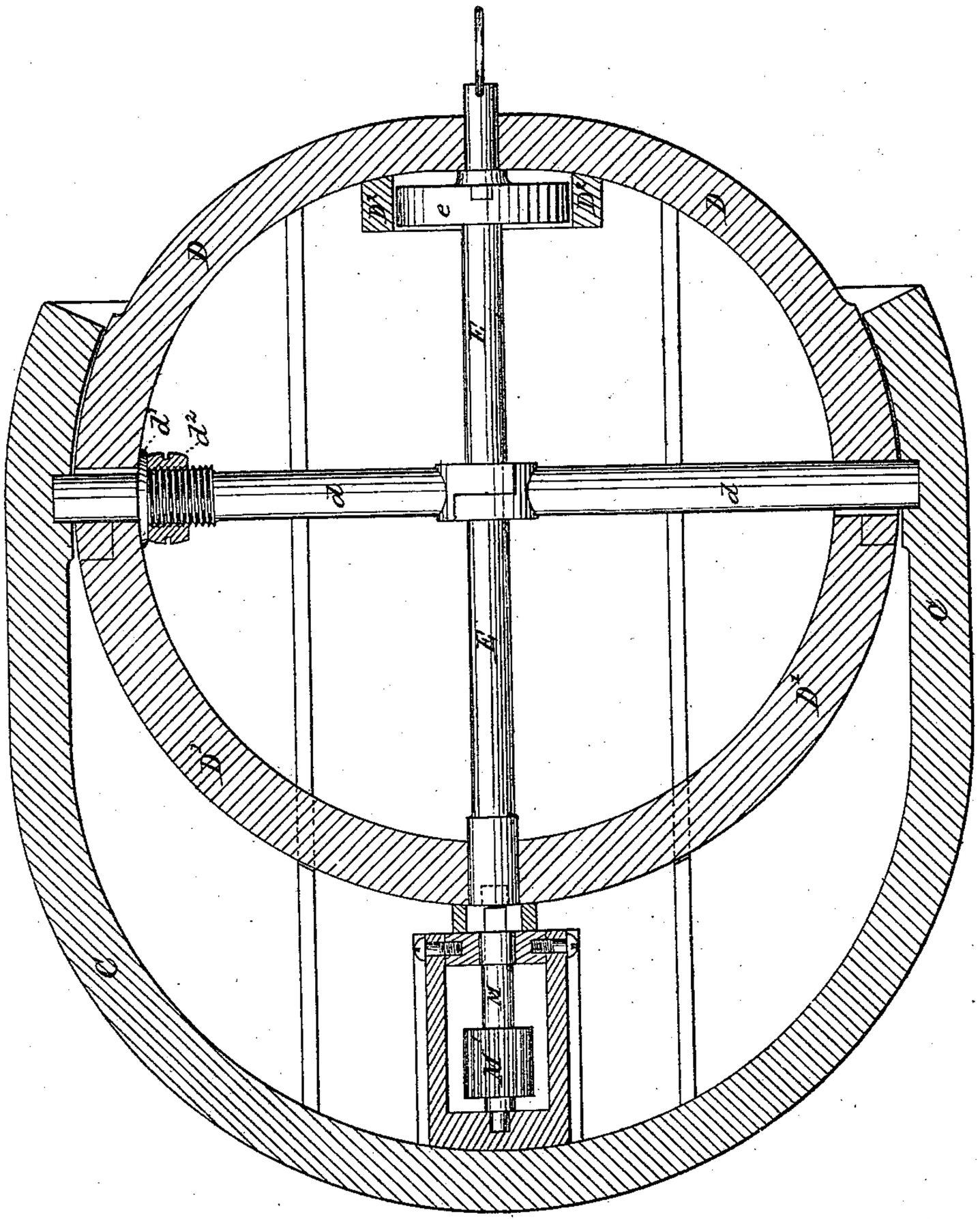
5 Sheets--Sheet 1.

WILLIAM CORLISS.

Improvement in Safes.

