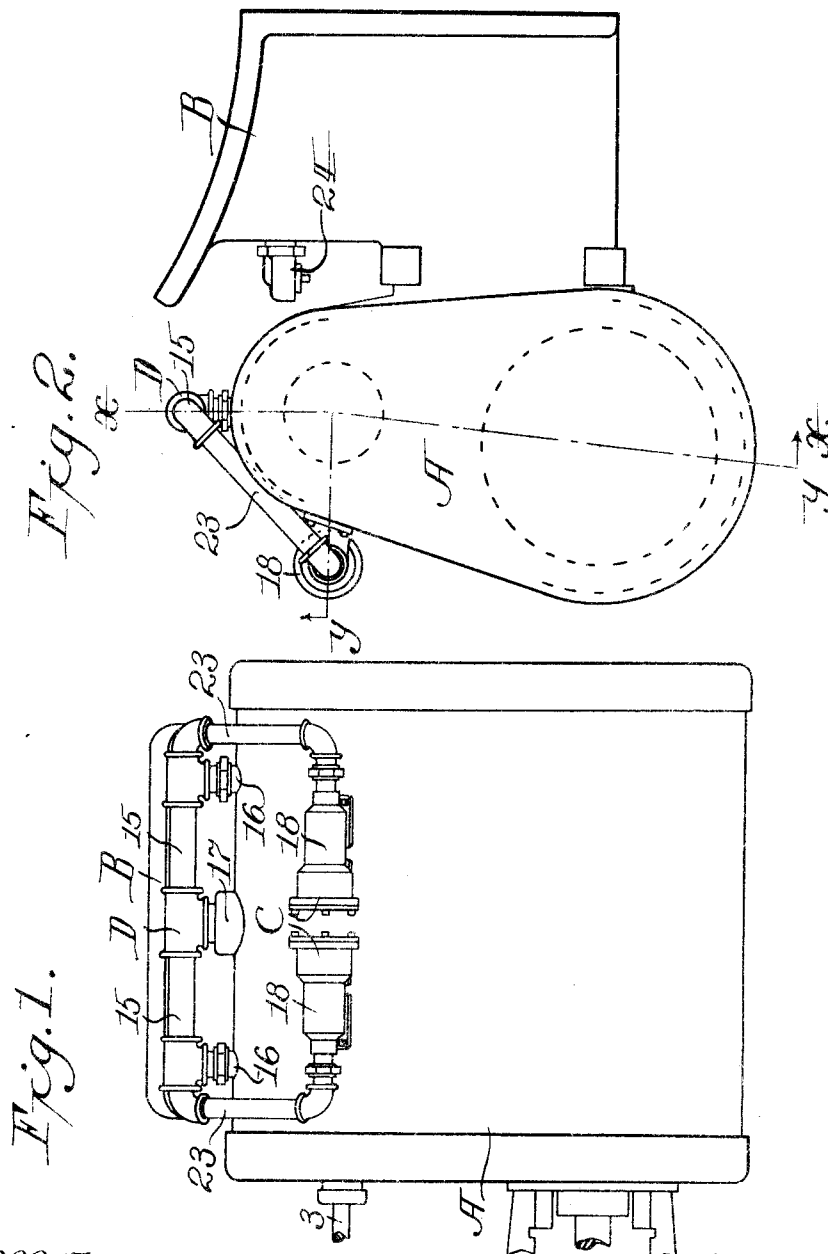


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2 SHEETS—SHEET 1.



