(No Model.) 2 Sheets—Sheet 1.

A. LAIDLAW.

GRAIN CLEANING MACHINE.

No. 365,080. Patented June 21, 1887.

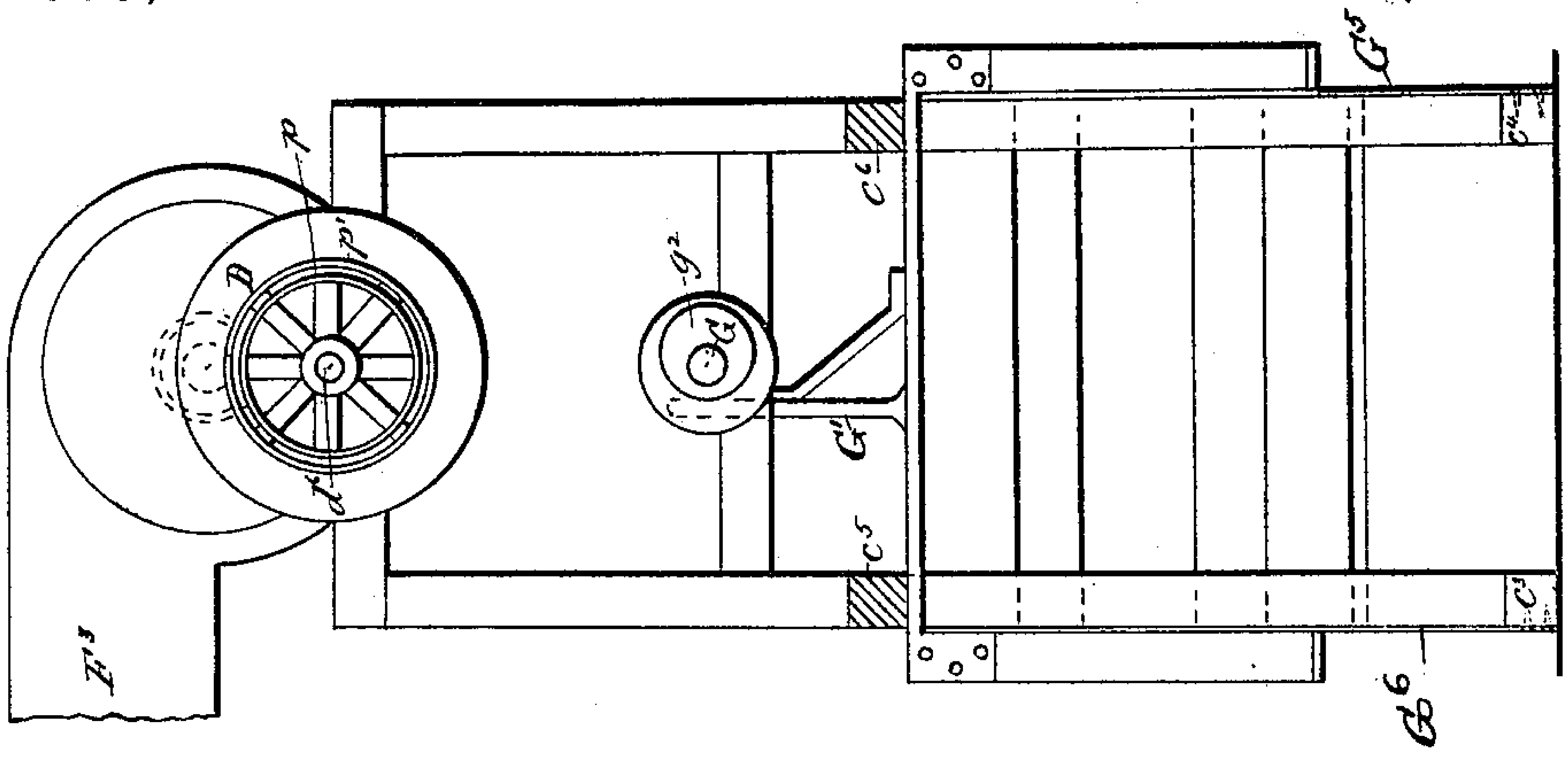

Fig. 2.

