



# UNITED STATES PATENT OFFICE.

ABRAM VAN BRUNT, OF BRIDGEPORT, CONNECTICUT.

VALVE-RELEASE MECHANISM FOR STEAM-ENGINES.

1,003,165.

Specification of Letters Patent. Patented Sept. 12, 1911.

Application filed March 29, 1911. Serial No. 617,619.

*To all whom it may concern:*

Be it known that I, ABRAM VAN BRUNT, a citizen of the United States, and a resident of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Valve-Release Mechanism for Steam-Engines, of which the following is a full, clear, and exact description.

This invention relates more particularly to the valve mechanism of what is known as the Corliss type of steam engine.

One of the principal objects of the invention is to provide means whereby the valve may be operated through a movable arm in such a way that a very quick and positive release is obtained and in which one of the contact blocks will be positively actuated by a rectilinear movement so that the blocks will not wear at the edges as is usually the case by the means ordinarily employed for actuating the valves, thus permitting the engine to be run more economically and at the same time provide a mechanism which may be used on engines of very high speed.

Other objects of the invention are to provide simple and efficient mechanism for operating the valve which may be used in connection with engines of various kinds; and to provide simple means whereby the valve may be cut off at any desired point.

Another object of the invention is to provide simple means whereby a rock arm may be connected to be operated by an eccentric and this arm made to engage a member or part secured to the valve stem, so as to cause the rotary movement of the valve stem and then have the engaging surface released by a sliding rectilinear movement, instead of a radial movement, either through the action of said arm or automatically through the action of the governor.

A further object of the invention is to provide simple and efficient means by which both blocks serving as engaging parts or trips may be positively moved and in such a way that the engaged block or member will be positively restored to a position to be engaged immediately the engaging block or member is moved past the same.

A still further object of the invention is to provide mechanism which is simple in construction and which may be readily made and assembled.

With these and other objects in view, the invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a front elevation, partly in section, of one form of mechanism embodying my invention. Fig. 2 is an end elevation of the mechanism shown in Fig. 1, the cylinder and supporting means for the valve stem being shown in section; and Fig. 3 is a detail perspective view of one of the trip blocks.

The engine cylinder 10 has a valve stem 11 projecting within the same and around the valve stem is a packing gland 12 to keep the stem tight and permit an oscillatory movement of said stem. A frame or bracket 13 is secured to the cylinder 10, and this bracket serves to support the outer end of the stem and also the valve-operating and release mechanism 14. This mechanism 14 has a valve arm or member 15 secured thereto, as by a key or otherwise, and said member 15 has a lug or projection 16 to which one end of a rod 17 is held. The rod 17 at the lower end may carry a piston which enters a dash pot 18 of any suitable kind, it being intended that the dash pot be such as employs a vacuum and which will force the rod 17 downward and move the member 15 with the valve stem in one direction.

An arm 19 may be connected through a rod 20 to a rock arm or to an eccentric by which said arm may move or rock back and forth, and said arm has a boss portion 21 which has an opening therethrough to fit about the valve stem 11, which latter serves as a support and as a pivot for said arm. A boss or bracket 22 is attached to or formed integral with arm 19 and moves therewith, and said boss may be formed of two members or parts and held together by means of screws or bolts 23 to adapt the members to be separated. The boss or bracket 22 has an opening or recess 24 in which a block 25 is adapted to slide. This block 25 carries a lug or pin 26 and around said pin or lug is a spring 27 tending normally to force the block upward within the recess 24. This block 25 may be substantially a cube or of any other polygonal form, and at one side

thereof has an engaging member or trip 28 secured thereto by a bolt 29 or otherwise, and this member 28 serves as one of the engaging means and may be of steel tempered  
 5 so as to be very hard or of any other suitable material, the purpose of making the engaging member 28 square being to adapt the same to be used on all four sides thereof. The bolt head 29 is adapted to move in open  
 10 end 30 in the end of the bracket 22, the end or side 31 of which serves as a retaining means to hold the block 25 from endwise removal therefrom, and to further hold the said block against removal the bracket 22  
 15 is provided with an overhanging lip or part 32 which permits a certain movement of the block 25, the said lip being of such length as will hold the block in the recess except when the member 28 is removed in which  
 20 case the block by lateral movement may then be entirely removed from the recess 24 to place another in its stead or for any other purpose desired.