Witnesses:  
 G. M. Copenhagen,  
 G. Morris

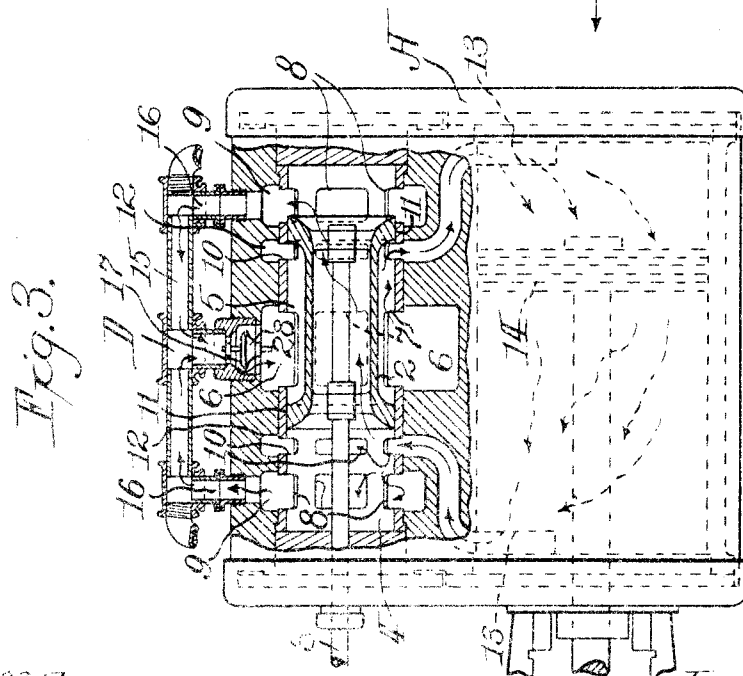
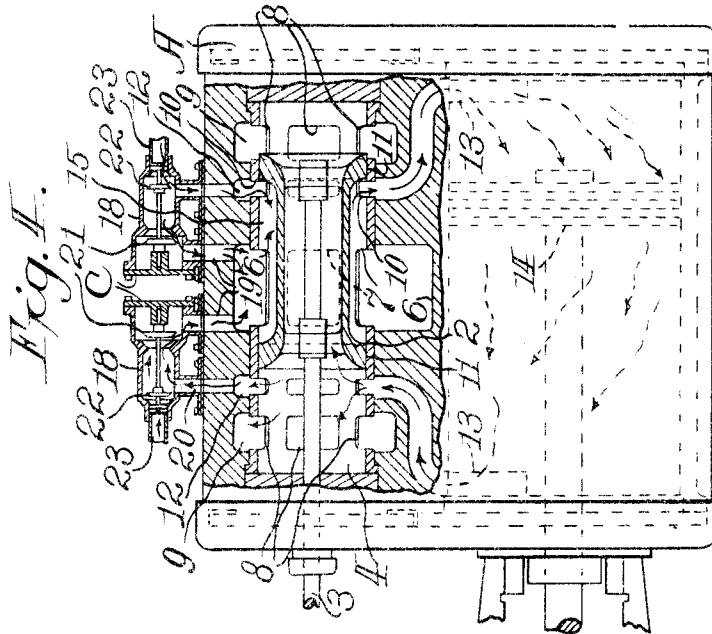
Inventor:  
 Francis O. Whealon,  
 by: *[Signature]*  
 Attorney.

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Witnesses:  
 J. M. Copenhaver.  
 J. Morris

Inventor:  
 Frances O. Whealon,  
 by: F. S. Hedberg  
 Attorney.

# UNITED STATES PATENT OFFICE.

FRANCIS O. WHEALON, OF ST. PAUL, MINNESOTA.

## DRIFTING DEVICE FOR LOCOMOTIVES.

1,058,018.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed June 27, 1911. Serial No. 635,577.

*To all whom it may concern:*

Be it known that I, FRANCIS O. WHEALON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improved Drifting Device for Locomotives, of which the following is a specification.

My invention relates to an improved drifting device for locomotives and its object is to provide means for circulating air and vapor from the compression side of the piston to the vacuum side during the entire stroke of the piston while the engine is drifting. The term drifting is used to define the action of the engine when working continuously by momentum or gravity with the steam cut off—throttle closed.

An object of my invention is greater simplicity of construction and effectiveness in use than devices of its kind heretofore employed.

To these ends my invention consists of the following features of construction and combinations of parts hereinafter described and claimed.

In the drawings with which I have illustrated my device and which form part of my specification, Figure 1 is an elevation of a locomotive cylinder equipped with my improved drifter; Fig. 2 is a front end elevation of the cylinder; Fig. 3 is a side elevation of the cylinder partly in section on the line X—X of Fig. 2, and Fig. 4 is a similar view partly in section on the line Y—Y of Fig. 2 to better illustrate the action of my new structure.

In the above drawings I have shown an engine cylinder A connected to the saddle B of a locomotive and provided with the drifter parts C and D.

I have disclosed my invention in connection with an engine cylinder provided with what is commonly termed inside steam admission having a piston valve 2 operated by the valve rod 3 within the valve chamber 4 and having the steam space 5 communicating with the steam chest 6 which is located centrally between the ends of the cylinder, by means of steam openings 7. Exhaust ports 8 occur in the valve chamber at each extremity of the valve stroke communicating with the exhaust cavities 9 which surround the valve chamber and communicate with the exhaust channel and smoke chamber of the locomotive in the usual manner. Steam

ports 10 occur in the wall of the valve chamber between the exhaust port 9 and the steam opening 7 and are adapted to be closed by the valve faces 11 of the valve 2 in certain positions of the valve. The ports 10 communicate with the steam passages 12 which surround the valve chamber at these points and communicate with their respective ends of the cylinder through openings 13. A piston 14 is shown operating within the cylinder in the usual manner. The operation of the valve 2 in the valve chamber 4 together with the connected ports and steam passages is common to all locomotives of the type shown during the application of steam to the engine and the structure of these parts may be considered common to locomotives of this type and typical of locomotive engines having the same functions.

The drifter part D consists of a pipe 15 communicating through pipes 16 with the exhaust passage-ways 9 at each end of the cylinder and communicating with the steam chest 6 through the valve chamber 17 located adjacent thereto in which operates a check valve 28 which is adapted to close the drifter pipe 15 upon the admission of steam to the steam chest. Pipes 15 and 16 allow the circulation of air from the compression side of the piston through the ports 10 and 8 into the steam chest 6 and thence through steam opening 7 and steam space 5 to the port 10 and steam passage 12 upon the vacuum side of the piston during its successive reciprocations while drifting.

