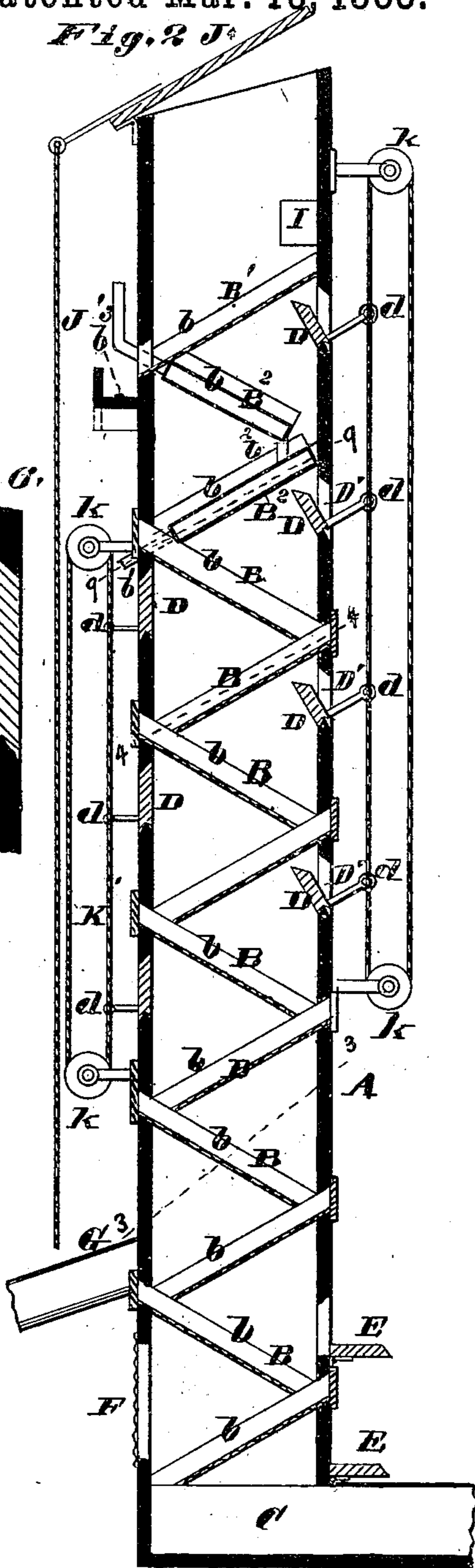
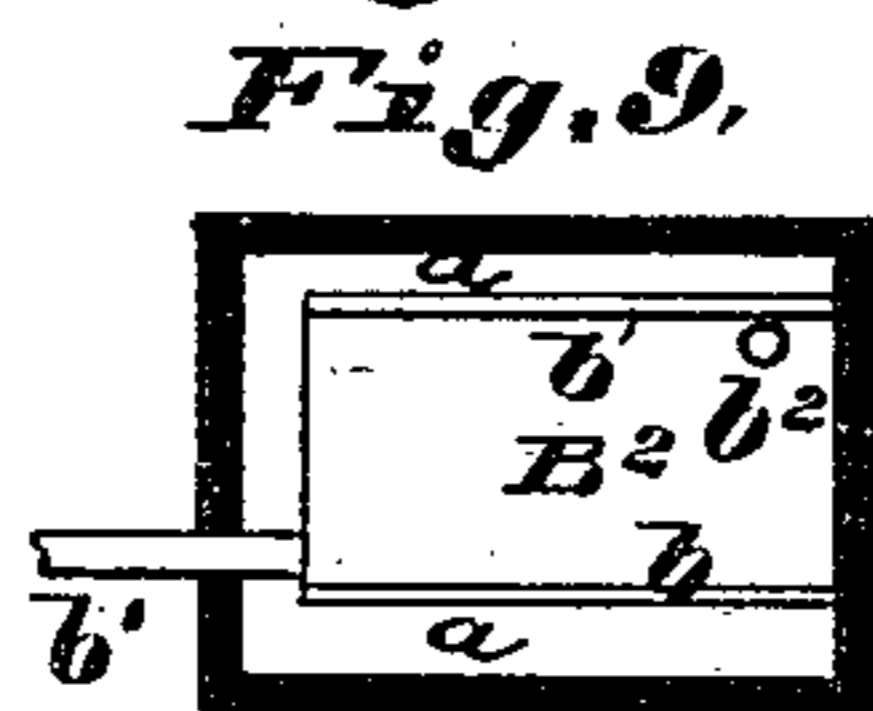