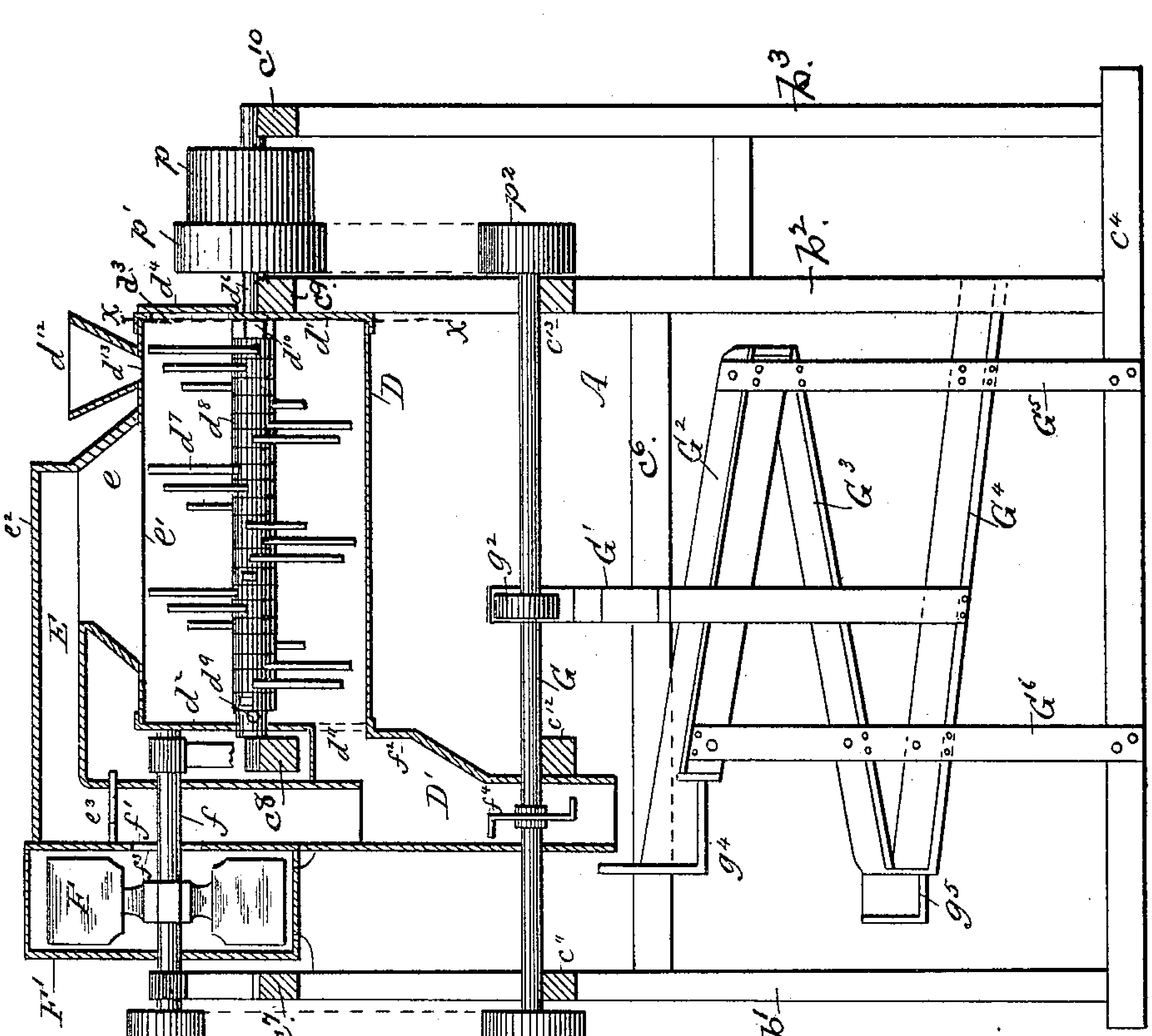

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

A. LAIDLAW.

GRAIN CLEANING MACHINE.

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Fig. 7.