No. 126,132. Patented April 30, 1872.

Fig. 1.



Witnesses

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5 Sheets--Sheet 2.

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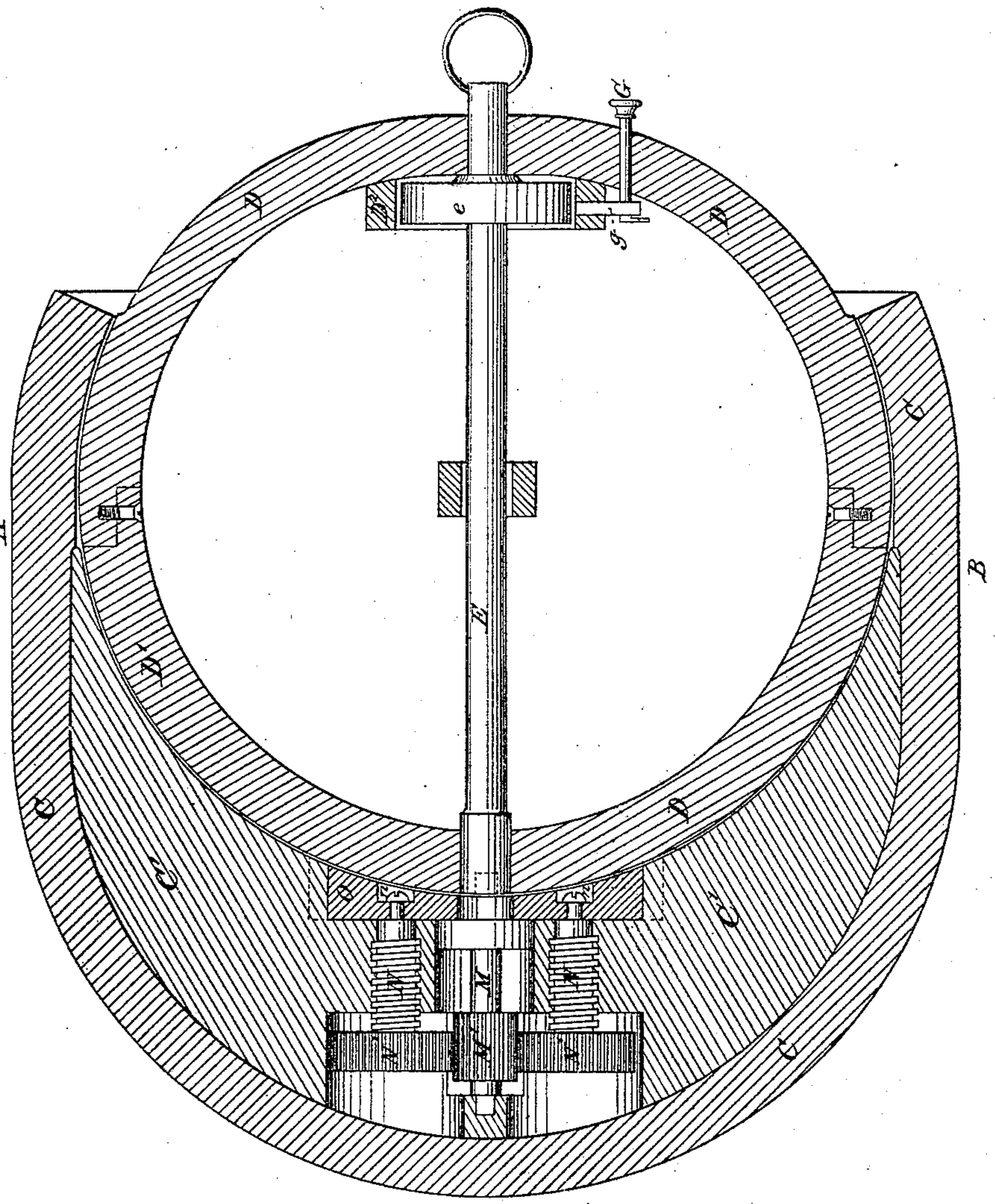
Fig. 2.



