(No Model.)

G. B. TAYLOR.

VARIABLE EXHAUST FOR LOCOMOTIVES.

No. 497,970. Patented May 23, 1893.

Fig. 1.

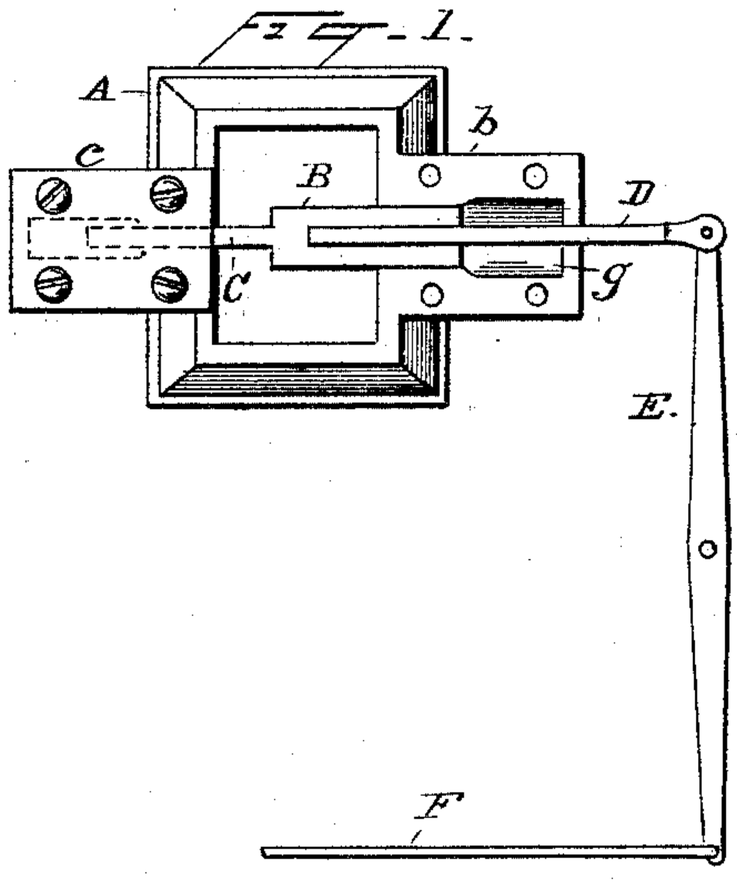


Fig. 2.

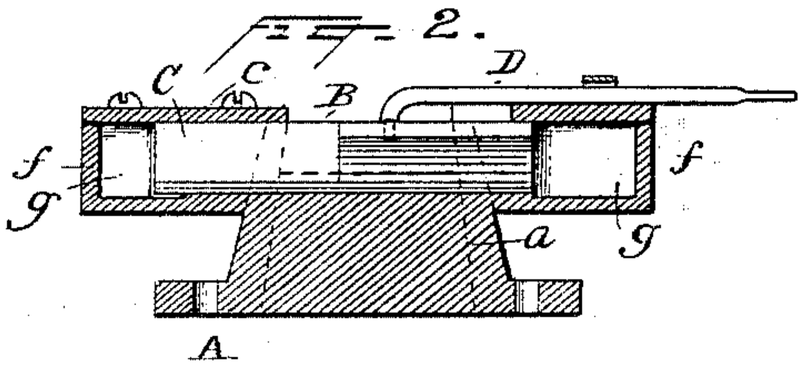


Fig. 3.

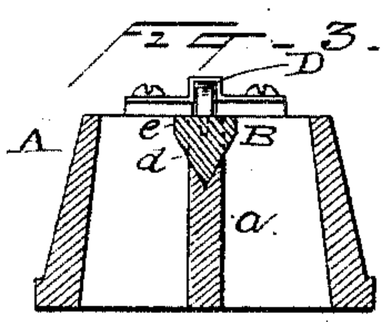


Fig. 4.