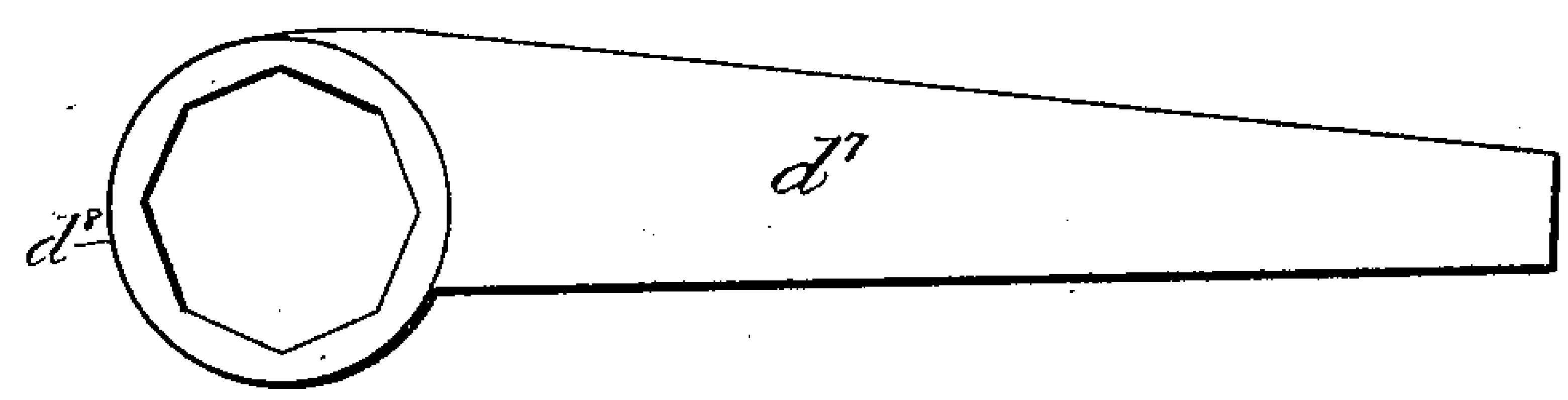


Fig. 3.

