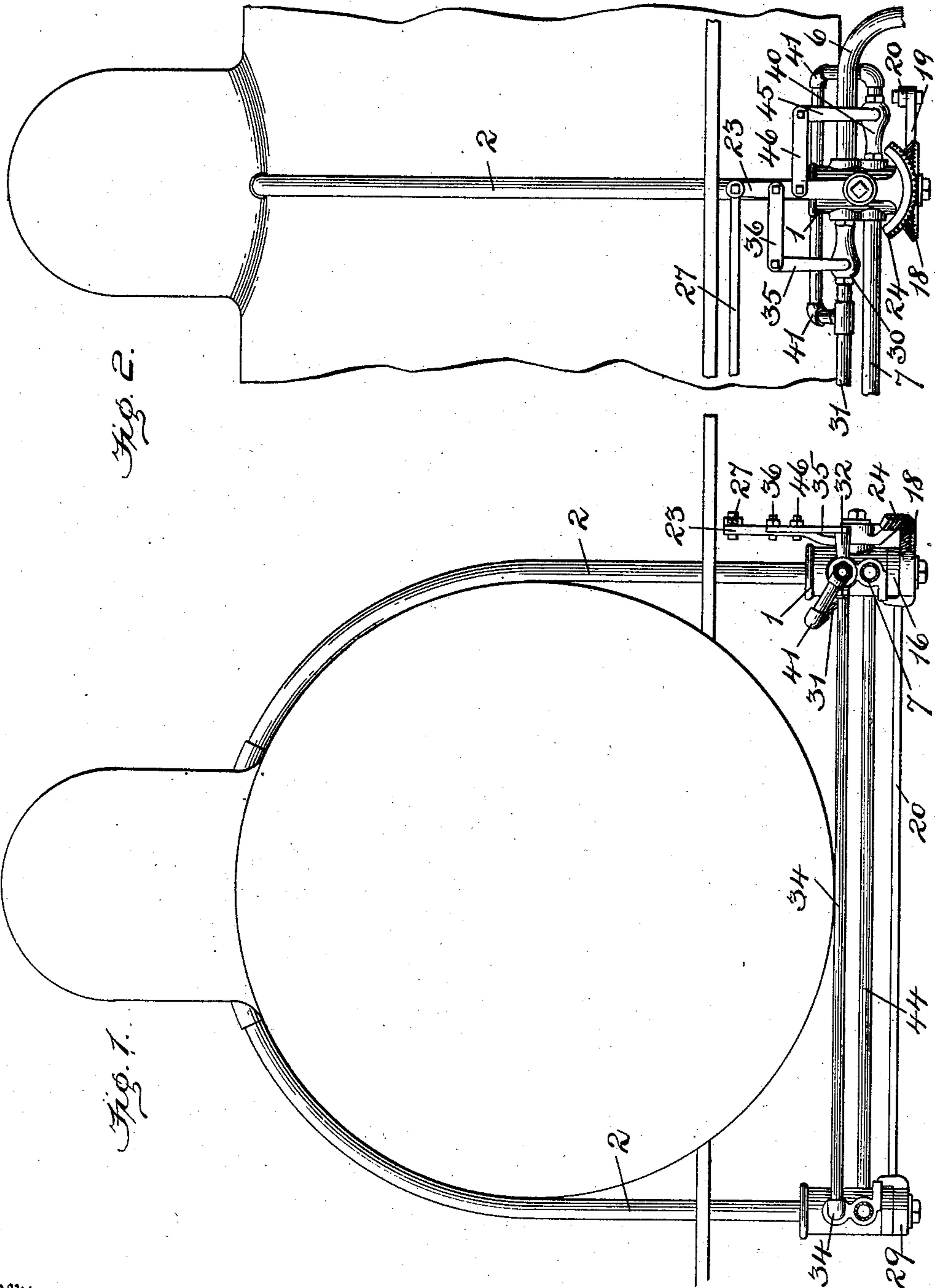


No. 865,942.

