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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC AIR SANDING-MACHINE.

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*To all whom it may concern:*

Be it known that I, ALBERT F. KUBICEK, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Air Sanding-Machines, of which the following, when taken in connection with the drawing accompanying and forming a part hereof, is a full and complete specification, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to machines wherein air is used to insure a flow of sand on to a railway rail or other article; and the principal object of this invention is to obtain a device by means of which, when the sand discharge pipe becomes clogged, as by wet sand therein, and a pressure of air is produced in such sand pipe, such pressure will not extend back into the sand box.

A further object of the invention is to obtain a device by means of which a steady flow of sand will be obtained, when desired.

I have illustrated a construction embodying this invention in the drawing referred to, by a vertical sectional view showing the air chamber and main piston of the device under air pressure, to open the air ports and deliver air to the sand discharge pipe and showing the sand valves closed, as when such sand discharge pipes are clogged and a determined pressure obtains therein.

A reference letter applied to designate a given part is used to indicate such part throughout the figure of the drawing, wherever the same appears.

A is a cylinder, closed at end *a*, and provided with the removable end *a'*.

B, *b*, are, respectively, flanges to cylinder A; and C is a cylinder open at its ends and provided with flanges D and *d*.

E is a plate provided with apertures *e*, *e*, therein.

F is the floor of a sand box in which sand box the device is placed and such floor is provided with an aperture *f* through which the bottom G of the device extends. Bottom G is preferably a casting and is shown secured to the plate E as by cap screws H, H.

*h*, *h*, are cap screws extending through the flange D into the plate E, securing the cylinder C to such plate E.

*h'*, *h'*, are cap screws extending through flange *b* into flange *d* and securing the cylinder A to cylinder C; and *h''* are cap screws securing the end *a'* to the cylinder A.

I, I, are chambers in bottom G.

J is the sand discharge outlet. Each of the cham-

bers I, I, is provided with similar sand discharge outlets, the one to the right hand chamber being broken away in the drawing on account of lack of room to show same.

K is an air pipe, the inlet end or port *k* whereof is in communication with chamber L above piston M in cylinder A when such piston is acted upon by a determined pressure of air in such chamber, and the lower end *k'* whereof discharge into the sand discharge pipe J.

N is an air supply pipe discharging into chamber L. The inlet end of the air pipe N is in communication with a suitable source of air supply.

O, O, are depending tubes attached to piston M. P is a piston in tube O. The upper end of tubes O communicate respectively with chamber L, so that the pressure of air on the upper end of piston P is the same as the pressure in chamber L and on the upper face of piston M.

Q, Q, are springs the upper ends whereof abut against the under face of piston M and the lower ends whereof are supported by stationary abutments, preferably the adjustable collars R, R, respectively. Collars R, R, are provided with external screw threads by means of which they are adjustably secured in end *a* and thereby a determined pressure of the springs Q, Q, on piston M, (when such piston is in a given position), is obtained. When air is not supplied to chamber L through pipe N the springs Q, Q, force piston M upward to close the ports or receiving ends *k*, *k*, of air pipes K, K, and also to close the sand valve S, S, in a manner hereinafter described.

*p* is the stem of piston P. Stem *p* connects valve S and piston P and is provided with means to limit the downward movement thereof, preferably the shoulder *p'*.

T is a spring in tube O. The upper end of spring T abuts against the under face of piston P and the lower end thereof rests on abutment *t*. Abutment *t* is provided with external screw threads, whereby the desired tension of the upper end of the spring T on piston P is obtained to secure a determined difference of pressure in chambers L and I before piston P is depressed against the resiliency of spring T to force valve S down off its seat U. As hereinbefore stated, the valves S, S, are illustrated as closed, that is, in position with the discharge pipe J clogged or closed and with the pressure in chambers I, I, respectively, so near to the pressure in chamber L that spring T closes such valves to their respective seats.

V, V, are holes in cylinder C. This device is set into the sand box of which a section F of the bottom is illus-



trated, so that dry sand may entirely cover the device and so that sand will enter the chamber W in cylinder C through such holes V, V.

The pistons M and P and valves S, S, are shown in the drawing in position they respectively assume when there is a pressure of air in chamber L to force piston M down against the resiliency of springs O, O, to open the ports *k, k*, and with sufficient pressure (which may be termed back pressure), in chambers I, I, respectively and in discharge pipe J to permit the resiliency of spring T to raise piston P and close the valve S, S. In such case the pressure in chamber I and discharge pipe J will rise until it is substantially equal to the pressure in chamber L, unless the obstruction to the discharge of air and sand from chamber I and pipe J is removed by such pressure or by other means; and when such obstruction is removed the pressure in chamber I will fall and piston P will be depressed by pressure thereon in tube O above such piston and the valve S will thereby be opened and sand may flow from chamber W into chamber I and through the discharge pipe J to the rail or other place desired.

When sufficient obstruction occurs in the discharge pipe J so that the air entering such discharge pipe through pipe K cannot, together with the sand flowing through valve S, S, flow from the discharge pipe J fast enough to prevent a rise in pressure in such discharge pipe J and chamber I, the valve S will be automatically closed so soon as the pressure in chamber I reaches a determined mark. Such rise in pressure in chamber I will, if necessary, blow the sand back off the face of the valve S coming in contact with the valve seat U to clean such valve seat, and such valve will at all times close before there has been a sufficient increase of pressure in chamber W and in the sand box (by the back flow of air from chamber I over the valve S into chamber W and from chamber W through aperture *v, v*, into the sand box), to force sand from the sand box to waste.