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5 Sheets--Sheet 3.

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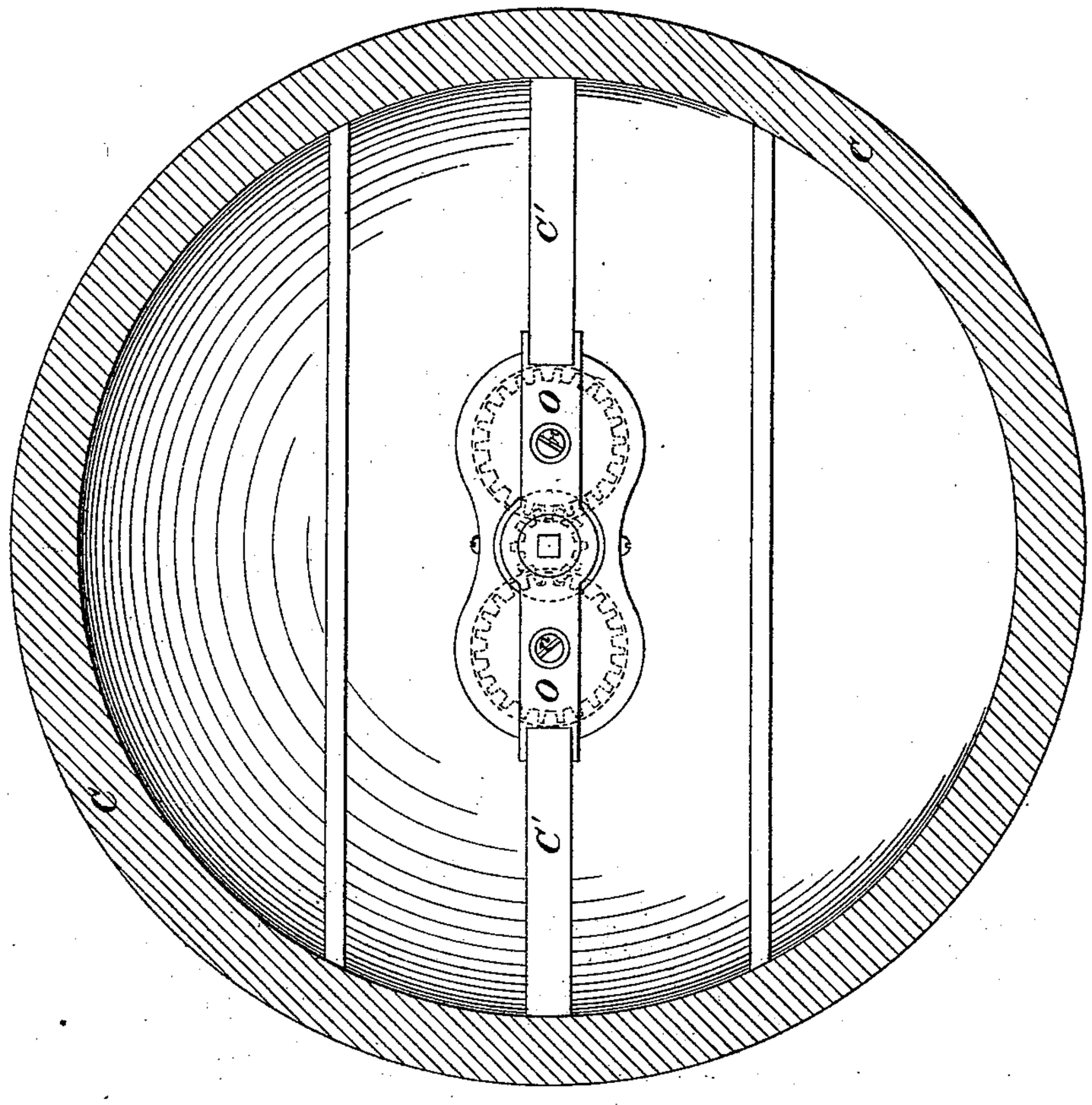

Fig. 3.