PATENTED SEPT. 10, 1907.

H. RAU, JR.  
PNEUMATIC TRACK SANDER.  
APPLICATION FILED APR. 20, 1907.

2 SHEETS—SHEET 1.



Witnesses  
Edwin K. Bradford  
Harry Gill.

By

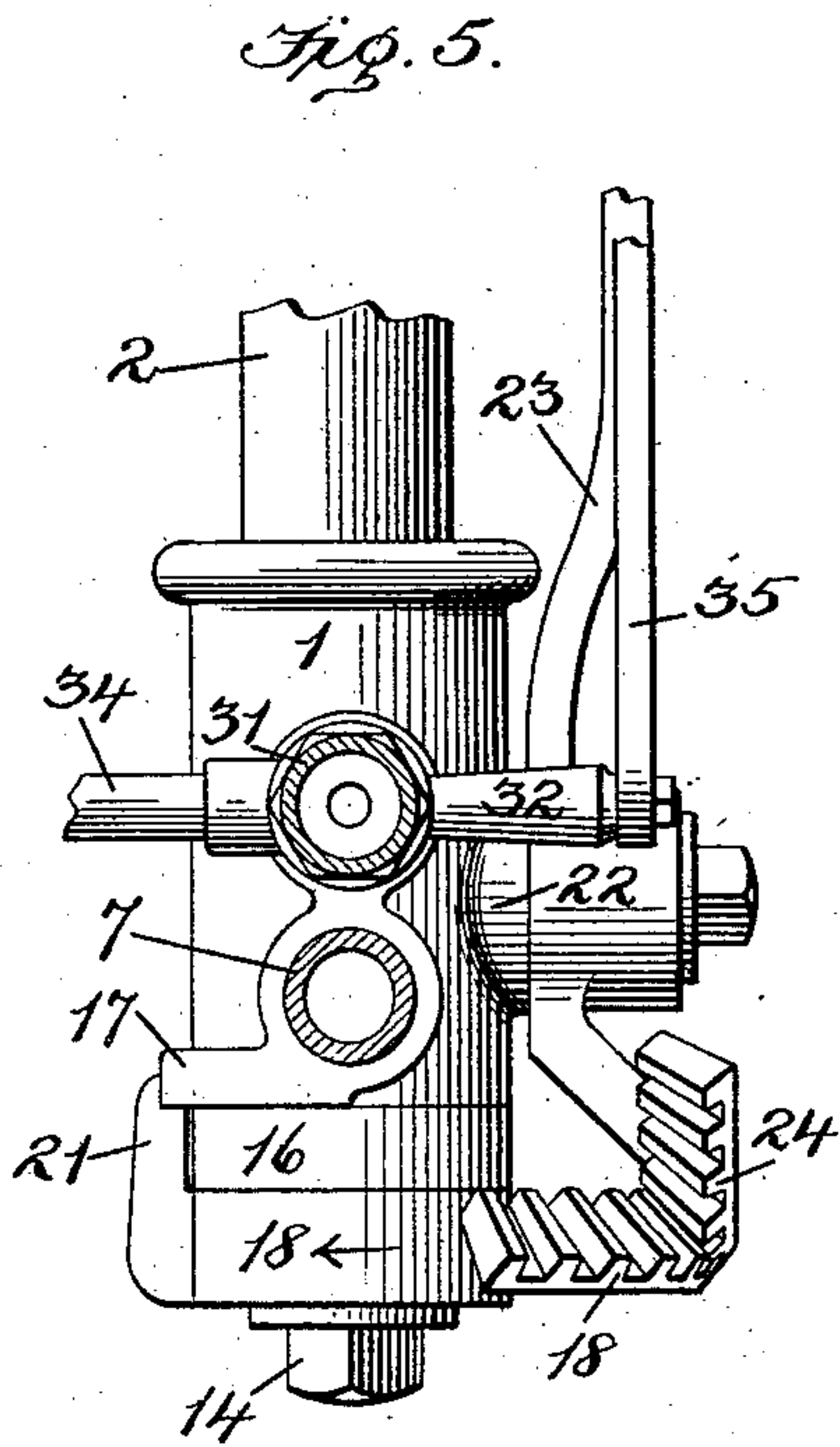
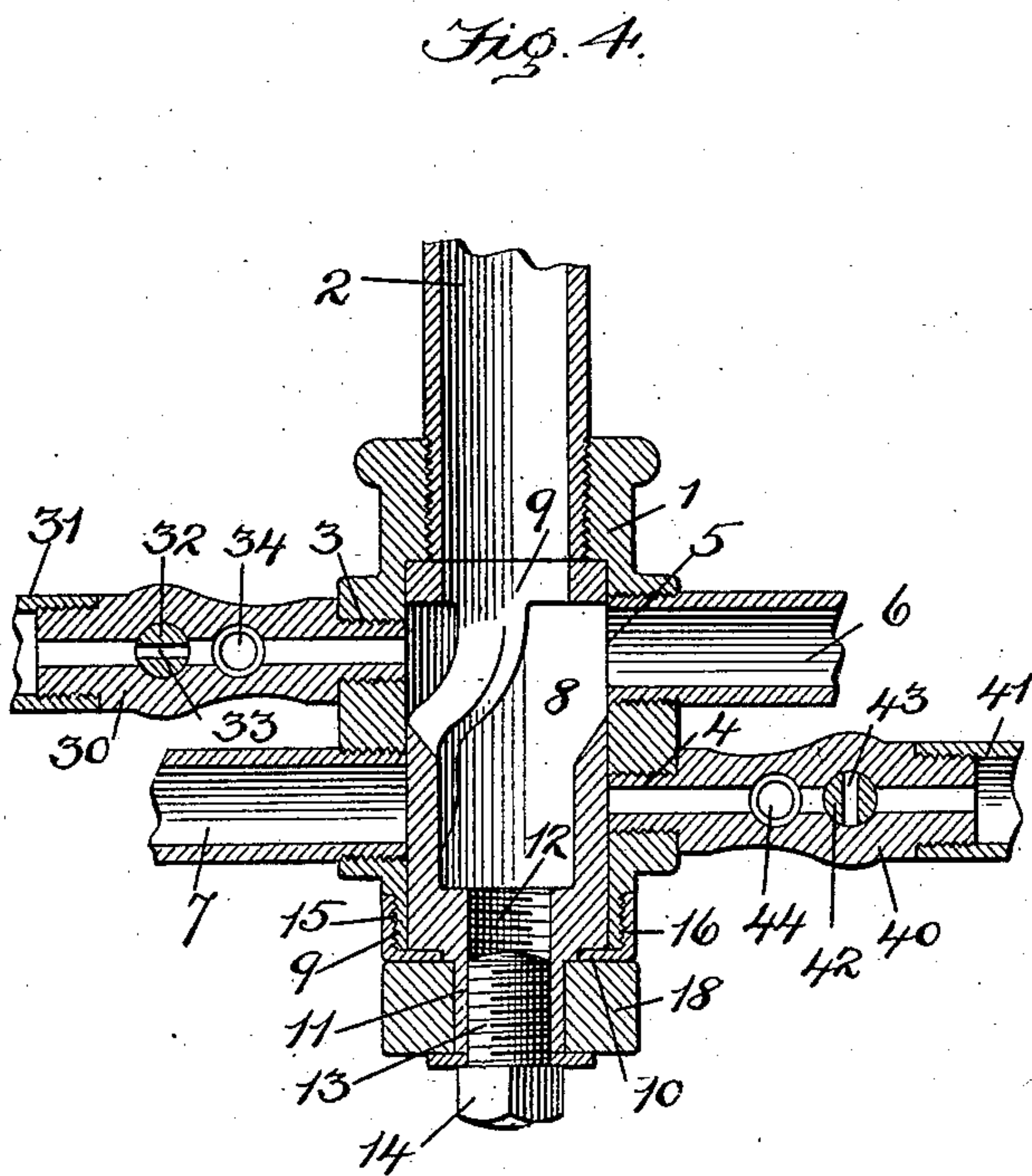