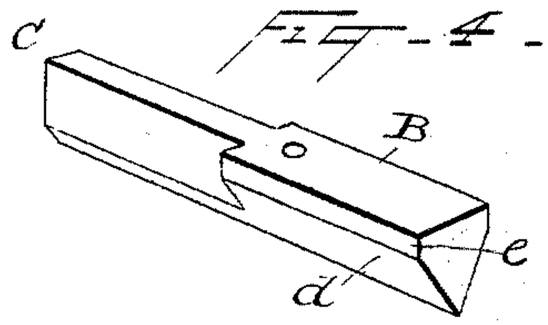


Fig. 5.

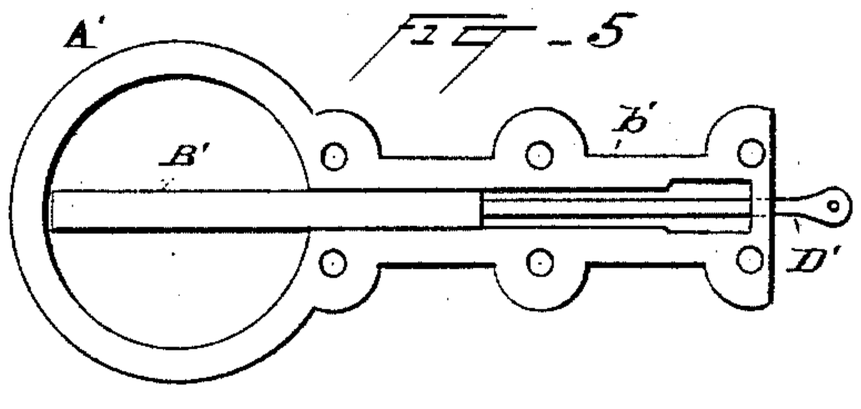
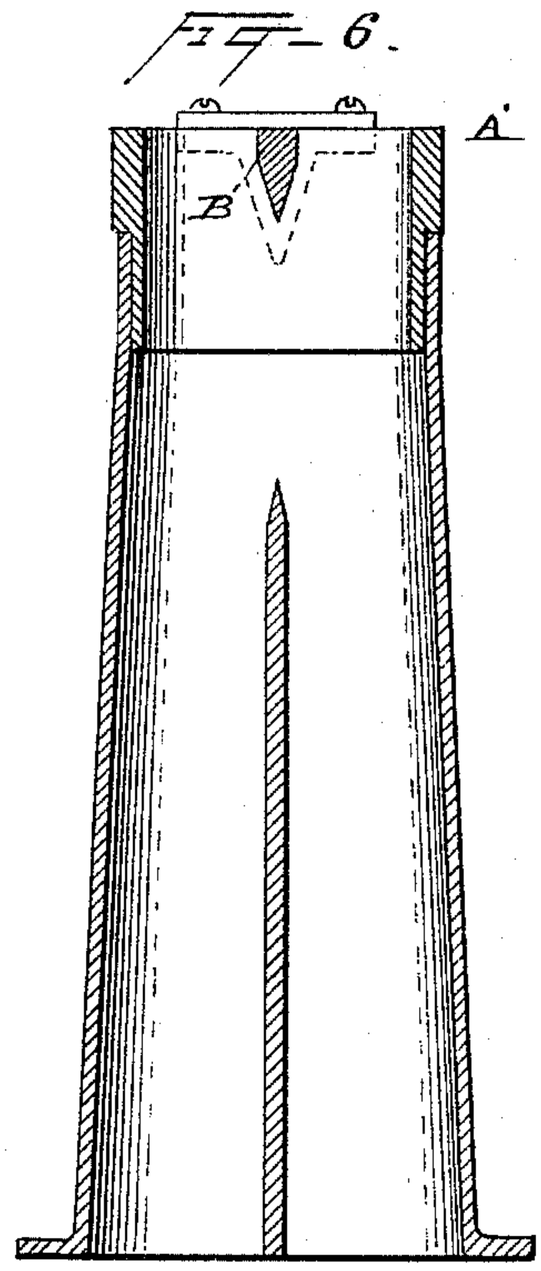


Fig. 6.



