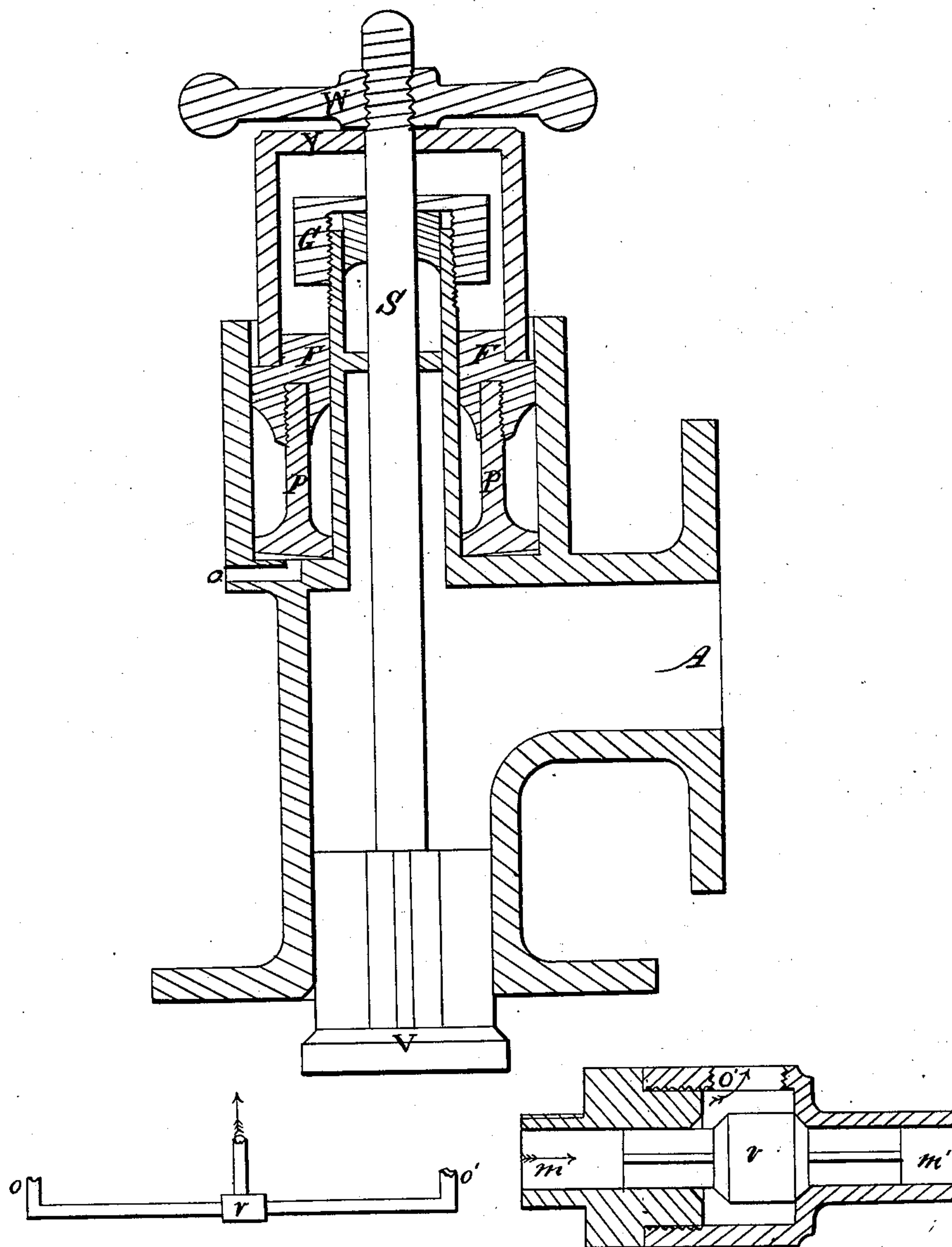


No. 12,966.

PATENTED MAY 29, 1855.