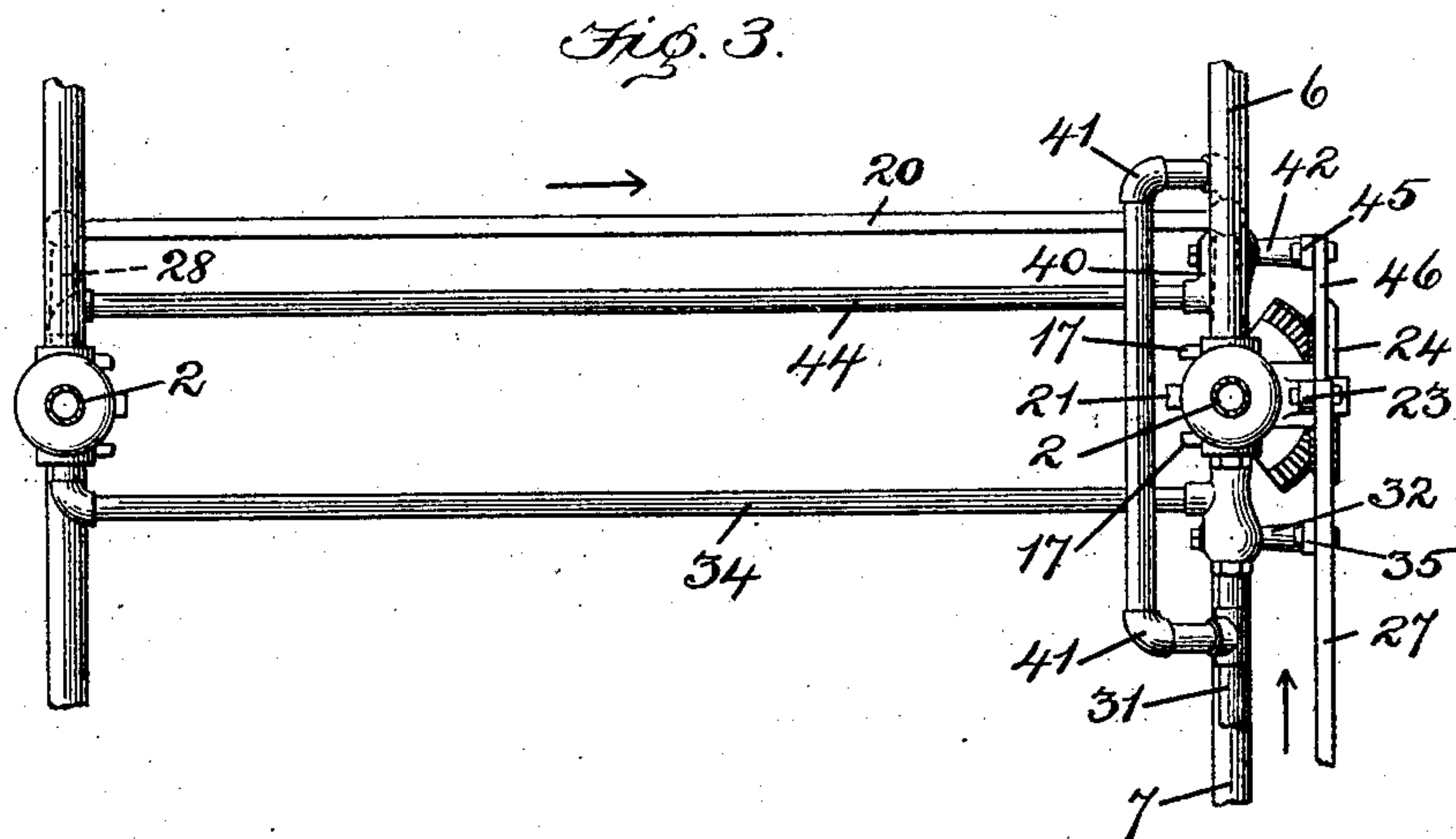
Inventor  
Henry Rau Jr.,  
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# UNITED STATES PATENT OFFICE.

