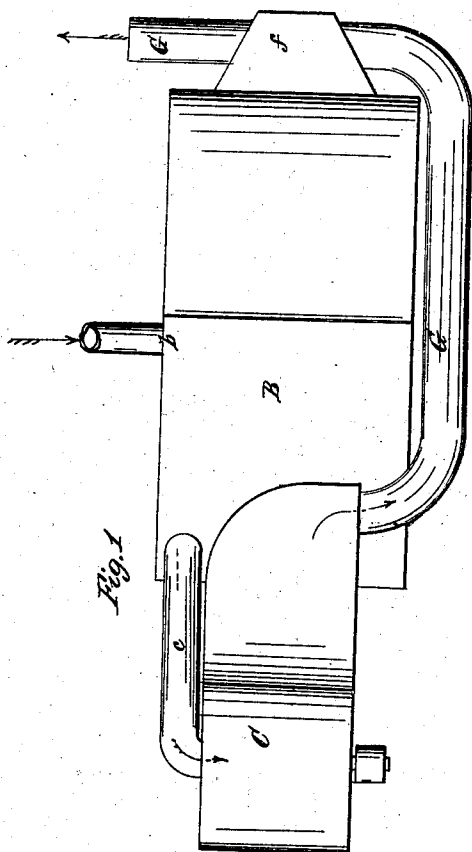


S. W. Wood,
Grain Conveyer.

No 79,044.

Patented June 16, 1868.