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GEORGE B. TAYLOR, OF NEW BRUNSWICK, NEW JERSEY.

VARIABLE EXHAUST FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 497,970, dated May 23, 1893.

Application filed July 30, 1890. Renewed October 31, 1892. Serial No. 450,451. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. TAYLOR, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented a certain new and useful Improvement in Variable Exhausts for Locomotives, of which the following is a specification.

The object I have in view is to produce means for varying the size of the exhaust nozzle of a locomotive, capable of being operated from the cab of the locomotive, which will be simple in construction and effective in operation. A practical and efficient variable exhaust for locomotives will permit of the adjustment of the exhaust to the conditions of operation of the locomotive, and the result will be a saving in fuel as well as a more uniformly satisfactory operation of the locomotive. If the locomotive is not making steam with sufficient rapidity, the exhaust can be decreased in size to the desired extent which will sharpen the discharge into the stack and increase the draft. For this reason larger exhaust nozzles may be employed than it is practicable to use with nozzles having fixed conditions, and when the locomotive is steaming freely the nozzle can be enlarged to its full size, relieving the engine of some back pressure and resulting in the saving of fuel. The power to choke the nozzle and sharpen the exhaust when the locomotive is steaming poorly would make it possible for the engineer to get uniformly satisfactory results and losses of time in running due to insufficient steam pressure would be avoided.

In the accompanying drawings forming a part hereof—Figure 1, is a plan view of a double exhaust nozzle with devices embodying my invention applied thereto, the cap plate to the guide box at the right of the nozzle being removed. Fig. 2, is a vertical central section of the same through the partition dividing the nozzle, the sliding choking plate and operating bar being in elevation. Fig. 3 is a vertical section at right angles to Fig. 2. Fig. 4, is a perspective view of the sliding choking plate. Fig. 5, is a top view of a single nozzle having the invention applied thereto, the cap plate of the guide box for the sliding choking plate being removed, and Fig. 6, is a vertical section of the single nozzle, the exhaust pipe being also shown.

The double nozzle A shown in Figs. 1, 2 and 3, has two rectangular exhaust ports formed by the walls of the nozzle and by the central pratition *a*, which forms a continuation of the central partition of the exhaust pipe upon which the nozzle is mounted as will be well understood, this being one of the usual forms of exhaust nozzles for locomotives.

To make the exhaust one capable of being varied from the locomotive cab, I remove the end of the central partition *a* so that it does not extend through to the end of the nozzle and mount upon it a sliding choking plate B having a V-shaped lower edge which rests in a similarly shaped groove in the top edge of the partition. This choking plate slides in and out of a guide box *b* formed in a wing cast on the nozzle. From the end of the choking plate, a guide plate C extends into a guide box *c* like the box *b* but located on the opposite side of the nozzle. The guide plate like the choking plate works in a groove in the top of the partition; it is of the same width as the partition *a* of the nozzle, while the choking plate is wider than such partition and projects laterally into the ports when it is pushed out of the guide box *b*. When the choking plate is withdrawn wholly into the box *b*, the exhaust ports are of full size since the guide plate C then forms only an extension of the partition *a* without occupying any of the space of the exhaust ports. As the choking plate is moved out of its box it closes the ports more or less according to the extent of its movement, both ports being choked or decreased in size simultaneously and to the same extent. I have found that with a double nozzle having ports two and one-half by three and one-half inches in size, a choking plate projecting beyond the partition one half inch on each side, will give the maximum variation required, although of course my invention is not limited to a plate of that width, since it might be found desirable to use choking plates of greater or less width. The guide plate C has straight sides forming a continuation of the sides of the partition. The sides of the choking plate are however inclined as shown at *d* and they also are preferably vertical for