D. STODDART.
CUT-OFF VALVE.

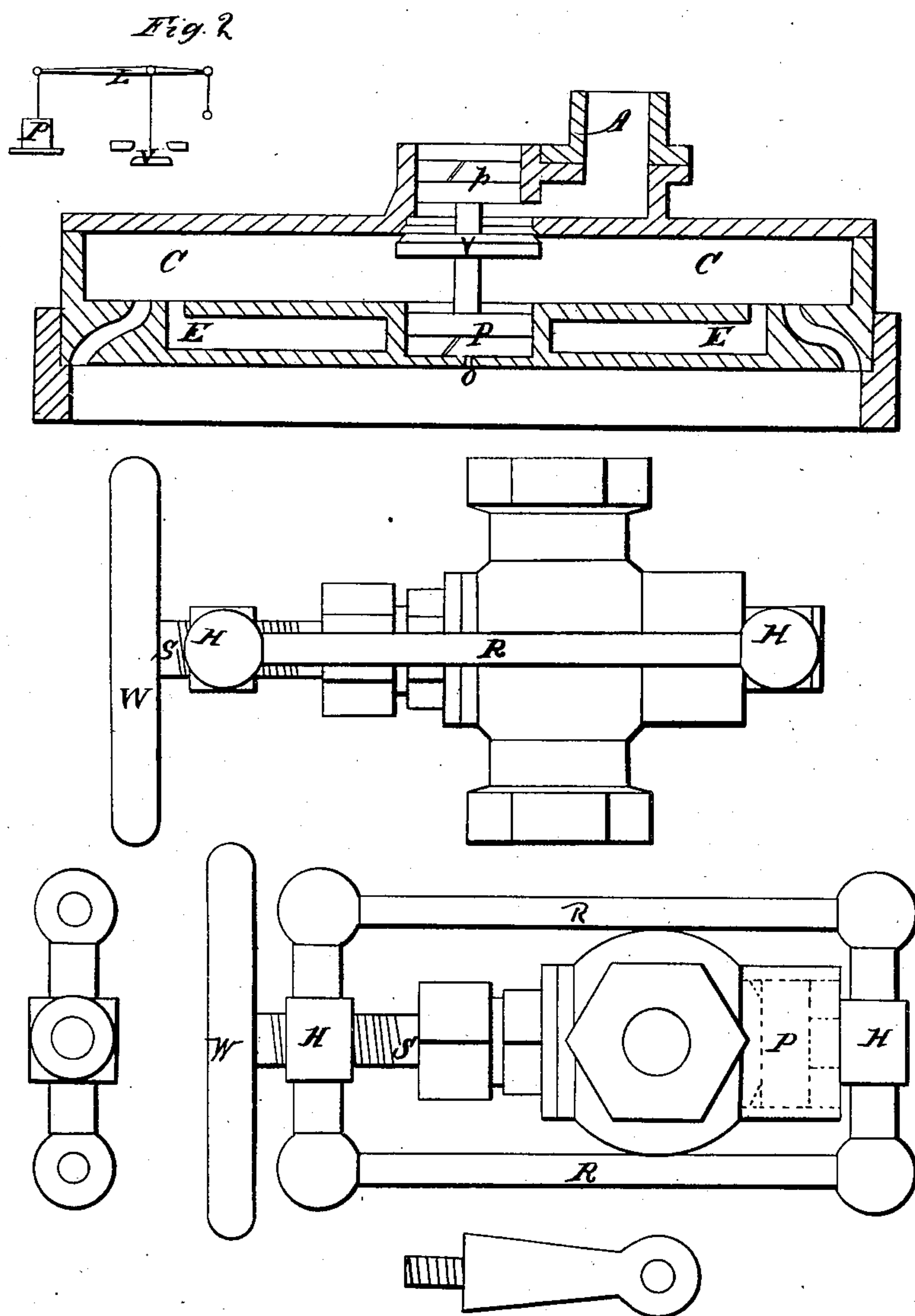
2 SHEETS—SHEET 1.



David Stoddart

D. STODDART.
CUT-OFF VALVE.

2 SHEETS—SHEET 2.



David Stoddart

UNITED STATES PATENT OFFICE.

DAVID STODDART, OF CINCINNATI, OHIO.

CUT-OFF VALVE.

Specification of Letters Patent No. 12,966, dated May 29, 1855.

To all whom it may concern:

Be it known that I, DAVID STODDART, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and Improved Mode of Arranging and Operating Cut-Off Valves; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists in so arranging a disk or piston, connected to the cut-off valve, and connecting the space below said disk or piston to the main cylinder, by a pipe or passage that the cut-off valve may be operated by the steam from the cylinder, passing and returning through said pipe or passage communicating with the space below the said disk.