HENRY RAU, JR., OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-FOURTH TO WILLIAM H. RHINE AND ONE-FOURTH TO GEORGE EDWIN DEMUTH, OF BALTIMORE, MARYLAND.

## PNEUMATIC TRACK-SANDER.

No. 865,942.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed April 20, 1907. Serial No. 369,192.

*To all whom it may concern:*

Be it known that I, HENRY RAU, Jr., a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Pneumatic Track-Sanders, of which the following is a specification.

This invention relates to improvements in pneumatic track sanders and has particular reference to that form of sander shown in Letters Patent No. 798,060 granted to me August 22nd, 1905 in which the communication between the sand-box and the forward and rear sand tubes is controlled by a single valve which latter when in one position will permit sand to escape through one tube but will prevent the escape of sand through the other tube or tubes.

In the form of sander just alluded to after the sand controlling valve has been shifted to open the port to the tube through which sand is to be blown the valve for supplying air to that particular tube is then operated so as to drive the sand out. While this form of sander is practical and commercially successful it has been found in actual practice that one of the objects of that invention, to-wit, the churning of the sand by the shifting of the valve, is practically defeated by the neglect of the engineer who, being called upon more often to use the forward sand tube will let the valve remain open to communication with said forward tube in order that he may only be required to operate the forward air tube to get the sand when desired. By the engineer thus allowing the sand valve to remain stationary and practically always open to that tube mostly used, the sand in the sand valve chamber will become packed and hard and practically immovable by the mere action of the air and the result is that when the sand is needed for the forward tube it cannot be obtained and if it is needed for the rear tubes the sand is so packed and hard in the valve chamber that the valve cannot be operated.

One object therefore of the present invention is to provide a construction whereby the engineer is required to shift the sand valve every time he wants sand on the rails.

Another object is to provide a construction whereby the air cannot be utilized in the sander without shifting the sand valve.

Another object is to provide a construction whereby the air and sand valves may be operated simultaneously, and

Another object is to provide a construction whereby the air and sand valves at opposite sides of the locomotive or other vehicle may be operated alike and in unison.

With these and other objects in view the invention is illustrated in the accompanying drawing, in which,—

Figure 1 illustrates in a diagrammatic form a loco-

tive boiler, the sand box thereon and to which latter my improved sander is attached. Fig. 2, shows a side elevation of the same. Fig. 3, illustrates a plan view of my improved devices connected as in actual practice on opposite sides of a locomotive. Fig. 4 illustrates a sectional elevation through the sand chamber, valve and air valves, and Fig. 5 shows an end elevation of the same.

Referring to the drawings by numerals, 1, designates the sander casing whose upper end is provided with a threaded opening into which the lower end of a sand supply pipe, 2, enters. This sand supply pipe extends from the casing upwardly and its upper end enters the bottom of the sand dome on top of the boiler as clearly seen in Figs. 1 and 2 of the drawings.

The sander casing is provided with the two air-supply openings, 3, and, 4, one of which has position in the side of the casing near the upper end thereof while the other opening, 4, has position near the lower end of the casing and at the side diametrically opposite from that side where the opening, 3, enters the casing.

Diametrically opposite the opening, 3, the casing is provided with a sand outlet, 5, in which one end of a sand distributing tube or pipe, 6, enters. This tube or pipe, 6, leads from the casing to a point in front of the drivers of the locomotive and its discharge end terminates near the rail where the sand is to be delivered. A sand-discharge pipe, 7, also enters the casing at a point diametrically opposite the lower air-opening, 4, and the latter pipe extends from said casing and terminates at a point in the rear of the drivers and adjacent to the rail on which the sand is to be spread.