When the supply of air is cut off from air supply pipe N springs O, O, will force piston M to close ports *k* and as piston M rises the abutment *t* in the lower end of the tube O will come in contact with shoulder *p'* on stem *p* and maintain the valve S thereof in a closed position.

To prevent clogging of the passage way *e, e*, between chamber W and chambers I, I, respectively the inlets V, V, are so made (in number, size and position) that the flow of sand therethrough into chamber W is less than the capacity of passage ways *e, e*, for the flow of sand therethrough and over valve S, S, when valves are open.

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

1. In a device provided with a plurality of chambers, one of such chambers forming an air chamber, and provided with an air inlet, an air outlet having a port, and a movable wall to control the port, and the other of such chambers forming a sand chamber and provided with a sand inlet and with a sand outlet, the combination of means to yieldingly maintain the movable wall of the air chamber, in position to close the port of the air outlet, a cylinder mounted on such movable wall, the upper end of the cylinder communicating with the air chamber, a communicating passage way between such air outlet and the sand chamber, such communicating passage way

directed to discharge into the sand outlet, a valve seat and a valve to co-act therewith to control the sand inlet, a piston to such valve, such piston longitudinally movable in the cylinder which is mounted on the movable wall, and means to yieldingly hold the piston in position in the cylinder to seat the valve and close the sand outlet when the movable wall is in position to open the air port of the air chamber.

2. In a device provided with a plurality of chambers, one of such chambers forming an air chamber and provided with an air inlet, an air outlet having a port, and a movable wall to control the port, and the others of such chambers forming sand chambers a communicating passage way between the sand chambers, one of such sand chambers provided with a sand inlet and the other one provided with a sand outlet, the combination of a cylinder open at the ends thereof mounted on the movable wall of the air chamber, means to yieldingly maintain the movable wall of the air chamber in position to close the port of the air outlet, a communicating passage way between such air outlet and one of the sand chambers, such communicating passage way directed to discharge into the sand outlet of the chamber, a valve seat and a valve to co-act therewith to control the passage way between the sand chambers a piston to such valve, such piston longitudinally movable in the cylinder which is mounted on the movable wall of the air chamber, and connected to such movable wall to be mechanically moved to seat the valve and close the sand outlet when the air port of the air chamber is closed by such movable wall, and means to yieldingly hold the piston in a position to seat the valve when the air port is opened by the movement of such movable wall.

3. In a device provided with a plurality of chambers, one of such chambers forming an air chamber and provided with an air inlet, an air outlet having a port and a movable wall to control the port, a depending tube on the movable wall and a piston in the tube, the chamber in the tube above the piston communicating with the air chamber, and the others of such chambers forming sand chambers, a communicating passage way between the sand chambers, one of such sand chambers provided with a sand inlet and the other one provided with a sand outlet, the combination therewith of springs to yieldingly maintain the movable wall of the air chamber in position to close the port of the air outlet, a passage way from such air outlet arranged to discharge into the sand chamber provided with an outlet and to direct the flow of air under pressure therethrough into such sand outlet, a valve seat and a valve to co-act therewith to control the passage way between the sand chambers, springs to yieldingly maintain the valve seated, and a stem connecting the valve and the piston.

4. In a device provided with a plurality of chambers, one of such chambers forming an air chamber and provided with an air inlet, an air outlet having a port and a movable wall to control the port, and the other of such chambers forming a sand chamber and provided with a sand inlet and with a sand outlet, the combination of means to yieldingly maintain the movable wall of the air chamber in position to close the port of the air outlet, a cylinder on the movable wall, such cylinder communicating at its upper end with the air chamber, a valve seat and a valve to co-act therewith to control the sand inlet, a piston to such valve, such piston mounted in the cylinder and longitudinally movable therein, means to yieldingly hold the valve seated, when the movable wall is in position to open the port to the air outlet of the air chamber, and a connection between the valve and the movable wall to mechanically close the valve to its seat when the movable wall is in position to close the port to the air outlet, and means to deliver air flowing through the air outlet to the sand chamber, and a communicating passage for air above the piston to the air chamber.

5. In a device provided with a plurality of chambers, one of such chambers forming an air chamber and provided with an air inlet, and a plurality of air outlet ports



and such chamber provided with a movable wall to control the several ports, and the others of such chambers forming a plurality of sand chambers, such chambers respectively provided with a sand inlet and with a sand outlet, the combination of means to yieldingly maintain the movable wall of the air chamber in position to close the ports of the air outlets, valve seats and valves to co-act therewith to control the sand inlets to the respective sand chambers, means to yieldingly hold the respective valves seated when the movable wall is in position to open the air ports, means to force the respective valves

open by pressure in the air chamber above the pressure in the corresponding sand chamber when such air ports are open, a connection between the valve and the movable wall to mechanically close the valves to their respective seats when the movable wall is in position to close the ports to the air outlets and means to deliver air flowing through the air chamber to the sand chambers. 15

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