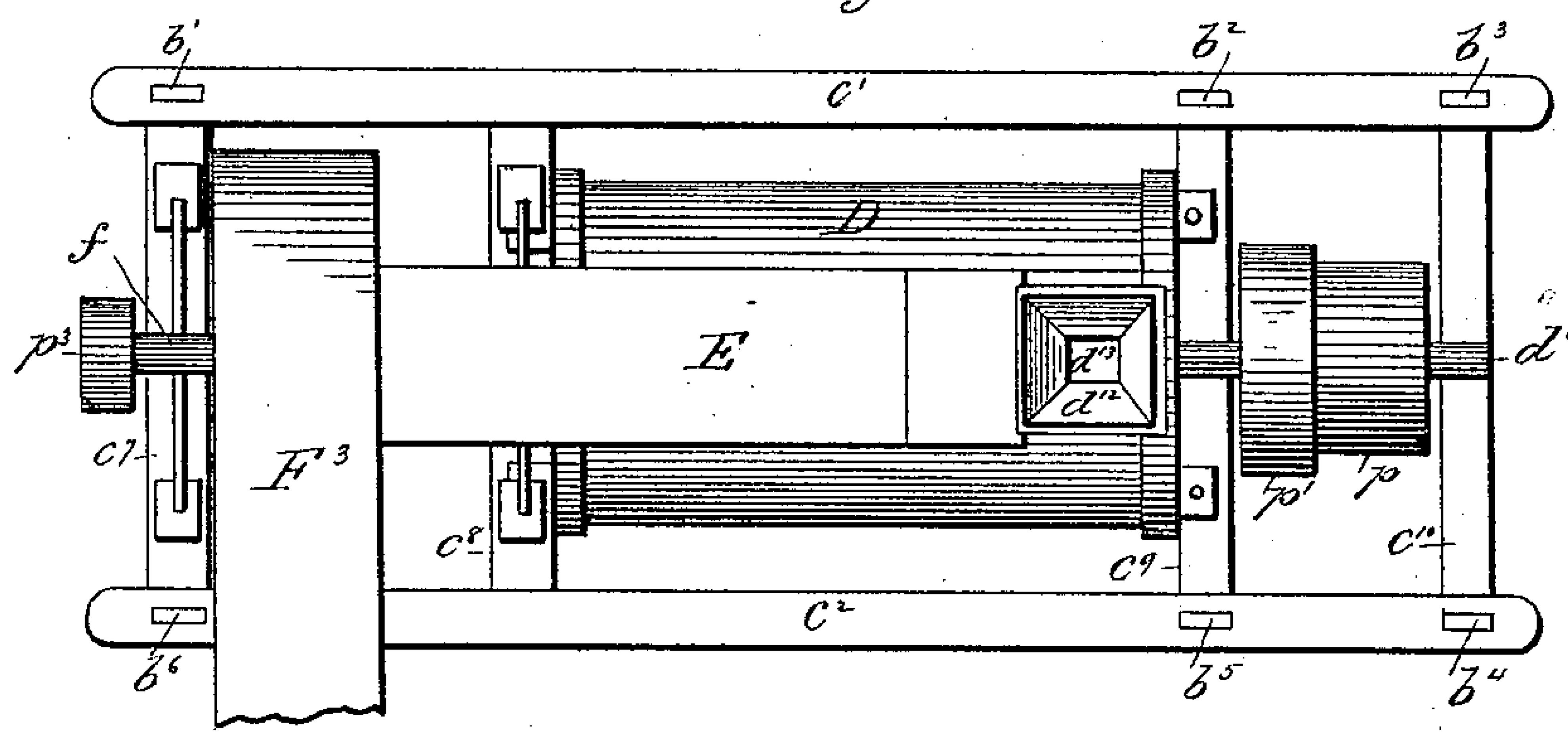


Fig. 4.

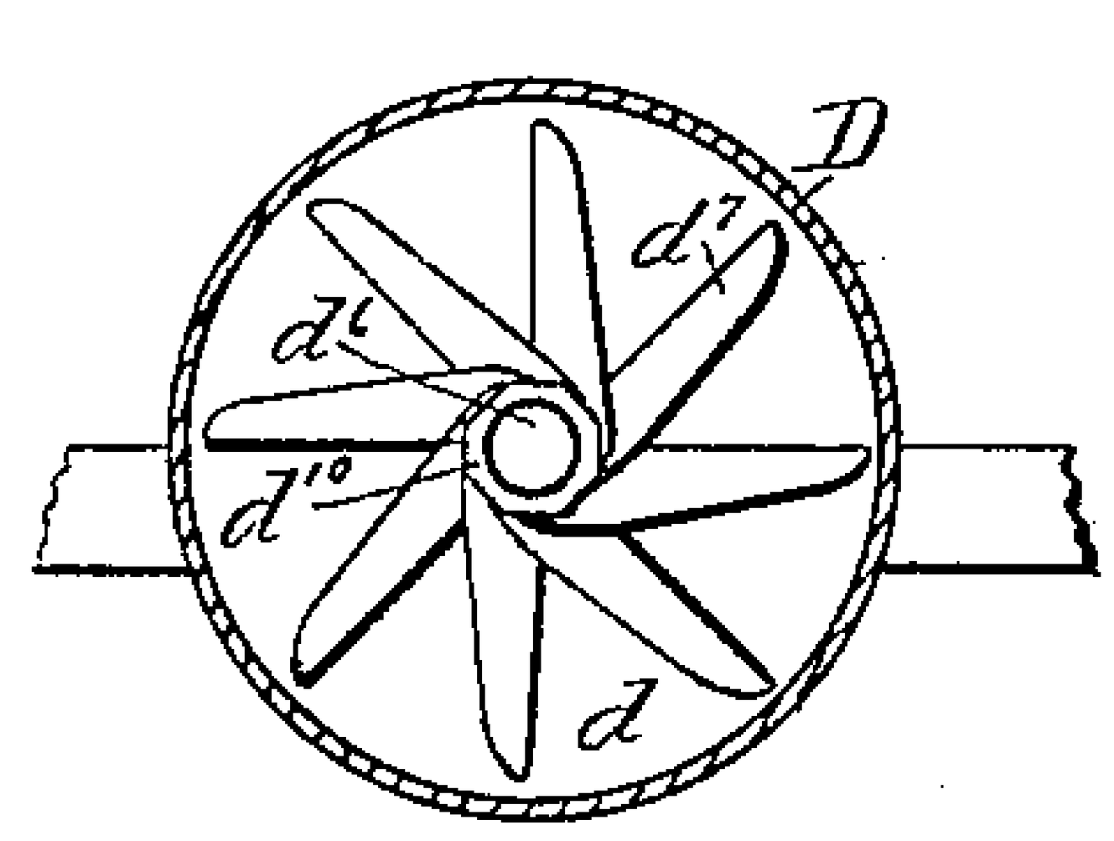


Fig. 5.