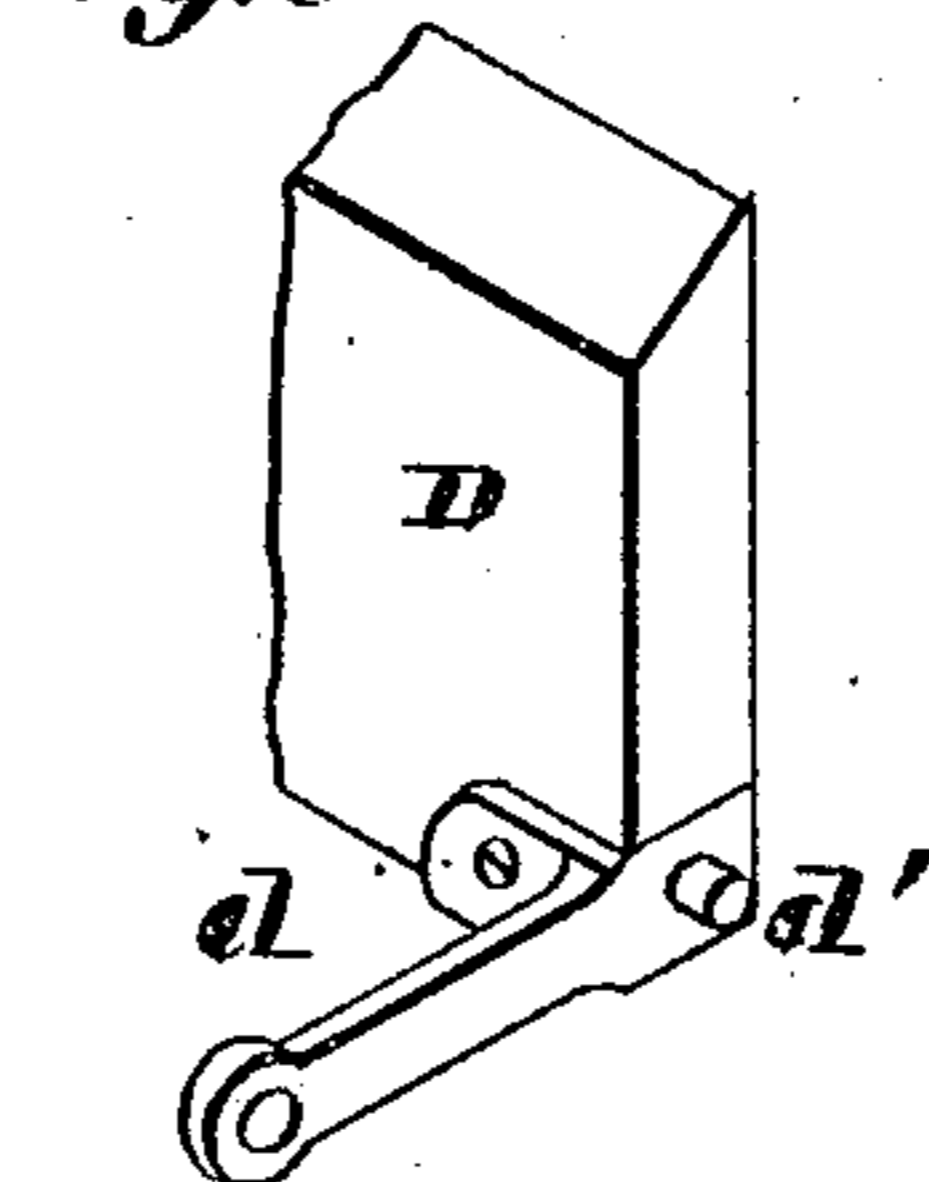