On the interior the casing is provided with a chamber, 8, which extends vertically from the sand-supply pipe, 2, to a point below the sand-discharge pipe, 7, and the air-supply openings are in communication with said chamber. A valve, 9, has position within said chamber, 8, and said valve has a shape which conforms to the shape of the chamber, which in the present instance is circular. The valve has a circular base, 10, which in the present instance is provided with a downwardly-projecting central stem, 11, having a central passage, 12, and a screw-plug, 13, at the lower end of said passage having a square or angular head, 14, for the purpose of conveniently emptying the chamber, 8, of sand prior to the removal of the valve for any purpose.

The lower end of the valve casing is provided with exterior screw-threads, 15, and a cup-shaped collar, 16, fits over said lower end of the casing and is also provided with interior screw-threads which engage the exterior threads on the casing. The bottom of the collar projects beneath the valve and supports the latter in the casing, as clearly shown in Fig. 4, but in no way interferes with the rotation of said valve in the casing. This construction prevents the sand from working its



way out of the chamber, 8. The valve casing is also provided with two projecting lugs, 17, which form a stop to limit the rotation of the valve as will presently be explained.

- 5 A segment gear, 18, in the present instance, is rigidly connected in a horizontal position to the stem, 11, at the lower end of the valve, 9, and said gear projects laterally at the bottom of the casing and is provided with an arm, 19, to which a connecting bar, 20, is attached  
10 for a purpose to be presently described. A vertically-projecting stop-lug, 21, is carried on the segment gear and said lug projects between the lugs, 17, on the valve casing and by contact with the latter serves to limit the rotation of the valve within the casing.
- 15 The side of the valve casing is provided with a boss, 22, and an operating lever, 23, is pivoted to said boss. The lower end of this operating lever is provided with a segment gear, 24, which oscillates in a vertical plane and which meshes with the gear, 18, on the lower end  
20 of the valve to impart motion to the latter. The upper end of the operating lever is pivotally connected to a horizontal rod, 27, which latter extends rearwardly to a point in the cab where it may be conveniently operated (pulled or pushed) by the engineer.
- 25 It is to be understood that in practice two casings, 1, and sand-distributing valves are provided on each locomotive,—that is, one at each side of the boiler as clearly seen in Figs. 1 and 3 and the connecting bar, 20, extends from the arm, 19, of the gear, 18, beneath  
30 the boiler and is connected to an arm, 28, on the rotating head, 29, of the sander on the opposite side of the boiler. This latter sander casing therefore requires no gears as it is operated entirely by the movement of gear, 18, on the valve at the other side.
- 35 At the air supply opening, 3, I provide a valve, 30, whose end is screwed into said opening. An air-supply pipe, 31, from any suitable source of air supply, such as the main reservoir on the locomotive, is connected to the outer end of the valve, 30. This valve  
40 has a key, 32, with a port, 33, which governs or controls the passage of air from the pipe, 31, to the chamber, 8, for the forward sanding operation. Between the key, 32, and the chamber, 8, the air valve, 31, is provided with a branch pipe, 34, which extends at right angles to  
45 said valve; passes beneath the boiler, as seen in Fig. 1, and enters the upper end of the sander casing at the opposite side of the boiler. It will be understood that when the valve-key, 32, is operated to open the port, 33, and permit the passage of air through the latter, the  
50 air will not only pass into the chamber, 8, but will also travel through the branch pipe, 34, to the upper air inlet in the casing at the opposite side of the locomotive. The closing of said valve port, 33, will likewise shut off the air from the branch pipe 34.
- 55 By reference to Figs. 2 and 5 of the drawing it will be seen that the outer end of the key, 32, of the air valve, 30, is provided with a vertically-projecting arm, 35, and that the upper end of this arm is connected by a link, 36, with the gear lever, 23. At the air-supply  
60 opening, 4, at the bottom of the sander casing I provide another air-valve, 40, and from the end of said latter valve I run a pipe, 41, which passes at the rear of the sander casing and communicates with the air supply pipe, 31. This latter valve, 40, is also provided with a