The engaging member or trip 28 when  
 25 the arm 19 is rocked on its pivot, is adapted to engage a member 33 which is similarly formed and of like material as the member 28 and is held to a block 34 by a bolt 35 or otherwise. This block 34 is pivoted at 36  
 30 to the dash pot arm or member 15, and at the lower part thereof, so that when the arm is rocked back and forth, the member 28 on one movement will engage the lower end of the member 33 and will force the member  
 35 15 and valve stem 11 to rock or oscillate the valve to allow the steam to enter the engine cylinder, and as soon as the members 28 and 33 are disengaged, in a manner to be presently described, the dash pot, owing to the  
 40 vacuum therein, will quickly force the rod 17 downward and will restore the valve to its normal or closed position to cut off the steam.

To positively move the block 25 to release  
 45 the engaging member 28 from the engaged member 33 of the dash pot arm, various means may be employed. As shown, a crank or arm 37 is held to a shaft 38 arranged to rock in the bracket or boss 22, and secured  
 50 to this shaft 38 is an arm or finger 39 the outer end of which is seated in a recess 40 in the block 25. As the said shaft 38 is oscillated through the arm 37, the block will be forced against the tension of the spring  
 55 27 within the recess 24 and will thus disengage the member 28 from the engaged member 33 of the block 34 to permit the dash pot to operate to close the valve as already described. The arm 37 has a cam  
 60 slot 41, a part of which is on a radius of the valve stem 11 as a center, and at one end has an abrupt portion, as 42, serving as a means to cut off the steam by releasing the trips or engaging members, and at the oppo-  
 65 site end of said slot is also an abrupt cam

portion 43 serving as an emergency means for cutting off the steam by actuating of the valve through the governor as will be presently described. A pin or roller 44 is  
 70 movable in the slot 41 and the position of the pin 44 determines the point of cut off. The pin 44 is carried by the end 45 of a governor lever 46. This lever 46 is pivoted to rock on the valve stem 11, and may have one end connected by a rod 47 to the gover-  
 75 nor in order that the latter may position said lever 46 and thereby the position of the pin 44. As will be seen, the lever 46 is set through the governor to position the pin 44 for the purpose of cutting off the steam at  
 80 the desired point and said pin will remain in this position, and as soon as the arm 19 in its rocking movement carries the arm 37 far enough to cause the abrupt cam slot 42 to engage the pin, this action will move the  
 85 arm 37 on its pivot shaft 38, and through the arm 39, will force the block 25 by a rectilinear movement from engagement with the trip or engaged member 33 to permit the valve stem to be rotated to close the valve  
 90 and cut off the steam through the action of the dash pot 18. Should the governor belt break for any reason, the lever 46 will move far enough to engage the cam slot end 43 and this will cause the movement of the  
 95 arm 37 and disengagement of the trip 28 to permit the steam to be cut off.

The arm or member 15 has an overhang-  
 100 ing portion 48 forming a recess 49 under the same for the block 34, and this block is normally forced downward toward the trip 28 by a spring 50 which is arranged around a rod or lug 51 carried by the block 34, there being a pin or bolt 52 extending through  
 105 the block 34 and into a slot 53 in the overhanging portion 48, thus serving to further guide and hold the block against falling in case of accident. The block 34 carries a pin 54 which is adapted to move in a cam slot  
 110 55 in the arm 19. This cam slot has a part substantially concentric with the center of the valve stem 11 and an abrupt cam portion 56 which has a pin entering the same and will cause the trip member 33 to be sud-  
 115 denly forced downward in a position to be engaged by the trip member 28. By this means and by means of the construction and operation of the trip block 25, the two wear-  
 120 ing surfaces or ends of the trip members are both positively moved with respect to each other, and the releasing trip member 28 and block 25 have a sliding direct rectilinear movement from the trip member 33 so as  
 125 to avoid the tendency of the edges becoming round through wear, thus serving not only to lengthen the life of said trip members, but also produces economy in the use of steam, and further permits the engine to run at a very high speed and much faster  
 130 than could be accomplished should the trip

members or the releasing trip member have a radial movement instead of a rectilinear movement.

The lever 46 may be connected by a rod 57 to a similar lever on another valve so that a plurality of valves may be operated in unison, and likewise the arm 19 may be also connected to a similar arm through the rod 58 to work two or more valves simultaneously, though each valve may be operated independently if desired.