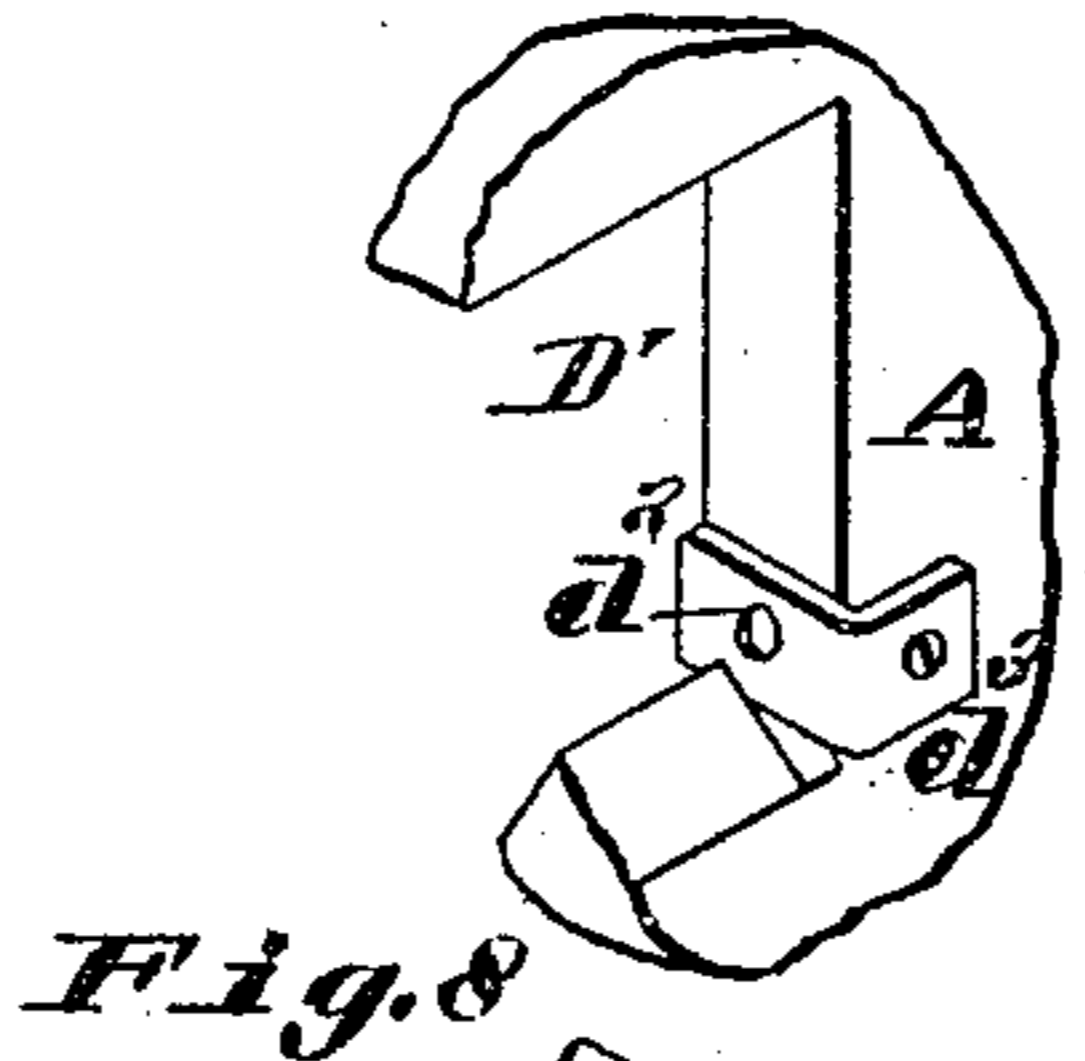
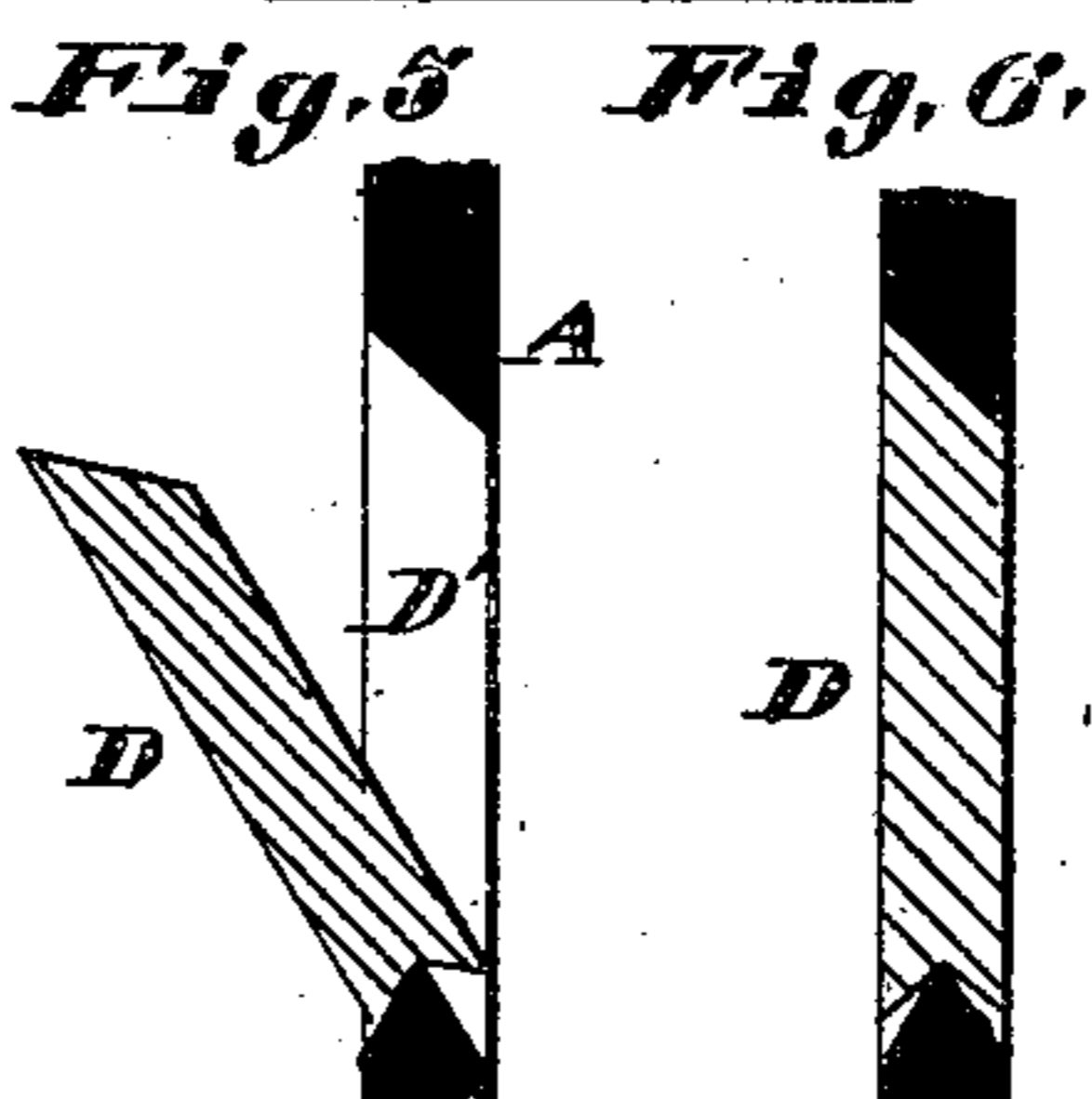