key, 42, with a port, 43, which controls the passage of 65 air from the pipe, 41, to the chamber, 8, for the rear sanding operation. From this valve 40, and between the key, 42, and the chamber, 8, I also run a pipe, 44, to the sander at the opposite side of the boiler and this latter pipe also enters the casing at the opposite side 70 of the boiler for the rear sanding operation at that side. The outer end of the key, 42, of this valve, 40, is also provided with a vertically-projecting arm, 45, and a link, 46, connects the upper end of this arm also with the gear lever, 23. 75

By reference to Fig. 2, of the drawing it will be seen that the gear lever, 23, and valve arms, 35, and, 45, are all in the vertical position. When these parts are in this position both of the keys, 32, and, 42, that control the air passages are in the cut-off position so 80 that air cannot enter either of the valves, 30, or, 40. Also, when the parts are in this vertical position the sand valve, 9, in the casing has such a position that both of the sand outlet tubes, 6, and, 7, are closed so that the air cannot get into the chamber, 8, and the 85 sand cannot leak out through either of the sand tubes, 6, or, 7, and the entire sander device is in the inoperative position. When however it is desired to discharge sand through the forward sand tube, 6, the engineer must push the horizontal rod, 27, outwardly 90 in the direction of the dart in Figs. 2 and 3, and by this outward movement of the rod turn the gear, 18, toward the rear and rotate the valve, 9, so as to uncover the sand pipe 6, and air passage diametrically opposite it as seen in Fig. 4. Simultaneously with 95 this forward movement of the rod, 27, the upper end of the gear lever, 23, will be moved forward carrying the link, 36, and arm, 35, also forward with it and by this movement of the said arm, 35, cause the port, 33, in the key, 32, to permit the air to pass through the 100 valve and some of the air entering the chamber, 8, to blow sand out through pipe, 6, while the branch pipe, 34, will also convey the air to the opposite sander and blow sand through the upper forward sand tube at that side because the valve in the casing at this latter side 105 has also been opened through the movement of the bar, 20, in the direction of the dart in Fig. 3.

By again referring to Fig. 4 it will be seen that while the valve, 30, and forward sand tube, 6, are opened, the valve, 40, and rear sand tube, 7, are both closed 110 and air is not admitted nor is sand discharged at the lower end of the chamber. Now by reason of this construction and coaction of the parts the engineer cannot leave the forward sand tube open because as long as said tube remains open the air will blow through 115 the valve, 30, and in order to shut off the air the engineer must necessarily operate the rod, 27, to restore the parts to their vertical or normal cut-off position and in doing this he must rotate the valve, 9, and thus stir the sand in the chamber, 8. 120

To discharge sand through the rear sand tube, 7, the operating rod, 27, will be drawn to the rear thus operating the link, 46, arm, 45, key, 42, so that air can pass from pipe, 31, around the rear of sander pipe, 41, then through the port, 43, of the valve, 40, and into 125 the lower end of the chamber and also across through pipe, 44, to the air supply for the rear sander at the opposite side of the locomotive. In order to discon-



tinue the discharge of sand through the rear tubes the engineer must again restore the parts to their inoperative position and thereby again stir the sand in the chamber, 8. It will thus be seen that by the simple pushing or pulling of the rod, 27, the engineer opens the desired air and sand tubes and stirs the sand, and upon restoring the parts he again stirs the sand, and in no event can he operate the sander either to open or close the air ports or sand outlets without stirring the sand. It will also be seen that only one operation is required and the engineer is not called upon to operate the air separately from the sander but both operations occur simultaneously and at both sides of the locomotive. It is also to be understood that each rotation of the valve, 9, in the sand chamber, 8, causes the sand in said chamber to be broken up or stirred as described in my said Patent Number 798,060.