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5 Sheets--Sheet 4.

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Improvement in Safes.

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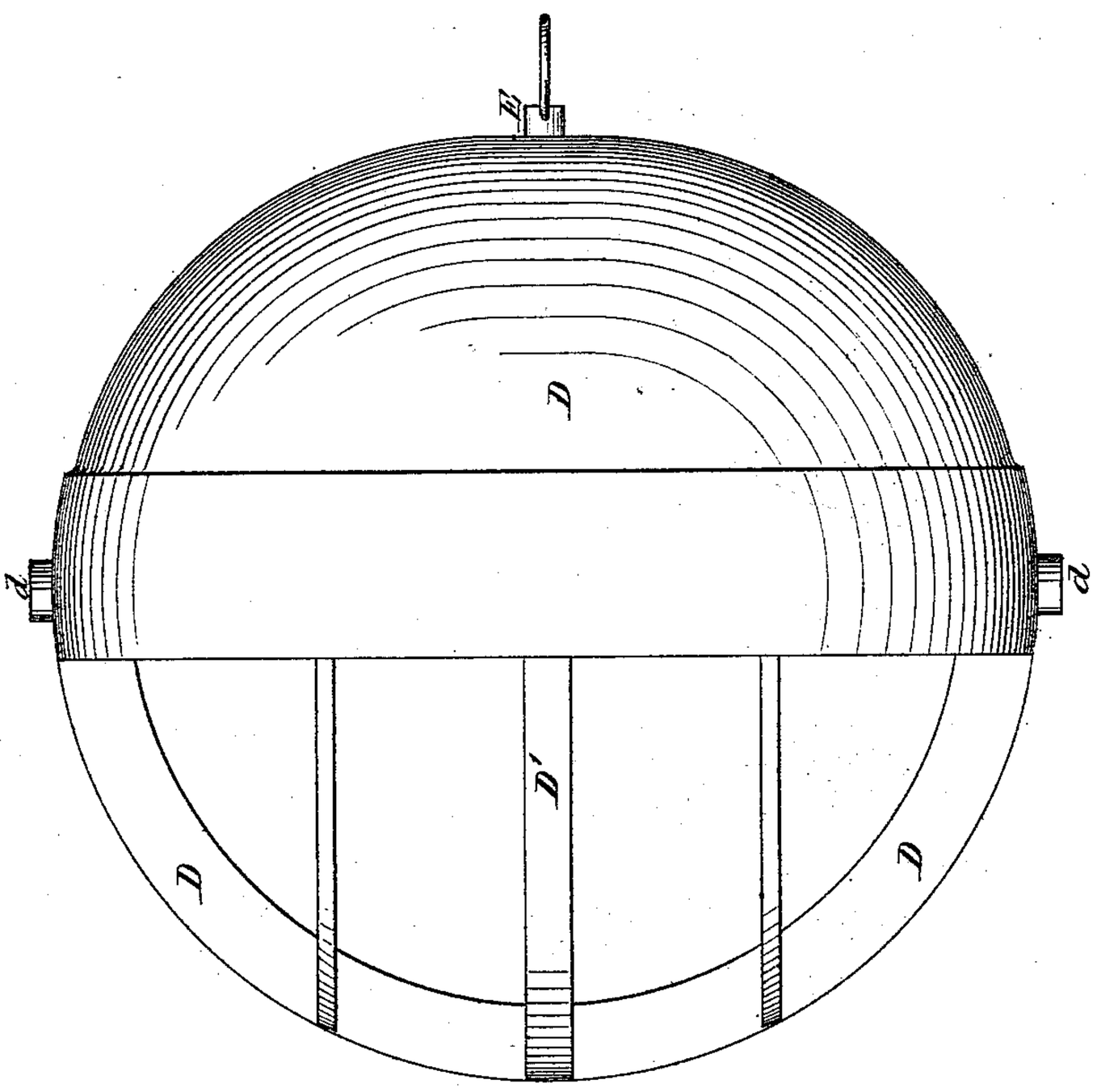
Fig. 4.