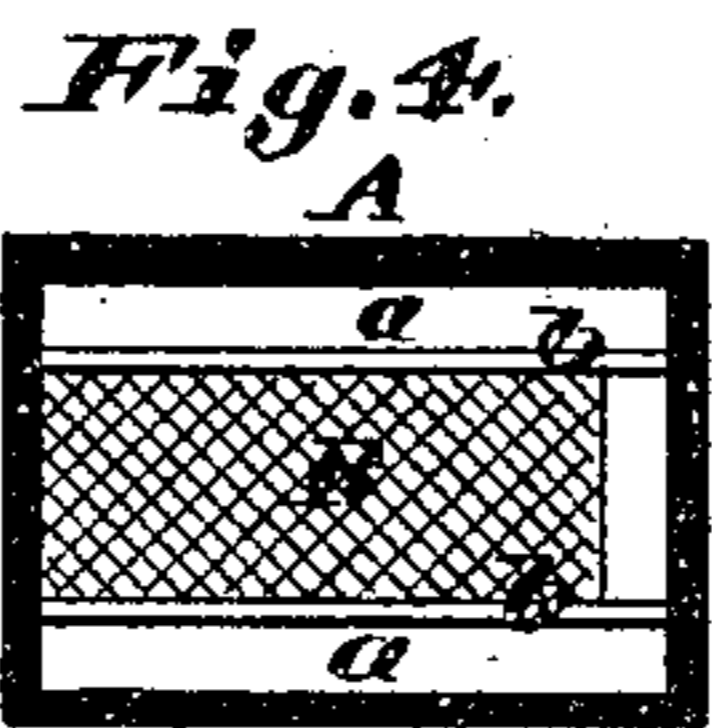