Description.—The principle of this invention is susceptible of use in several forms with different constructive details, but the one represented in drawings Nos. 3 and 4, we should prefer as the simplest and most generally applicable. These drawings represent a common globe-valve internally the same as in common use, but externally with the additions of a small cylinder with a steam-tight piston or disk in it, connected by cross-heads, and side-rods, to the valve stem. P the disk (dotted in). H, H cross heads. R, R side-rods. S valve stem. The space in the small cylinder under P had no connection with the inside of the globe, but is connected by a pipe to some part of the cylinder, say at the center for the present purpose of description. The disk P should have a greater area than the cut-off valve.

Operation: The steam connection from the boiler to the engine being opened, the main piston commences its stroke, and continues till it passes the hole midway in the cylinder connecting to the space under P, then the steam behind the piston rushes through the connecting pipe and acting on disk P closes the valve, while the main piston continues to the end of the stroke, the steam behind it and also under P, by reason of expansion, having gradually reduced to nearly one-half its initial pressure. But if the area of P is sufficiently large the reduced pressure will still hold the valve shut, until the engine exhausts, when the steam under P will rush back again to the cylinder, leaving unbalanced the pressure of steam above the cut-off valve exerted on its

face, and hence the cut-off valve opens to give the engine steam for the return stroke when the like operation is again performed. In condensing engines the external atmospheric pressure on P will likewise air the valve in opening. The part of either stroke performed before the steam connection is opened between cylinder and disk P is equal one-half the stroke plus one-half depth of the main piston, and this latter item must have due consideration in locating any other holes in the cylinder for cut-off purposes. It is apparent that connections of cylinder to space below disk P may be formed earlier in the stroke than already described, and the operation would be the same, except that a steam connection of the parts of the cylinder before and behind the piston would result in such case, unless we insert in the connecting pipe a double-check-valve as shown in drawing No. 5, wherein if steam comes from one end of the cylinder through *m* as the arrow represents, it will shut the check valve opposite and continue through the branch *o'* to the cut-off; or if steam comes through *m'* from the other end of the cylinder it will shut the double-check-valve on the opposite side, and continue to the cut-off arrangement as before. Thus we might have a cut-off changeable at pleasure, by several stop cocks and connecting pipes and opening a cock on each side of half stroke the engine will cut off after passing the first open cock. The distance between any point of cutting off and its corresponding hole in the cylinder will vary with any change in the size or throttling of the hole or connecting pipe, in the pressure of steam, or speed of the piston. Where the hole and connections are proportionally large, and the motion of the piston slow, the valve will cut-off almost immediately as the main piston passes the hole, but as you decrease the size of connection, quicken the speed of the piston and reduce the pressure of steam, so will the distance increase between the hole and the piston of the main piston, when the cut-off valve is fully shut. A large connection will shut the valve quickly, but slamming is the consequence which can be obviated in such case by the use of the disk-pot or other contrivance already in use for like purposes. Each case must be determined by its own required conditions, according to established rules of philosophy and practice applicable in such cases. Also in assuming

the proper ratio for the area of disk P, and the cut-off valve, the period of cutting off and the probable throttling of steam by the throttle or governor valve must enter into
5 the calculation.

Drawing No. 1, represents section *f* of steam chest and part of cylinder of a common slide valve engine with another construction of cut-off P and *p* disks of 36 and
10 25 sq. in. area V valve of 36 sq. in. O opening connecting to cylinder. The operation by the admission and exhaust of steam through opening O is substantially as already described.

15 Drawing No. 2, shows another construction of cut-off with throttle combined P annular piston or disk, F follower, G gland, *p p p* spaces for packing, Y, cylindrical

yoke, O opening drilled in. Its mode of operation as a cut-off is identical with the
20 first described.

Having now fully described the construction and mode of operation of such cut-off valves, what I claim as new and my invention—

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Consists in so arranging the disk P, connected with the cut-off valve, and in relation to the space below P connecting it by a passage to the cylinder, that the cut-off valve will be operated by steam from the cylinder
30 as set forth.

DAVID STODDART.

Witnesses:

JOHN VAN AMRINGE,
ELIZA J. STODDART.