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5 Sheets--Sheet 5.

WILLIAM CORLISS.

Improvement in Safes.

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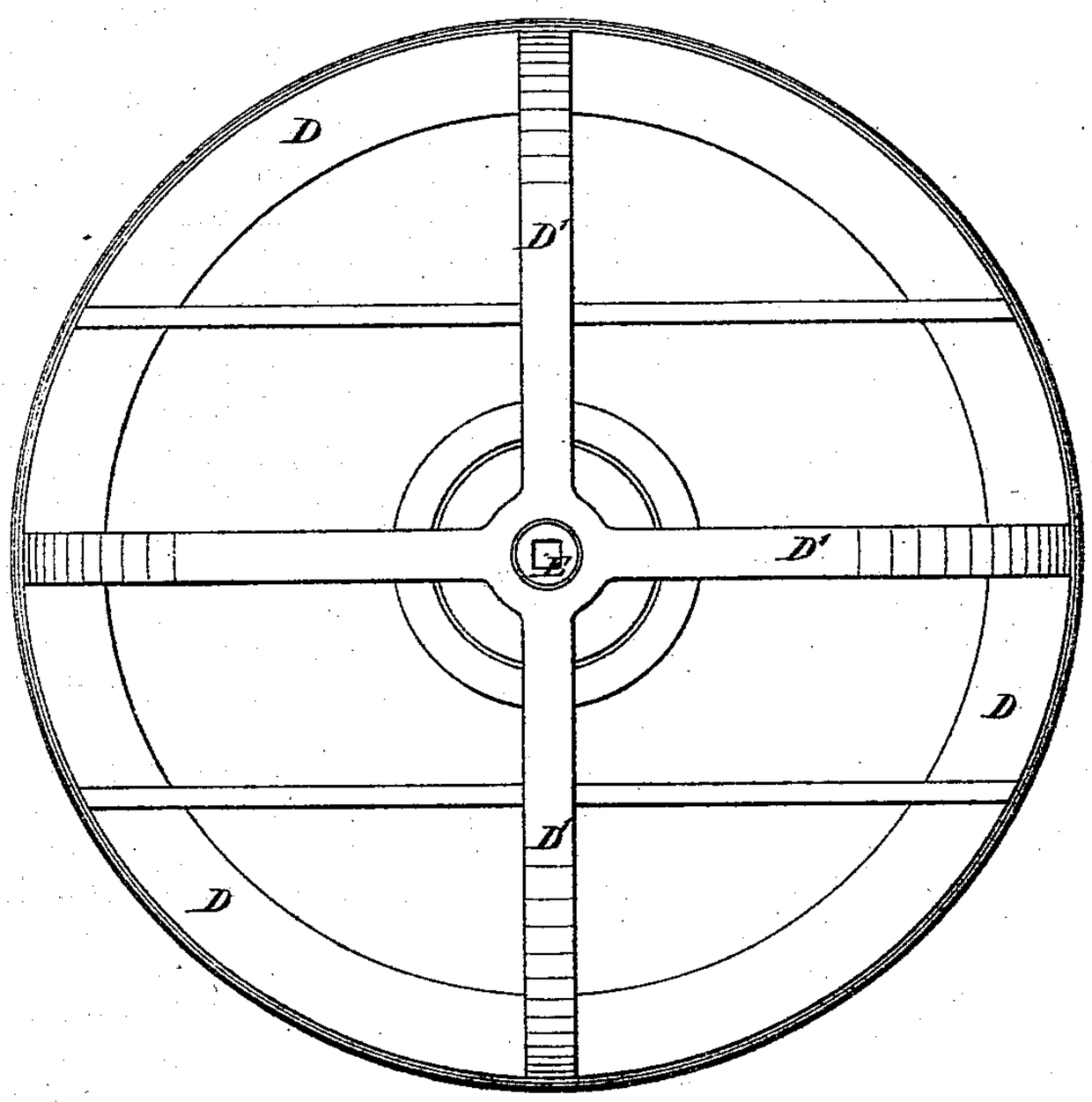
Fig. 5.