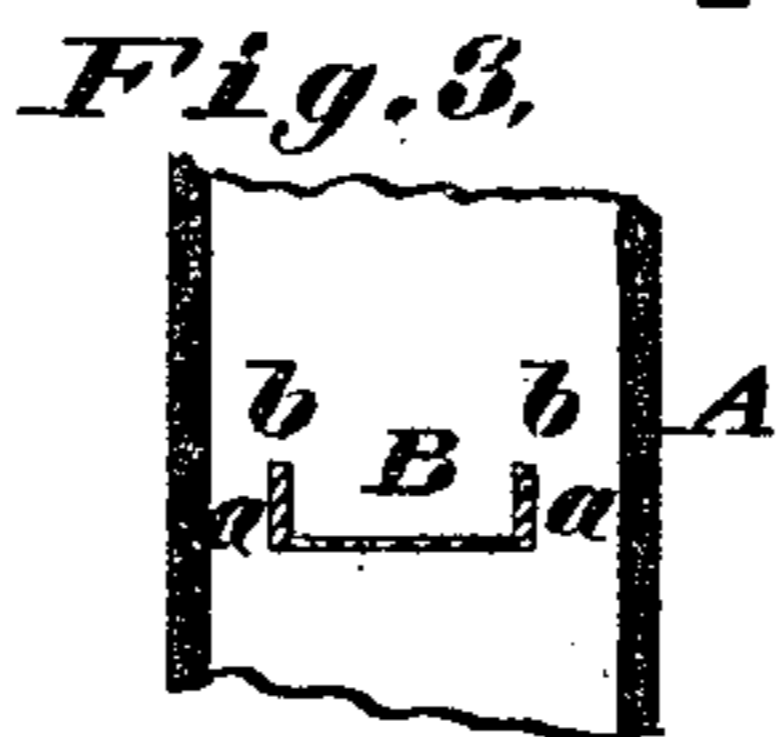
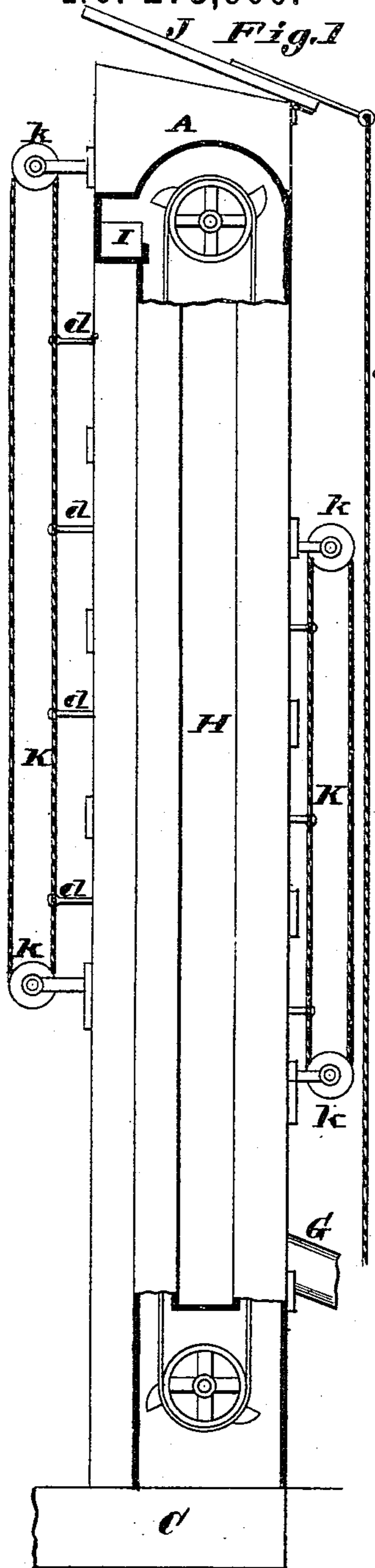