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

1. A pneumatic sander having a sand outlet a valve for controlling the same; an air-inlet, a valve for controlling the said air inlet, and means whereby said outlet and inlet valves may be actuated by a single operation.

2. A pneumatic sander having a sand chamber, a sand valve movable in said chamber to stir the sand, an air-inlet in said chamber, an air valve for controlling the air inlet, and means for moving the air valve and sand valve simultaneously.

3. A pneumatic sander having a plurality of sand chambers each having an air inlet and a sand outlet; a sand valve in each of said chambers; means for connecting the sand valves of said chambers so they may be operated in unison; an air pipe connecting the air inlets of said chamber; a valve for controlling the air through said pipe, and means for operating the air valve and the sand valves of both chambers simultaneously.

4. A pneumatic sander having a sand chamber with an air inlet and a sand outlet; a sand valve in said chamber; means for operating the sand valve; an air controlling valve, and means for connecting the operating means of the sand valve and the air valve whereby the movement of one of said valves will cause the other valve to be moved.

5. A pneumatic sander having a sand controlling valve, an air controlling valve; an operating device, and means coacting between the operating device and both of said valves whereby to operate both valves simultaneously.

6. A pneumatic sander having a sand valve for controlling a plurality of sand outlets; a plurality of air valves, and means whereby said valves may be operated to simultaneously open one air valve and one sand outlet at a time.

7. A pneumatic sander having a sand chamber with a plurality of sand outlets, a sand valve for controlling the escape of sand through said outlets; a plurality of air valves supplying air to said chamber, and means for op-

erating said valves whereby but one sand outlet and one air valve will be opened at a time.

8. A pneumatic sander having a plurality of sand outlets, a valve for controlling said outlets, an air valve; an operating device, and means whereby the operating device may be moved to cause the sand valve to open one sand outlet and to simultaneously open the air valve.

9. A pneumatic sander having a plurality of sand outlets, a valve for controlling said outlets; an air valve; an operating device, and means connecting the said valves with the operating device whereby they may all be operated simultaneously.

10. A pneumatic sander having a plurality of sand outlets, a valve for controlling all of said outlets; an air valve coacting with each sand outlet, and means whereby when one sand outlet is opened the corresponding air valve will be opened.

11. A pneumatic sander having a sand outlet for the forward sander and another outlet for the rear sander, a valve for controlling both of said sand outlets; an air-inlet valve for the forward sander; an air-inlet valve for the rear sander, and means connecting the sand controlling valve with the air inlet valves whereby to operate them to open one sand outlet and one air inlet at a time.

12. A pneumatic sander having a sand chamber with a plurality of sand outlets and a plurality of air inlets; a sand valve for controlling said outlets; an air valve for each of said air inlets; a single operating device, and means for connecting said valves with the operating device whereby but one air valve and one sand outlet may be opened at a time and all of said valves and outlets may be closed at one time.

13. A pneumatic sander having a sand chamber with a plurality of sand outlets and a plurality of air inlets; a sand valve for controlling said outlets; an air valve for each air inlet; an operating device for moving the sand valve to open one sand outlet at a time; means for connecting the air valves with the operating device of the sand valve, and an operating rod connected with operating device of the sand valve for moving all of said valves.

14. A pneumatic sander having a plurality of sand outlets; an air inlet valve coacting with each sand outlet; an air supply pipe leading to both air inlet valves; an operating device and means for connecting the sand and air valves with said operating device.

15. A pneumatic sander having a plurality of sand outlets; a single sand valve for controlling said outlets; an air-inlet valve for each of said outlets; an operating rod; means coacting between said rod and the sand valve whereby the latter may be moved to stir the sand each time the rod is moved and means for connecting the air inlet valves so as to cause them to open but one at a time upon the movement of said operating rod.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY RAU, JR.

Witnesses:

CHARLES B. MANN, Jr.,

HARRY GILL.