Witnesses:

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O. E. Duffy

Inventor:

William Corliss

by his attorney

L. L. Stetson

126,132

UNITED STATES PATENT OFFICE.

WILLIAM CORLISS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SAFES.

Specification forming part of Letters Patent No. 126,132, dated April 30, 1872.

To all whom it may concern:

Be it known that I, WILLIAM CORLISS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Safes for security against burglars, of which the following is a specification:

The accompanying drawing forms a part of this specification, which sets forth what I consider the best method for carrying out the invention.

Figure 1 is a central vertical section, representing the safe in its closed condition. Fig. 2 is a horizontal section, showing the parts in the same condition. Fig. 3 is a cross-section through the body of the safe, the revolving part, which performs the function of a door, being removed. The section is on the line A B in Fig. 2. Figs. 4 and 5 represent the door alone or detached from the main body of the safe; Fig. 4 is a side view; and Fig. 5 is a rear view.

Similar letters of reference indicate like parts in all the figures.

C is a single piece of thick, strong, and practically burglar-proof material. It may be of cast-iron, Franklinite, or analogous fusible materials, made hard and tough by interweaving wrought-iron with highly crystalline material, or it may be malleable metal variously compounded of cast-steel and iron or other softer matter, or it may be formed of any of the ordinary or suitable materials to turn and break drills or offer a direct resistance, by its hardness and other qualities, to any of the operations by cutting, drilling, or other means for obtaining an opening through it. It is adapted, as represented, to receive and partially inclose a revolving door with its attachments, having a general spherical outline, the larger diameter and axis of which is always within the shell. It is here shown as somewhat deeper than is necessary for the mere rotation of the door, and within the back space is placed a crescent-shaped piece of iron or other suitable material, as indicated by C′, which I term a backing-piece. This backing-piece is made to fit with slight clearance all around its semicircle, the bail attached to the door, and may be made with two members corresponding to the cross-bail, but is shown in the drawing with the horizontal member only. To this backing-piece is attached an apparatus for holding the door when closed, and for forcing it forward when required, as will be fully explained further on. The main body of the door D is a hollow mass of similar burglar-proof material of a slightly-flattened hemispherical form. It is adapted to revolve or swing in the mouth of the main body or shell C, and to form alternately an easy or tight junction therewith, according as the door is allowed to settle backward a little within the main body or is forced strongly forward. The door D opens by turning around on the vertical shaft or pintle *d;* a stout cross-bail, D^1, is fitted to the back of the door D and revolves therewith. The main receptacle for the books, moneys, jewelry, and other valuables deposited in the safe, is within the spherical interior of the revolving part D D^1, which I shall in future designate collectively by the single word "door" or by the single letter D. A large portion, however, of the space within the main body or shell C, in the rear of the revolving door, may be made available for papers and other valuables which do not require frequent handling. It is a little more difficult to obtain access to them than to those articles which are in the revolving door. The interior of the latter is shelved and may be divided into pigeon-holes or other ordinary or suitable subdivisions. It may contain strong boxes with intricate locks, &c., as a guard against the intermeddling of parties who may, in large establishments, properly be allowed access to the main interior of the safe; such additions are common in all safes and need not be further alluded to. So also of the mode of decorating or furnishing the exterior or interior. I propose to employ any ordinary or suitable means of imparting elegance and convenience to the structure. The safe is locked and unlocked by locks of any ordinary or suitable character, acting through the medium of a shaft, E, which extends through the door D in a line at right angles to the pintle. I have represented it as extending directly through the pintle *d*, the latter being made in two parts peculiarly matched together and leaving a space for the free passage of the shaft E. The shaft is fitted tight and easy in a hole in the center of the front of the door, and may be operated by a wrench or hand-crank of suita-