(No Model.)

M. A. SHEPARD.
APPARATUS FOR DRYING AND CLEANING GRAIN AND VENTILATING
BUILDINGS.

No. 273,900.

Patented Mar. 13, 1883.



Attest,
Albert G. Fish
Charles Pickle

Inventor:
Morrill A. Shepard

UNITED STATES PATENT OFFICE.

MORRILL A. SHEPARD, OF LEBANON, ILLINOIS.

APPARATUS FOR DRYING AND CLEANING GRAIN AND VENTILATING BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 273,900, dated March 13, 1883.

Application filed November 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, MORRILL A. SHEPARD, of Lebanon, St. Clair county, Illinois, have invented a certain new and useful Apparatus for Drying and Cleaning Grain and Ventilating Buildings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My apparatus consists of an air column or shaft extending vertically from the floor above the roof of a building, or, at the least, having considerable vertical extension, and having appliances, substantially as described, to dry, or to dry and clean, grain during its descent in said shaft.

Figure 1 is a side elevation with part of the elevator-wall broken away. Fig. 2 is a vertical section through the drying apparatus. Fig. 3 is a detail section at 3 3, Fig. 2. Fig. 4 is a transverse section at 4 4, Fig. 2. Fig. 5 is an enlarged detail section of shutters, showing the same open; and Fig. 6 is a similar section, showing the shutter closed. Figs. 7 and 8 are detail perspective views illustrating the shutter-hinge and operating-arm. Fig. 9 is a transverse section at 9 9, Fig. 2, showing a top view of one of the inclined steam-chutes.

A is the air-shaft, shown extending above the roof of the building, and provided with a hinged cover, J, opened by a cord or chain, attached to an arm of the cover. Within the shaft are inclined screens or riddles B B', over or through which the grain passes in descending the shaft. There are also inclined steam-chutes B², having a close chamber, through which steam passes to render the floor of the chute hot for the purpose of heating and drying the grain passing over it. The grain to be treated may be raised by an elevator, H, of ordinary construction, and by said elevator dumped into a chute, I, discharging onto the riddle B'. The meshes of this riddle are made so coarse as to allow the grain to run through, the larger impurities being discharged into a chute or trough, b³. From the riddle B' the grain drops upon the upper one of the steam-chutes or driers B², from whose lower edge it falls upon the more elevated part of the next drier B², down which it flows and falls upon the upper screen, B, being received upon the