As a further precaution and to cause the dash pot member 15 to be positively moved backward by the arm 19 in case the dash pot failed to operate the same, I may provide a recess cut-away portion on the boss of the arm 19, to receive the head of a pin 59, which latter moves freely within a recess or cut-away portion 60 in the boss of the arm or member 15. In the ordinary movement of the arm 15, the shoulders formed by the cut-away portion will not engage the pin 60, but should the dash pot fail to close the valve through the arm or member 15, the arm 19 on its return movement will cause the pin 60 carried thereby to engage the shoulder at one end of the cut-away part and move the arm 15 in position to cut off the steam.

From the foregoing, it will be seen that simple and efficient means is provided whereby two trip blocks having engaging parts may be positively moved so that a very quick action both of engagement and release is secured; that by the means shown the engaging trip member is positively moved in a direct line and with a sliding movement from engagement with the other trip member; that said means will permit the engaging members or trips to wear much longer and to be more effective while in use; that simple means is provided whereby the steam may be cut off at the desired point; that simple means is provided whereby the cut off may be regulated through the governor; and that said means is simple in construction and may be readily made and assembled.

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

1. The combination with a valve-operating element, of an arm held to said element, a rocking arm, two movable trip members, one carried by each arm and movable independently thereof, and means for positively moving one of the trip members in a direct line from disengagement with the other member.

2. The combination with a valve-operating element, of an arm pivotally held to said element, a rocking arm, two trip members one of which is pivotally held, one carried by each arm and movable independently thereof, means for positively moving one of

the trip members in a direct line from disengagement with the other member, and means for positively moving the pivotally held member.

3. The combination with a valve-operating element, of two movable engaging trip members, and means for positively moving one of the trip members in a direct line from disengagement with the other member.

4. The combination with a valve-operating element, of a rocking member held thereto, means for forcing the member in one direction, a block pivotally held to said member, means for moving the block on its pivot, a rocking arm, a trip block carried by said arm and held to have an independent rectilinear movement thereon, and means whereby said block may be caused to engage the first-mentioned block or be positively disengaged therefrom.

5. The combination with a valve-operating element, of a movable member held thereto, means for forcing the member in one direction, a block held to said member, means for moving the block, a movable arm, a trip block carried by said arm and held to have an independent rectilinear movement thereon, and means whereby said block may be caused to engage the first-mentioned block or be positively disengaged therefrom.

6. The combination of a pivotally held block, means for moving the block on its pivot, a trip block held to have a rectilinear movement, and means whereby said block may be caused to engage the first-mentioned block or be positively disengaged therefrom.

7. The combination of a rocking member, a block held to said member, a rocking arm, a trip block carried by said arm and held to have an independent rectilinear movement thereon, and means whereby said block may be caused to engage the first-mentioned block or be positively disengaged therefrom.

8. The combination with a valve-operating element, of an oscillatory member fixed thereto, a trip block carried by said member, a lever, means for connecting the lever to a governor, a rocking arm, a trip block adapted to move with said arm and adapted to have a relative sliding movement thereon, a shaft, an arm carried by said shaft engaging the trip block, and an arm held to the shaft and having a part thereof engaged by the lever connected to the governor to actuate the same and thereby move the second block.

9. The combination of an oscillatory member, a trip block pivotally held to said member, a governor lever, a rocking arm, a trip block adapted to move with said arm and having a relative sliding movement thereon, a shaft, an arm carried by said shaft engaging the trip block, and an arm held to the shaft and having a part thereof engaged

by the governor lever to actuate the same and thereby move the second block.

10 The combination with a valve-operating element, of an oscillatory member fixed thereto, a trip block carried by said member, a governor lever, a rocking arm, a trip block adapted to move with said arm and having a relative sliding movement thereon, and an arm held to move the second trip block and having a part thereof engaged by the governor lever to actuate the same.

15 11. The combination of an oscillatory member, a trip block pivotally held to said member, a governor lever, a rocking arm, a second trip block adapted to move with said arm and having a relative sliding movement thereon, and means connected to the second trip block and to the governor lever to actuate said second block.

20 12. The combination with a valve-operating element, of an oscillatory member fixed thereto, two independently movable trip blocks, a shaft, an arm carried by said shaft engaging one of the trip blocks, a second arm held to the shaft, and means for operating the arm.

25 13. The combination with a valve-operating element, of a trip block movable with said element, means for moving the trip block in one direction, a rocking arm, a second block slidably held on said arm and adapted to move with the same during its rocking movement, an arm pivotally held to the first-mentioned arm and having a connection with the block to move the same, said arm having a cam slot, and a lever having means at one part thereof adapted to connect with a governor and having a part engaging the cam slot of the block-operating arm and serving as a means to actuate the arm to disengage the slidable block to permit the valve-operating element to be moved.