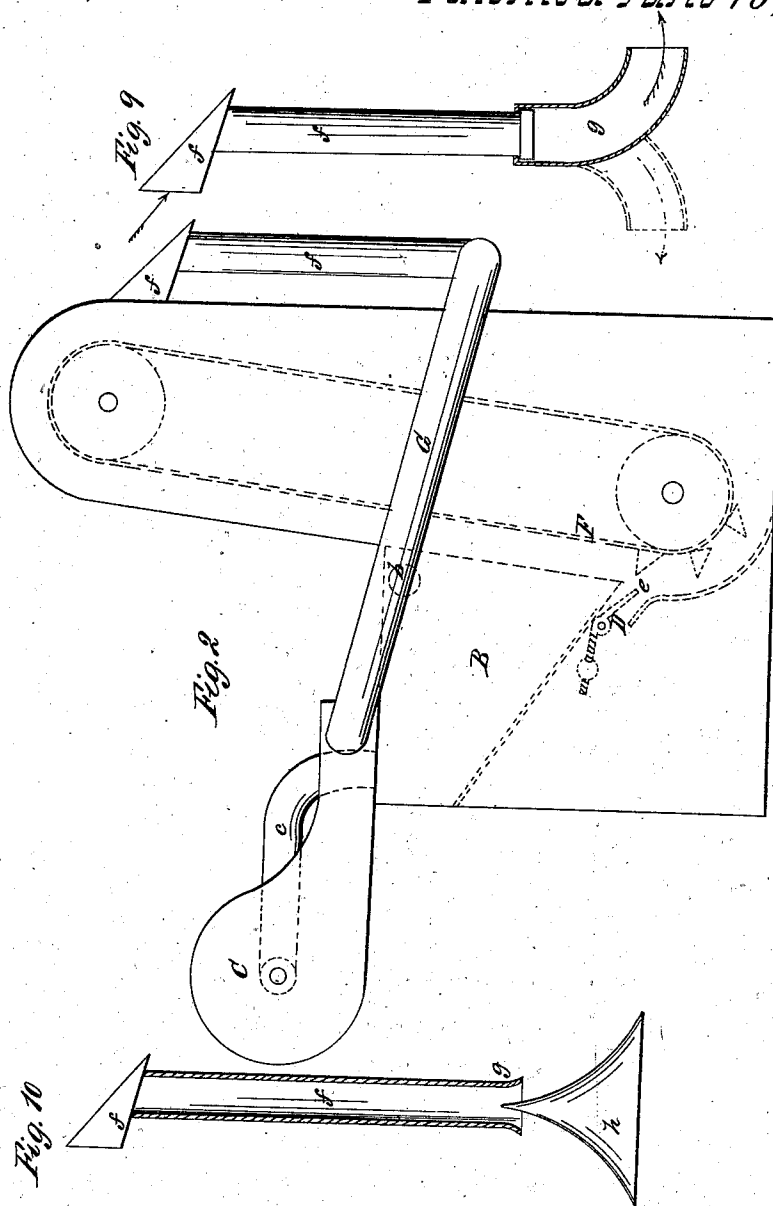


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Inventor;
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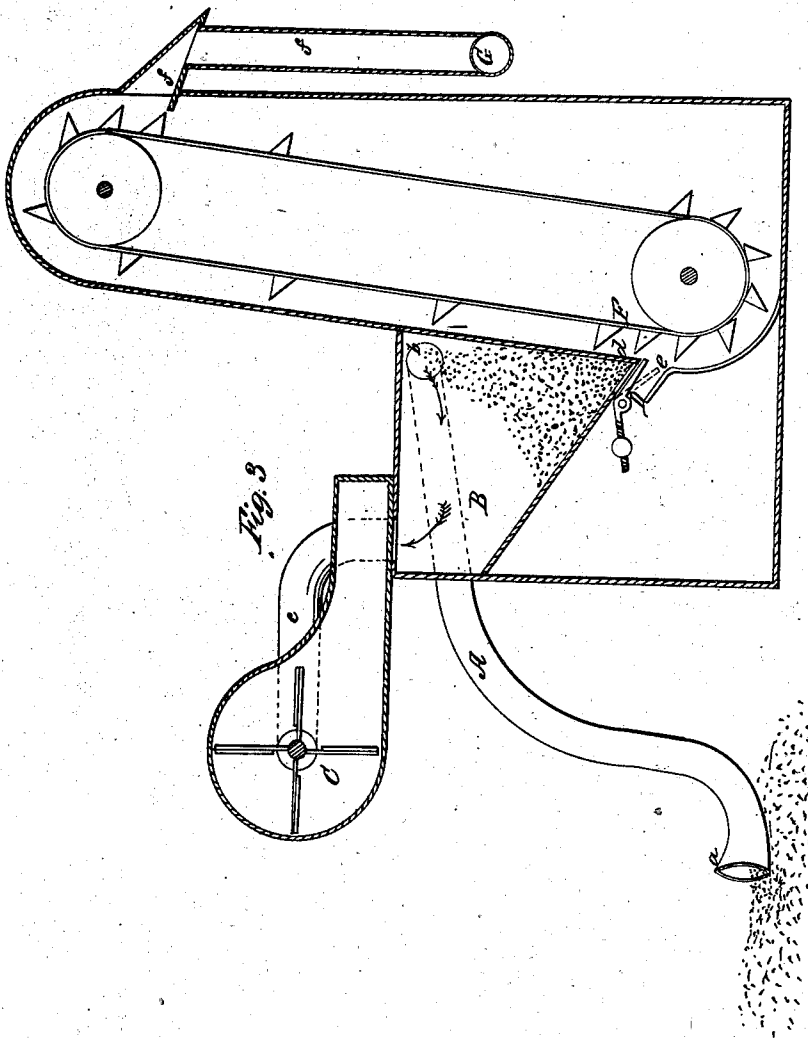
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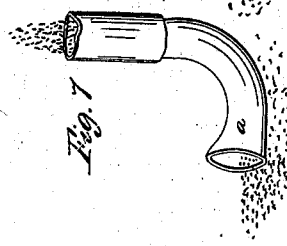
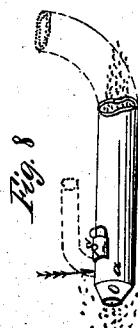
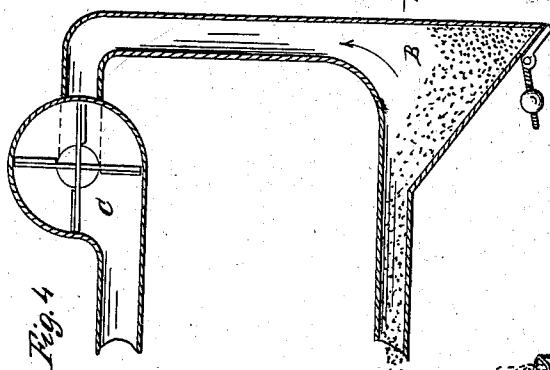
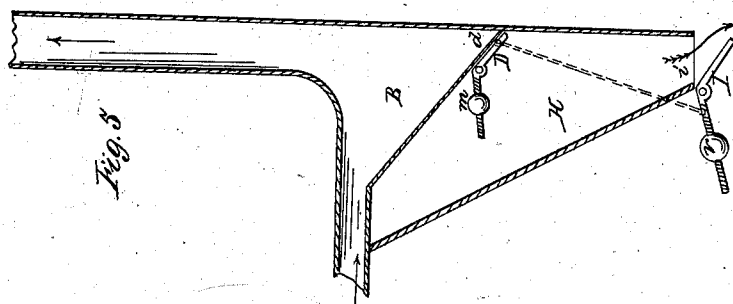
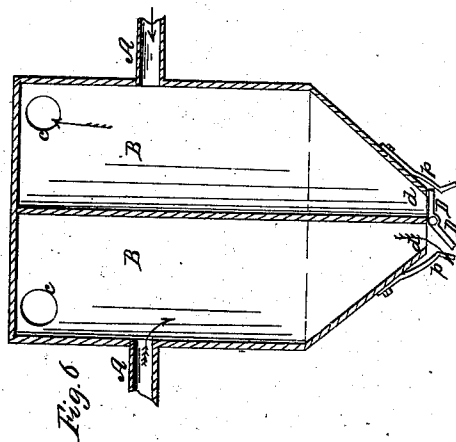
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4 Sheets, Sheet 4.