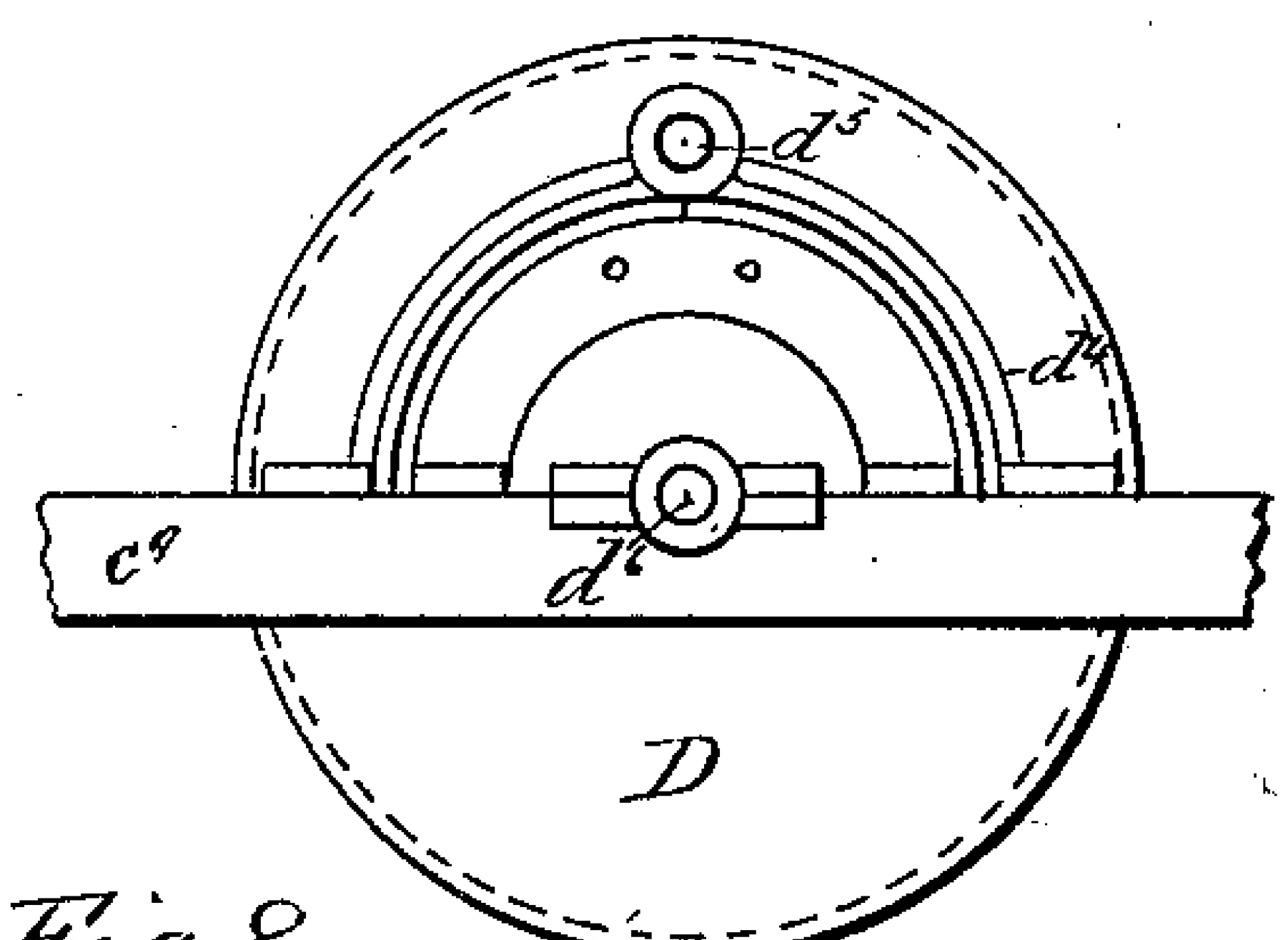


Fig. 6.