a short distance at their upper edges as shown at *e*. The object of this configuration is to limit as far as possible the tendency of the issuing exhaust steam to lift the choking plate from its seat, and also (by means of the vertical portions *e*) to give the steam the same direction of discharge on the inner edges of the ports as on the other edges whether the ports are choked or not. The boxes *b* and *c* are closed by cap plates as shown, secured by screws or bolts and they also preferably have solid end walls *f*. The seats of the choking and guide plates in these boxes and in the edge of the partition are planed to give an accurate fit, enlarged spaces *g* being left in the boxes in casting to permit this to be done. The operating bar D is pivotally secured to the choking plate B and connects with a centrally pivoted lever E which projects through the side of the smoke box of the locomotive and is connected with a rod F extending back to the cab.

To apply the invention to a single round nozzle A′ (Figs. 5 and 6) the choking plate B′ projects into the nozzle from a long guide box *b′* formed in a wing cast on one side of the nozzle. No guide plate extending into a box on the other side of the nozzle is employed since the withdrawal of the choking plate is designed in the case of the single nozzle as well as in the case of the double nozzle to leave the nozzle without obstruction to the discharge of the exhaust steam. A thin plate extending into a box on the other side of the nozzle the same as in Fig. 1 might be employed without departing from the spirit of my invention. The operating bar D′ is shown in Fig. 5 as passing through the end of the box *b′*. The choking plate D′ is also made of V-shape with the point of the V presented to the issuing steam and its sides at the upper edge are also preferably made vertical as shown in Fig. 6. My variable exhaust is one which does not leak steam and is of extreme simplicity in construction.

What I claim is—

1. As a variable exhaust for locomotives, the combination with a locomotive exhaust nozzle, of a sliding choking plate, having a width less than that of the nozzle and adapted to be moved adjustably across the opening of the nozzle, substantially as set forth.

2. As a variable exhaust for locomotives, the combination with a locomotive exhaust nozzle, of a sliding choking plate, having a width less than that of the nozzle and adapted to be moved adjustably across the opening of the nozzle, and a guide-box on one side of the nozzle into which the choking plate is withdrawn, substantially as set forth.

3. The combination with a locomotive exhaust nozzle, of a sliding choking plate having a width less than that of the nozzle projecting centrally into and crosswise the nozzle, substantially as set forth.

4. The combination with a locomotive exhaust nozzle, of a sliding choking plate having a width less than that of the nozzle and projecting laterally across the nozzle, said choking plate presenting inclined sides to the issuing steam, substantially as set forth.

5. The combination with a locomotive exhaust nozzle, of a sliding choking plate projecting from a guide box on one side of the nozzle and a guide plate extending from the choking plate into a guide box on the other side of the nozzle, substantially as set forth.

6. The combination with a double locomotive exhaust nozzle, of a choking plate sliding adjustably across the nozzle on top of the partition separating the ports of the nozzle, said choking plate being of less width than the nozzle but of greater width than said partition, substantially as set forth.

7. The combination with a double locomotive exhaust nozzle, of a choking plate sliding adjustably across the nozzle on top of the partition separating the ports of the nozzle, said choking plate being of less width than the nozzle but of greater width than said partition, a box on one side of the nozzle from which said choking plate projects and into which it is withdrawn, and a guide plate of the same width as the partition extending from the forward end of said choking plate into a box on the other side of the nozzle, substantially as set forth.

8. The combination with a double locomotive exhaust nozzle, of a sliding choking plate working in a groove in the top of the partition of the nozzle, and projecting laterally beyond the sides of the partition, a guide plate of the same width as the partition forming an extension of the choking plate and working in the groove in the top of the partition, and guide boxes on opposite sides of the nozzle in which the choking plate and guide plate work, substantially as set forth.

This specification signed and witnessed this 18th day of July, 1890.

GEORGE B. TAYLOR.

Witnesses:

JAMES HOUGHTON,

A. B. TAPPEN.