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United States Patent Office.

S. W. WOOD, OF CORNWALL, NEW YORK.

Letters Patent No. 79,044, dated June 16, 1868.

IMPROVEMENT IN PNEUMATIC GRAIN-ELEVATOR.

The Schedule referred to in these Letters Patent and making part of the same

TO ALL WHOM IT MAY CONCERN.

Be it known that I, S. W. Wood, of Cornwall, in the county of Orange, and State of New York, have invented an Improved Apparatus for Conveying and Elevating Grain; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a top view of a grain-conveying and elevating apparatus provided with my improvements.

Figure 2, a side elevation thereof.

Figure 3, a longitudinal vertical section of the same.

Figures 4, 5, and 6, views, in section, representing different modifications of a part of the apparatus.

Figures 7 and 8, views representing different constructions of the receiving-nozzle of the exhaust-pipe applicable in different circumstances.

Figures 9 and 10, views of modified constructions of the discharging-nozzle.

Like letters designate corresponding parts in all of the figures.

In this apparatus the grain is drawn into and conveyed in a pipe or passage by atmospheric pressure, produced by the continued partial exhaustion of the air therefrom, and then discharged, or further conveyed or elevated, if desired, by the usual mechanical means.

As the different parts of the apparatus are represented in the accompanying drawings, the atmospheric conveying-pipe or passage A conducts the grain into a close exhaust-chamber, B, from which the air is drawn by a blower, C, or air-pump, or equivalent means of exhausting air from the chamber and conveying-pipe. From the chamber B the grain is discharged either directly into the receptacle or into a mechanical elevator, F, which delivers it to a discharging-spout, pipe, or passage, f, from which it is finally directed by a nozzle, g, to any desired point.

The conveying-pipe A has two constructions of nozzle for taking up grain: first, that represented in fig. 7, to take up grain from the surface; second, that shown in fig. 8, for receiving the grain when inserted or immersed therein.

The surface-nozzle, fig. 7, is curved or bent, as indicated, so as to terminate in a nearly horizontal direction, in order to allow a free ingress of air, together with the grain, without obstructing the passage, and to draw in the grain from different directions as well. The end flares, or is enlarged, to more certainly secure the introduction of sufficient air. With this form of nozzle the pipe can be moved over the surface of the grain, slightly dipping therein, and rapidly receive and convey it.

The form shown in fig. 8 provides for controlling the admission of grain, so as not to clog therewith, even when inserted into the mass thereof, by contracting the mouth e, in order to prevent too great an ingress of grain, to be freely conveyed by the blast of air, mostly admitted through the side opening l, or pipe, as indicated by dotted lines in fig. 8.

The exhaust-chamber B receives the blast of air in its passage to the pump or blower, mingled with grain.

The blower or pump C is located above the chamber B, and the direction of the discharge from the conveying-pipe A is such, in relation to the position of the entrance into the pipe or passage e communicating between the chamber and the blower or pump, that the grain will be lodged in the chamber, while the air thus separated from the grain flows up to the blower. Various relative arrangements of parts will fulfill this condition, such as indicated in figs. 3, 4, 5, and 6. But the principle is the same in all, to wit, an enlarged chamber, to receive the grain and to diminish the velocity of the air through it by expansion, and such direction given to the grain as it enters the chamber as not to strike the entrance of the exhaust-passage leading to the blower or pump. This exhaust-chamber may be simply an enlargement of the pipe or passage through which the conveying-blast is conducted, and so arranged as to deliver the grain before reaching the pump or blower.