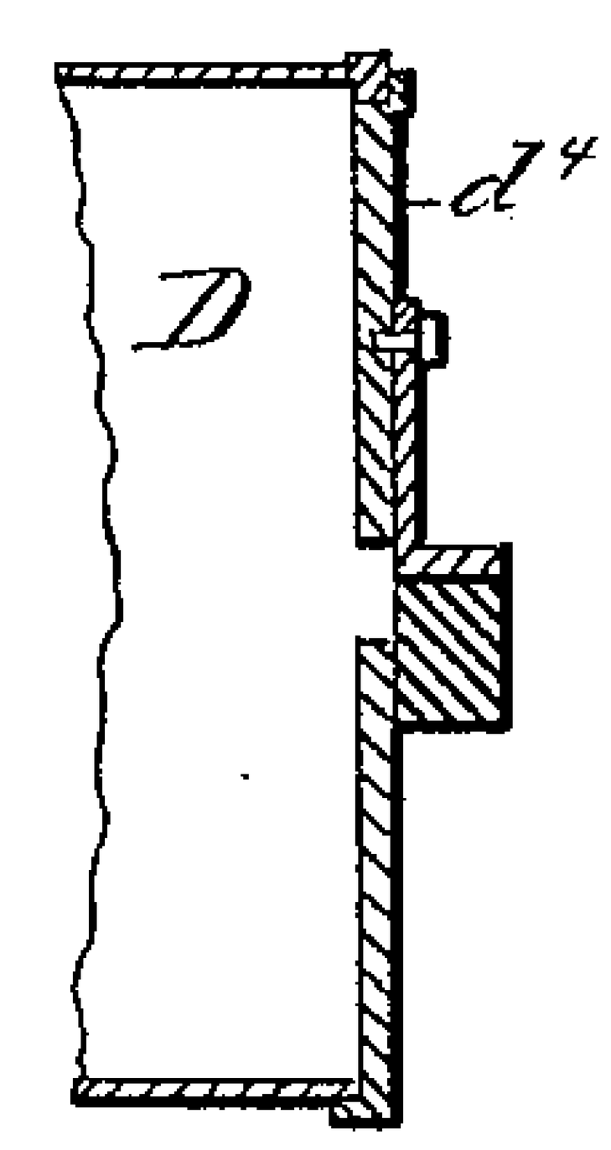
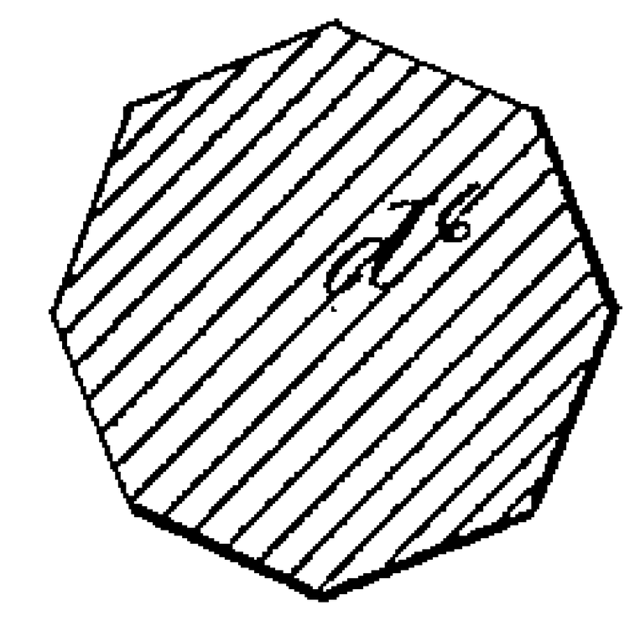


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALEXANDER LAIDLAW, OF ORILLIA, ONTARIO, CANADA.

GRAIN-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,080, dated June 21, 1887.

Application filed January 2, 1886. Serial No. 187,415. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER LAIDLAW, of the town of Orillia, in the county of Simcoe, in the Province of Ontario, Canada, millwright, have invented a new and useful Grain-Cleaning Machine; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to grain-cleaning machines; and it consists in the construction and arrangement of the parts of the same, which will be more fully hereinafter described, and definitely pointed out in the claims.