ble construction. The means represented in the drawing is simply a ring, which will drop down by its own weight when not in use so as to fall within the sweep of the door. The leverage afforded by the arrangement of the locking apparatus avoids the necessity of applying much power to the shaft E, and I have aimed at offering the smallest amount of projection to this shaft in order to avoid the possibility of operating it by violence. The spherical form of the door being a little flattened at the center of the front, the operating-shaft E and the lock-knobs are allowed to project sufficiently for working without interfering with the rotation of the door. Assuming that the lock is a more or less compounded register-lock, G is the knob by which it is operated, and *g* is the bolt or one of the bolts which it controls. The shaft E is provided with a strong wheel or lock-plate, *e*, recessed at proper points to receive the one or more bolts *g;* and, when the knob or knobs are properly operated to withdraw the bolt or bolts *g*, the shaft is free to be turned from the outside. I employ by preference a considerable number of stout bolts, *g'*, each passing through a tolerably close-fitting hole in an encircling ring, D^2, so that all the bolts must be sheared off in order to turn the shaft E by violence applied through the shaft, without previously unlocking. The considerable leverage afforded by the large lock-plate *e* and the number of bolts *g* which it is possible to throw into this plate from all sides, makes it easy to guard with absolute certainty against a forcible opening of the safe by such means. When the bolts are withdrawn by the operating of the lock or locks, the shaft E is free to be turned from the outside. The shaft is, at this juncture, coupled and engaged with the shaft M, which is mounted in bearings in the backing-piece C'. In the drawing, the shaft E is represented as having been drawn forward out of connection with the shaft M to allow the door to revolve, as will be explained further. By turning the shaft E, and consequently the shaft M, the small broad gear-wheel M' is turned and motion is communicated through two gear-wheels, N' N', to two stout screw-shafts or endless screws, N N. These are tapped in corresponding holes in the backing-piece C', and are connected at their front ends by small screw-bolts *n n*, as shown, to a long, broad bearing-shoe, O. This shoe is plain on its back face, and is hollowed on its front face to match the spherical adjusting-surface of the bail; it is also fitted in the backing-piece C' in such a manner as to prevent its turning, and recessed to receive the heads of the screw-bolts *n n*, all of which is fully shown in the drawing. When the shaft E operates the shaft M and thus, through the gearing represented, turns the strong screws N N, the shoe O is moved powerfully forward and, bearing fairly against the horizontal member of the bail D^1, forces it and the whole door strongly forward. A zone around the door D, where it fits within the front of the shell C when closed, is made a little larger in diameter than the other portions of the door, and is carefully finished, by grinding or otherwise, to form a perfectly-tight fit within the correspondingly-finished and hardened concave inner surface of the front of the shell. When the door is in condition for turning to open or close, the surfaces are a little distance apart, but after the door is closed this entire mass is moved forcibly forward by the screws N N, and the connection of the pintle *d* being made intentionally a little loose to allow of such motion, the entire door is moved forward and brought to a tight and very firm bearing within the front or mouth of the shell. In this position the friction offered to the turning of the door is very great, and as the shaft E, in the correct condition of the safe, remains engaged with the shaft M and is only drawn forward into the position represented after the lock-bolts *g* are withdrawn, it follows that the door is very efficiently held against turning, both by the frictional resistance offered by the closely-fitting periphery and by the socketing of the shaft M into the end of the shaft E; it is also held by the shearing contact of the exterior of the shaft E with the surface around the central hole in the shoe O. These several coinciding forces may be relied on as perfectly and absolutely proof against any force possible to turn the door D within its partially-inclosing case C. The junctions of the bail D^1 with the main body D may be lapped much further than is represented, but I do not esteem it necessary; and the holes through the door for the pintle-shafts may be made to allow of still more clearance. The pintle-shaft is made passing from the bottom to the top with means for adjusting at the top, but it could be made without passing through the center of the door, as by separate short pintles fastened to the shell and made adjustable by appropriate screws. I think it much better, however, to let the pintle pass entirely through, as by so doing I am able to hang the door at the top, thereby securing other important advantages. To lessen the friction I propose to use small disks of hardened steel or other suitable material, located at the foot of the pintle, on which the shaft will revolve. The weight of the revolving door and its attachments is carried by the pintle-shaft *d*, and rests on the end of the shaft as a step, its weight being received by the shaft near the top, through the medium of the collar *d* and adjustable nut d^2. By means of the adjustable nut d^2 the door and its attachments are raised and lowered with ease and delicacy. It is intended to make it a tolerably-close fit at all times, but the weight at the door causes it to fall back at the bottom against the pintle, thereby causing the spheroidal surface of the bearing-zone to fall away from the corresponding surface of the mouth of the shell, thus affording a clearance to the door in its rotation.