Figs. 4 and 5 show merely modified forms of such an enlargement of the passage.

Since the exhaust-chamber B receives the conveying-blast in its passage to the blower or pump, it must,

during the conveyance of grain, be closed, except at the inlet and outlet of the conveying-pipe or passage, while it must also have discharge-openings for the accumulated grain therein. To fulfil these conditions, all that is necessary is to secure a continual and sufficient accumulation of grain at the discharge-opening to keep it in a compact mass, and the grain itself will then keep the discharge-opening nearly or practically closed to the air, without interfering with its own discharge, or the constant flow of grain through the conveying-pipe A.

The exhaust-chamber B has such a form as to collect and discharge the grain at an outlet, *d*, which is ordinarily closed by a valve, D. The valve is kept closed by a counter-weight, *m*, so adjusted as to yield and allow the grain to run out when it has accumulated to a certain quantity or weight upon the valve, or the valve may be closed by the inward pressure of the air.

A still more perfect arrangement for the discharge is represented in fig. 5. Here the grain is first discharged from the exhaust-chamber B, through the discharge-opening *d*, into another chamber, H, and thence through an opening, *i*, closed by another valve, I.

These valves operate alternately, and consequently no passage for admitting air is ever opened into the exhaust-chamber through the discharge-openings. In order to insure the exact alternation of the two valves, they may be connected by a rod, as indicated by red lines.

By the arrangement represented in fig. 6, two exhaust-chambers or compartments, B B, are employed to receive the conveying-blast and grain, and discharge the grain alternately. The valves D D, closing the discharge-openings *d d*, may be connected together and move on a common centre, so that they must act alternately, as indicated.

In this figure also are shown springs, *p p*, instead of counter-weights, for regulating the accumulation of grain in the exhaust-chambers. The discharge of grain from the exhaust-chamber B may be direct to the place required. But it may be often desirable to further elevate the grain by the ordinary mechanical elevators. Such an elevator, of any construction, may be represented as at F, fig. 3, in the drawings.

The grain is received from the chamber B into a hopper or conveying-passage, *c*, and transferred to the elevator F, and thence delivered to the discharging-spout, or pipe, or passage *f*, which conveys the grain to the place required. The blast from the blower C or pump may here be introduced, for assisting the distribution of the grain. For this purpose a pipe, G, connects the blower with the discharge-pipe *f*. The discharge-pipe, however, may be used without the forcing-blast.

In order, also, to direct the discharge horizontally, or sidewise, a bent or curved distributing-nozzle, *g*, fig. 9, is employed, so formed as to direct the grain as required. And in order that the nozzle may direct the grain to one side or another, it is swivelled to the discharge-pipe or spout, as indicated in the same figure, the dotted lines indicating one position, and the full lines another. By turning the nozzle *g*, the direction of the discharge is varied at pleasure, so as to fill all parts of the room into which the grain is received, or to trim the vessel into which it is loading.

A modification of the swivelled nozzle may be made by multiplying the number of curved nozzles in different directions. But this is not so simple or effective as the single-swivelled nozzle.

Another modification is represented in fig. 10, consisting in a concave cone, *h*, situated centrally under the discharge-pipe *f*, and discharging the grain equally in all directions.

What I claim as my invention, and desire to secure by Letters Patent in a pneumatic grain-conveyer and elevator, is—

The combination and arrangement of the atmospheric conveying-pipe or passage A, exhaust-chamber B, and pump or blower C, substantially as and for the purpose herein specified.

In combination with the foregoing, I also claim the self-acting discharge-valve D, operating substantially as and for the purpose herein set forth.

I also claim the additional chamber H, and discharge-valve I, alternating with the valve D, substantially as and for the purpose specified.

I also claim the contracted aperture *o* of the receiving-nozzle, for the purpose specified.

I also claim the combination of a pneumatic pipe or passage, for conveying grain, with a mechanical grain-elevator, as herein specified.

I also claim the curved or bent discharge-nozzle *g*, arranged in combination with the discharge-pipe or spout, so as to distribute the grain by its own gravity, substantially as herein specified.

S. W. WOOD.

Witnesses:

J. S. BROWN,

A. VAN VRANKEN.