One object of my invention is to provide a grain-cleaning machine in which any kind of grain may be cleaned, but which is more especially adapted for treating barley and rendering it clean and free from all hulls, beards, or awns, without injuring the berry and in such manner as to materially increase its value both in commercial and general usage.

A further object of my invention is to provide a grain-cleaning machine which is simple and effective in its construction and operation, strong and durable, easily handled, and readily understood, all of the parts being convenient and accessible for cleaning or repair.

I attain these objects by the mechanism illustrated in the accompanying drawings, wherein like letters indicate similar parts in in the several views, and in which—

Figure 1 is a partly sectional longitudinal elevation of my improved grain-cleaning machine. Fig. 2 is an end elevation of the same, with a portion of the frame-work broken away. Fig. 3 is a top plan view of the machine. Fig. 4 is a transverse vertical section on the line *x x* of Fig. 1. Fig. 5 is an end view of the cylindrical casing on an enlarged scale, also showing one of the journal-brackets for supporting the shaft passing through said casing, and the movable panel. Fig. 6 is a broken sectional side view of the cylindrical casing, showing the movable panel and bracket for supporting the same. Fig. 7 is a detail view in side elevation of one of the knives. Fig. 8 is a cross-sectional view of the shaft of the knives.

A represents the frame of the machine; b', b^2, b^3, b^4, b^5, and b^6; the posts of the frame; c' and c^2, the longitudinal top rails; c^3 and c^4, the bottom longitudinal rails; c^7, c^8, c^9, and c^{10}, the top cross-rails, and c^{11}, c^{12}, and c^{13} the middle cross-rails.

In the upper portion of the frame-work just described a cylindrical casing or shell, D, is mounted, having ends or heads d' and d^2. A shaft, d^6, passes through the central portions of the said heads, the head d' having an opening, d^3, therein, which gives access to the interior of the cylindrical casing D, and is adapted to be closed by a panel, d^4, which may be of any well-known or preferred construction, and which is moved over the opening in the head d' by means of the projection d^5. The said panel may be constructed of any desired configuration, and is arranged in such manner as to uncover the opening d^3 when slid or otherwise removed therefrom, all of which is a well-known construction and operation and need not be enlarged upon herein. A hopper, d^{12}, is mounted on the top of the casing D, and registers with an opening, d^{13}, therein, and through which the grain is fed into the said cylinder or casing. This cylinder D is secured to the top portion of the frame-work in a stationary or stable position by any suitable well-known means, and its interior is smooth and regular in its configuration, without any projecting obstructions which would be productive of injury to the grain treated.

The shaft d^6, which passes through the interior central portion of the shell or casing D, has two fast pulleys, p and p', mounted on one end thereof, the said shaft being mounted in suitable journal-boxes secured to the frame-work on the outside of the two heads d' and d^2 of the cylinder D. That portion of the said shaft d^6 which lies between the interior portions of the heads d' and d^2 of the cylinder D is formed octagonal in cross-section, as shown in Fig. 8. Upon this octagonal portion of the shaft d^6 a series of blades or knives, d^7, are mounted, which have collars d^8, whose inner sides are octagonal in form and are adapted to slide over the said octagonal portion of the shaft d^6. By this means the knives d^7 are held in a positive position on the shaft d^6, and when once arranged thereon remain in a stationary position. The knives or blades d^7 are arranged in a spiral line around the shaft d^6 from the head d' to the head d^2, and are limited or confined at one end by a stud or pin, d^9, and clamped against said stud or pin d^9 by a nut, d^{10}, engaging with the other end of the shaft d^6, which is formed with a screw-thread to receive said nut.

By the arrangement of the knives as described, the grain which is fed into the drum or cylinder D, is not only cleaned by the revolving of the said knives, but at the same time is fed forward from the head d' to the exit or outlet opening d^{11}, formed in the lower portion of the head d^2. The shaft d^6 is driven or revolved by means of a belt engaging with the pulley p, the belt from the said pulley running to a suitable power medium, and is translated from the pulley p to a pulley, p', on the same shaft, and from thence to another pulley, p^2, below, for a purpose which will be more fully hereinafter described.

