

E is the exhaust-chamber, connected by pipe G with the steam-chamber M' of the low-pressure cylinder.

N N' are slide-valves controlling the supply of steam to the cylinders and operated in any usual manner by a shifting eccentric and a main-shaft governor inclosed in a governor-wheel N'', all as is customary in general practice.

The construction so far is of the usual kind and requires no particular description, as it will be readily understood by one skilled in the art.

The valve-seat of the high-pressure cylinder is shortened at *b b'*. This has no effect when the valve is in short travel, and the operation will be the same as it is at present in such engines in which steam is supplied to the low-pressure cylinder at the tension of the exhaust from the high-pressure cylinder; but when the valve is in long travel, as illustrated in the drawings, it is evident that by reason of this shortening of the valve-seat the valve will overtravel the said seat and a direct communication will be opened between the steam-

chambers of the two cylinders, so that steam of high pressure is supplied to the steam-chamber of the low-pressure cylinder and is supplied from the latter to the low-pressure cylinder, so that the piston of the low-pressure cylinder is operated by steam at high pressure, thereby greatly increasing the power of the engine. By this improved construction of my valve and valve-seat I am enabled to construct an engine so as to operate at its maximum economy at ordinary loads, leaving unexpected overloads to be taken care of by thus introducing steam of high pressure to the low-pressure cylinder.

I have illustrated my invention as applied to a two-cylinder expansion-engine with slide-valves; but I do not wish to limit myself or my improvement to this construction of engine or valve, as it is apparent that it may be applied to any engine or to any construction of valve or with any number of cylinders. Thus, for example, in such engines as have separate exhaust-valves for its cylinders—say of the Corliss type—I carry out my invention by narrowing the face of the valve, so that the exhaust-valve is made to open on its back edge when said valve is operated in long travel and overtravels its seat. Thus in Fig. 2, which is a detail view in section showing a portion of the high-pressure cylinder of such an engine, K is one of the exhaust-valves, which normally controls the escape of the exhaust-steam from the cylinder D into the exhaust-chamber E. In applying my invention to this type of valve I narrow its face, as seen at *k*, the dotted lines indicating the length of the face as at present constructed. As above, this has no effect when the valve is in short travel; but in long travel it opens communication between the cylinder D and the exhaust-chamber E at the time when steam is introduced into said cylinder from its steam-chest, thereby permitting steam at high pressure to pass into the exhaust-chamber of the high-pressure cylinder and thence into the low-pressure cylinder, as described in the case of an engine with slide-valves.

Having thus described my invention, what I

desire to claim as new, and to cover by Letters Patent, is—

1. In a multicylinder, expansion steam-engine of the class described, in combination with the high and low pressure cylinders, valves of variable travel and valve-seats, the valves overtraveling the seats at unusual loads, and automatically admitting steam at the pressure of the steam-chest to the low-pressure cylinder or cylinders, substantially as described.

2. In a multicylinder expansion steam-engine of the class described, in combination with high and low pressure cylinders, valves of variable travel, high-pressure steam-chamber, and high-pressure exhaust-chamber, the short bridge *b*, substantially as and for the purpose described.

3. In a multicylinder expansion steam-engine of the class described, in combination with the high and low pressure cylinders, high-pressure steam-chamber, and the exhaust-chamber, valves of variable travel and valve-seats, the valves overtraveling the seats at unusual loads, substantially as and for the purpose described.

4. In a multicylinder expansion steam-engine of the class described, in combination with the driving-shaft, the main-shaft governor mounted thereon, the high and low pressure cylinders, valves of variable travel, high-pressure steam-chamber and high-pressure exhaust-chamber, the short bridge *b*, substantially as and for the purpose described.

5. In a multicylinder expansion steam-engine of the class described, the driving-shaft, the main-shaft governor mounted thereon, the shifting eccentric controlled by said main-shaft governor, the valves and gearing operated by said eccentric, the high and low pressure cylinders, the high-pressure steam-chamber, the high-pressure exhaust-chamber, and the short bridge *b*, substantially as and for the purpose described.

JAMES B. STANWOOD.

Witnesses:

CLARENCE E. MEHLHOPE,
GEORGE HEIDMAN.