upper end of the same, and flowing down to the lower edge, where it falls upon the next screen B, and so on down the shaft, being at last discharged into the receptacle or chute C. The meshes of the screen are so fine as to retain the grain, but to allow smaller impurities—such as dust or small seeds—to pass through. The riddle B', steam drying-chutes B², and the screens B have passages *a* between their inclined sides and the walls of the shaft A, to allow the upward passage of air in the shaft. The air may enter the lower part of the shaft, either from the inside of the building through apertures at E or F, or may be brought into the lower part of the shaft through a passage, G, extending to the outside of the building. All of these airways E F G should be supplied with suitable valves or doors, one of which is shown at E, and may have gauze screens stretched across them, as seen at F. The walls of the shaft A have apertures D', extending the whole width of the screens B, below the upper end of each screen, and closed by shutters or slats D, hinged at the lower edge and opening inward, so that the upper edge, when thrown in, projects beneath the part of the screen upon which the grain falls from the screen above. The purpose of this is that any impurities passing through the screen, where the grain first strikes it, shall fall upon the shutter or slat D and be carried to the outside of the shaft, where they may drop into any suitable receptacle or conductor. These shutters may all be connected to a single operating-cord, *k*, upon each side, by arms *d*, as shown in Figs. 1 and 2, so as to be opened and closed simultaneously. The lower edges of the shutters D are grooved, as seen most clearly in Figs. 5 and 6, said grooved edge fitting as a saddle upon the angular edge of the aperture D'. The construction is such that when the shutter is open the inner part of the groove fits the inner side of the edge, and the lower edge of the shutter, upon the outside, carries any matters falling upon the shutter clear of the outer wall of the shaft. I prefer to provide my shutters with a peculiarly-constructed hinge which admits of attachment from the outer side of the shaft after the shutter D has been inserted in the aperture D'. Said hinge has a socket-piece of angular form fitting in a suitable recess in the cheek of the aperture,

said piece having a socket, d^2 , in one part and a hole in the other part to receive a screw, d^3 , by which it is attached to the wall of the shaft A. The pintle-piece I prefer to make of cast-iron, with two leaves forming an angle, and attached respectively to the end and face of the shutter at its lower part. The piece has a pin-
 5 tle, d' , fitting in the socket d^2 , and has an arm, d , for the attachment of the rope k , as aforesaid. The shutters D and apertures D' perform another function besides that of allowing the escape of smaller impurities, as aforesaid, for they allow the entrance of air into the shaft and enable the apparatus to be used as a very
 10 efficient ventilator, either when it is in use as a grain drier and cleaner, or when it is not in use for this purpose, for by means of these apertures the air may be taken from all the rooms through which the shaft passes and carried out through the top of the shaft. Thus
 20 explosive dust may be removed from mills or other buildings. The riddle B', screens B, and steam-chutes have upwardly-extending sides b , to retain the grain passing over them from dropping into the spaces a . The steam used for the steam-driers may be obtained from the exhaust-pipe of a steam-engine. I prefer it shall enter the lower pan or drier through a
 25 pipe, b' , at one corner, and pass into one corner of the other pan or steam-chamber through a pipe at the diagonally-opposite corner, so that it travels diagonally through the steam-chamber. It passes in like manner diagonally through the steam-chamber of the drier above.
 30 I have shown but two of these driers B², but do not confine myself to any special number. There may be one or more.

The apparatus may be used without the steam driers, because in a high shaft, like that

contemplated, there would be an upward current of air which would be very marked in cool weather when the building is heated; but the efficiency of the apparatus, even as a ventilator, is much increased by the steam-heaters B², as they heat the air within the shaft and cause an
 40 increased upward movement of the same.

It will be understood that I contemplate in most cases carrying the shaft A above the roof of the building, in manner of a chimney, so as to increase the draft and to give a long descent
 50 to the grain.

I claim—

1. The combination, with a shaft, A, extending upwardly, and provided with induction-openings below and eduction-openings above,
 55 substantially as described, of one or more inclined steam-tables, B², in the upper portion of said shaft, and inclined screens B in the shaft below, with side apertures, a , for the ascent of air between the steam-tables B² and the walls
 60 of the shaft A, substantially as and for the purpose set forth.

2. The combination, in elevated shaft A, having apertures D', with doors D at the sides thereof, of steam-heaters B² in its upper part,
 65 with apertures a beside the same, and the screens B beneath heaters B², for the purpose set forth.

3. The combination, with shaft A, of the screens B, apertures D', and shutters D, opening inward, and constructed to conduct the material passing through the screen through the
 70 apertures D', as described.

MORRILL A. SHEPARD.

Witnesses:

SAML. KNIGHT,
 GEO. H. KNIGHT.