In ordinary valve action in a locomotive engine the valve face 11 of the valve 2 closes the ports 10 of the valve chamber at each end of the cylinder to the passage of air and gases into and out of the cylinder when the piston 14 is at a point considerably distant from the extremity of the piston stroke. To permit the continuous circulation of air and gases from the compression to the vacuum sides of the piston, I place upon the engine cylinder A the drifter part C which consists of by-passes 18 of ordinary construction and having a communication with the steam chest 6 through a passage 19 and with the steam passage 12 through a passage 20 at each end of the cylinder. Each by-pass 18 is controlled by a double valve having a large valve part 21 which closes the by-pass under pressure from the steam chest and a small valve part 22 operated by the valve part 21 to close the by-pass to commu-

nication from the exterior. From the valve 22 I extend a pipe 23 to the end of the drifter pipe 15 of the drifter part D. Each by-pass 18 thus communicates with one extremity of the drifter pipe 15 and during the closure of the ports 10 by the valve 2 each end of the cylinder communicates through the steam passage 12, passage 20 and pipe 23 with the steam chest 6; and also communicates with the steam chest through the by-pass 18.

It is evident that during the greater part of the piston stroke the extremities of the cylinder on the two sides of the piston communicate with each other through the ports 10 and the exhaust ports and passage-ways and the drifter part D and are also free to communicate through the steam passages 12 and thence through the by-pass 18 or the pipes 23 and drifter parts D. The relative amount of air and vapor traversing the different routes will depend upon the relative resistances and sizes of the passage-ways. When the valve 2 closes the ports 10 the resistance of the passage through the exhaust ports increases until the ports 10 are closed after which the air and vapors are still free to pass through the steam passages 12 and by-passes 18 which connect with the steam chest.

A relief valve 24 is provided communicating with the steam supply passages of the engine and adapted to allow the entrance of air when the throttle is closed and the engine begins to drift.

In prior art devices air is sucked into the vacuum side of the cylinder and upon the return stroke of the piston the air sucked in, being on the compression side, is forced out through the exhaust passage-ways and smoke stack, thus adding to the useless work done by the piston during its stroke and in no way utilizing the suction upon the opposite side of the piston to draw off the compressed air. Moreover, no means of escape is provided for the air upon the compression side of the cylinder after the closure of the cut-off valve. In addition to the resistance offered to the movement of the piston by the air forced through the exhaust passages at each stroke, this form of device is likely to draw dirt and foreign matter into the cylinder to the injury of the latter. The action of the by-pass in my invention differs from this construction in the valve action, as the double valves remain open at all times allowing the passage of air and gases except when steam pressure, in the steam chest closes the valves through pressure on the valve parts 21. The vacuum side of the cylinder communicating through the by-pass connects with the compression side of the cylinder and receives its air supply from thence instead of from the outer air.

This application is an improvement over

patents granted to me on May 2nd, 1905, bearing Number 789,111, and on May 8, 1906, No. 819,828.

In accordance with the patent statutes I have described the principles of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a locomotive, an engine cylinder having ingress and egress ports in its wall for the admission and exhaust of steam, a steam chest connected with said ports, a piston adapted to reciprocate in said cylinder, a valve controlling said ports and adapted to reciprocate in said chest, a drifter passage forming a connection from the compression side of said piston through said ports into said steam chest to the vacuum side of said piston during reciprocations of the piston while drifting, a check valve adapted to close said passage to the admission of live steam and by-passes having communication with the live steam portion of said steam chest and with the extremities of said drifter passage for the purposes specified.

2. In a locomotive, an engine cylinder having a steam chest and ingress and egress ports in its wall for the admission and exhaust of steam, a piston adapted to reciprocate in said cylinder, a piston valve in said steam chest controlling said ports, a drifter passage forming a communication between the compression side of said piston through said ports into said steam chest with the vacuum side of the piston during successive reciprocations of the piston while the locomotive is drifting, a check valve adapted to close said passage to the admission of live steam thereinto, and valved by-passes having communication with the live steam portion of said steam chest and the extremities of said drifter passage, for the purposes specified.

3. In a locomotive, an engine cylinder having a steam chest and ingress and egress ports in its walls for the admission and exhaust of steam, a piston adapted to reciprocate in said cylinder, a valve controlling said ports and adapted to reciprocate in said chest, a drifter passage forming a connection between the compression side of said piston in said cylinder through said ports into said steam chest and the vacuum side of said piston in said cylinder during successive reciprocations of the piston while the locomotive is drifting, a check valve adapted to close said passage to the admis-

sion of live steam, a branch from each end of said passage connecting with the steam chest and an exhaust port and valve mechanism adapted to close said branch by the action of live steam, for the purposes specified.

In testimony whereof, I have signed my

name to this specification in the presence of two subscribing witnesses.

FRANCIS O. WHEALON.

Witnesses:

H. L. FISCHER,  
J. G. BRADBURY.