30 14. The combination with a valve-operating element, of a trip block movable with said element, a rocking arm, a second block slidably held on said arm and adapted to move with the same during its rocking movement, an arm held to the rocking arm and having a connection with the block to move the same, said arm having a cam slot, and a lever having means at one part thereof adapted to connect with the governor and having a part engaging the cam slot of a block-operating arm and serving as a means to actuate the arm to disengage the slidable block to permit the valve-operating element to be moved.

35 15. The combination of a trip block, a rocking arm, a second trip block slidably held on said arm and adapted to move with the same during its rocking movement, an arm pivotally held to the first-mentioned arm and having a connection with the block to move the same, said arm having a cam slot, a lever having means at one part thereof

adapted to connect with a governor, a pin carried by the lever and engaging the cam slot of the block-operating arm and serving as a means to actuate the arm to disengage the slidable block to permit the valve-operating element to be moved.

40 16. The combination with a valve-operating element, of a pivotally held trip block movable with said element, means for positively moving the trip block in one direction on its pivot, a rocking arm, a block slidably held on said arm and adapted to move with the same during its rocking movement, an arm pivotally held to the first-mentioned arm and having a connection with the block to move the same, said arm having a cam slot, and adapted to connect with a governor and engaging the cam slot of the block-operating arm to actuate the arm to disengage the slidable block to permit the valve-operating element to be moved.

45 17. In a valve release mechanism, the combination with a valve-operating element, of two movable trip blocks, one carried by the valve-operating element and the other independently movable thereof, and means for actuating one of the blocks to impart a rectilinear movement thereto.

50 18. In a valve release mechanism, the combination of a support, two trip elements, one pivotally held to move on the support, and the other independently movable thereof, and means for actuating one of the blocks to impart a rectilinear movement thereto.

55 19. In a valve release mechanism, the combination with a valve-operating element, of two trip blocks, one movable with the valve-operating element and the other independently movable thereof, and an arm for actuating one of the blocks to impart a rectilinear movement thereto.

60 20. In a valve release mechanism, the combination of a valve-operating element, a member held to said element, a block pivotally held to said member, means normally forcing the block on its pivot, means serving to guide the block, a rocking arm having a cam slot, a pin carried by the pivoted block and entering said slot, and a trip block movably held on said arm adapted to engage the pivotally held block.

65 21. In a valve release mechanism, the combination of a valve-operating element, a member held to said element, a block pivotally held to said member, a spring normally forcing the block on its pivot, a pin serving to guide the block, a rocking arm having a cam slot, a pin carried by the pivoted block and entering said slot, and a trip block slidably held on said arm adapted to engage the pivotally held block.

70 22. In a valve release mechanism, the combination of a valve-operating element, a member held to said element, a block pivotally held to said member, a spring normally

forcing the block on its pivot, a rocking arm having a cam slot, a pin carried by the pivoted block and entering said slot, and means held on said arm adapted to engage the pivotally held block.

23. The combination of a valve-operating element, of a member held to said element, a dash pot, means connected with the dash pot whereby the member may be moved in one direction, a trip block carried by said member, a lever pivoted to move about the valve-operating element adapted to be connected to a governor, a slidably held trip block, an arm to which the block is held, and means connecting the block and lever whereby the said lever may move the block to disengage the trip block and permit the dash pot to operate the valve-operating element and thereby cut off the steam.

24. The combination of a valve-operating element, of a member held to said element, means whereby the member may be moved in one direction, a trip block carried by said member, a lever pivoted to move about the valve-operating element adapted to be con-

nected to the governor, a second trip block, an arm to which the block is held, means connecting the block and lever whereby the said lever may move the block to disengage the trip block to permit the valve-operating element to cut off the steam, and auxiliary means for moving the arm to cut off the steam for the purpose set forth.

25. The combination of a valve-operating element, of a member held to said element, a dash pot, means connected with the dash pot whereby the member may be moved in one direction, a trip block carried by said member, a lever pivoted to move about the valve-operating element adapted to be connected to a governor, a second trip block, an arm to which the block is held, and means operated by the lever to move the second block.

This specification signed and witnessed this 25th day of March A. D. 1911.

ABRAM VAN BRUNT.

Witnesses:

JOHN ALLEN,

JAMES J. HILLEGASS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."