To the top portion of the cylinder or casing D an enlarged portion, e, of a duct, E, is connected, and registers with an opening, e', in the said drum, the said duct E extending to the rear of and down back of the head d^2 of the drum D, and some distance away therefrom, leaving an open space between the said duct E and the drum D. Back of the duct E, and connecting therewith, is a fan-casing, F', in which a fan, F, is situated and mounted on a shaft, f, suitably mounted in journal-boxes in one side of the frame and adjacent to the drum or cylinder D. On one end of this shaft a pulley, p^3, is secured, which is driven by a belt running from a pulley, p^4, mounted on the end of a shaft, G, which is suitably journaled in the frame-work of the machine; and to the other end of this shaft the pulley p^2 is secured, which is driven from the pulley p' on the shaft d^6, as heretofore described. The top portion or wall, e^2, of the duct E connects directly with the top portion of the fan-casing F', and the inner wall f' of the said fan-casing extends downward and forms one side of the chute D', into which the lower end of the duct E extends, the other wall, f^2, of said chute connecting with the lower portion of the cylindrical casing D at the opening d^{11}.

The fan-casing F' may be suitably secured to the frame-work of the machine, and is provided with an exit-spout, F^3, which may extend any suitable distance from the machine to a place of deposit. At the point where the shaft f passes through the wall f' of the fan-casing F' an opening, f^3, is formed, which connects with the duct E. In the said duct E, adjacent to the opening f^3, a sliding gate, e^3, is mounted, which acts to open and close communication between the fan F and said duct E, so that by closing said gate the suction force of the said fan may be concentrated on the grain undergoing the scouring process in the cylinder D as it is fed out of the opening d^{11} into the chute D', the suction then being exerted through the said chute D' and the lower extended portion of the duct. When the fan F is set in motion and the slide-gate e^3 is opened, so as to leave clear communication between the fan F and the upper part of cylinder D, the hulls or other matter which may have been separated from the grain by the action of the revolving knives or blades d^7 is drawn into the fan by suction and thrown out through the exit-spout F^3, as heretofore described. This operation is especially effective when the grain is revolved by the knives d^7 during the scouring process. When the gate e^3 is closed, no suction force is exerted directly upon the upper internal portion of the cylinder, but is then concentrated on the grain as it leaves the said cylinder through the opening d^{11} and passes into the chute D'. In the lower portion of the said chute D' a rotary agitating device, f^4, is situated, which is mounted on the shaft G, which passes through the chute at this point, said device acting to keep the chute open and clear. On the central portion of this shaft G an eccentric, g^2, is mounted, which engages with a projection, G', which is connected to the frame carrying the two sieves, G^2 G^3, and chute G^4. These sieves, G^2 and G^3, and chute G^4, are supported by flexible metallic strips, G^5 and G^6, which are connected to the frame-work of the machine and extend upward, and are secured to the frame which carries said sieves and chutes. When said shaft G revolves, the eccentric thereon operates against the projection G' and moves the sieves and chute in one direction, while the flexible strips G^5 and G^6 move them in the opposite direction, due to the resilient effort thereof to return to their normal position. The grain falling from the chute D' drops into a trough, g^4, then passes on to the sieve G^2, through the same, and down over the sieve G^3 into a trough, g^5, from which it passes out at the side of the machine into a suitable receptacle arranged at the lower end of the said trough.

Any small foreign matters which may not have been removed by the action of the fan and remain mixed with the grain during its passage over the sieves fall through the meshes of the latter and onto the chute G^4, from which they pass out at the end of the machine, to be disposed of as may be desired. This operation of the sieves, being well known in the art, will be readily understood.

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

A grain-cleaning machine mounted in a single frame-work and comprising a cylinder or casing, D, a shaft, d^6, passing therethrough and provided with a series of spirally-arranged knives, d^7, the duct E, communicating with the upper portion of the said casing or cylinder, and a chute, D', communicating with its discharge end, the fan-casing F', fan F, a series of vibrating sieves, G^2 G^3, and chute G^4, arranged below the parts named, and suitable shafting and pulleys, substantially as described.

ALEXANDER LAIDLAW.

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