The parts C and D are difficult to make and apply together by any ordinary means. I have

devised means for their manufacture which I am preparing to make the subject of other and separate Letters Patent. I will describe them here very briefly by saying that I forge both parts of a mingled material, as steel and soft iron, finishing the door carefully and inclosing it within the shell C, when the latter is worked into a cap-like form and before the mouth has been contracted. I then draw the mouth of the shell C together by subsequent operations, and draw it a very little too small. Then, when it is cold, I finish the inner edge of the mouth by proper tools, harden the whole, and the work is ready (with a very little grinding if it has sprung in the hardening) to be properly mounted for work, as herein shown.

I have further inventions in this class of safes, which I propose to patent through applications made or to be made therefor, distinct and separate from this, but they need not now be described.

My manner of construction avoids joints and fastenings. Neither of the parts C or D are perforated for any purpose except for locking, and neither present angles to afford a starting point for any violent operations of compressing or other forces, while the construction affords, by its mode of opening, all the convenience of the most simple ordinary safe. The mode of construction, with means for closing the joint at the junction of the parts C and D, surmounts one of the greatest practical difficulties in making burglar-proof safes, by absolutely precluding the entrance of wedges. By the use of means for forcing the door forward, I make the joint between the door and shell an absolutely-tight fit, metal to metal, leaving no seam for the entrance of even the thinnest wedge.

Some of the advantages due to certain features of this invention, as here described, may be separately enumerated, as follows: First, by reason of the fact that my revolving door is spherical in form and fitted within a spheroidal case, C, as shown, I am able to protect the contents of the safe within an inclosure which presents everywhere a rounded surface without angles or other projections, and adapted to open and expose the contents on the shelves or equivalent devices, with great convenience and facility for classification and the like, and also to provide for the adjustment of the door upward and downward, and the tightening and loosening of the joint altogether by the movement of the door forward and backward. Second, by reason of the fact that the shell C partially incloses the door, and that the opening or mouth of the shell is smaller than the diameter of the door, and that both parts are made of great strength, and that the door opens only by moving inward, it follows that the door cannot be forced out by the explosion of powder or other fulminates within the safe, or otherwise by any force less than would be sufficient to destroy the building in which the safe might stand. Third, by reason of the fact that the pintle d is made in sections and adapted to be applied separately and thrust upward and downward into their places, as shown, and that the door D is mounted on such pintle by means of the loose collar or washer d^1 and the adjusting means d^2, I am able to make and apply the work together with very accurately-formed and closely-fitting joints, to adjust the position of the door upward and downward with great delicacy, so as to turn with almost unappreciable resistance from friction. This method of hanging the door also causes it, by its own gravity, to settle back upon the pintle-shaft as soon as the forward pressure is relaxed, thus affording a slight clearance of the door from the shell in its rotation. Fourth, by reason of the fact that the pintle d stands within larger holes or slots in the door D, and of the provisions for moving the door powerfully forward after it is in the closed position, I am able to allow of the forward motion in securing, and of the backward motion in opening, while at the same time I turn the door with facility and without resistance. Fifth, by reason of the fact that the door D is provided with a stout bail, D^1, which completes its spherical contour while leaving the back mainly open, and that the cavity in the back of the shell C is provided with a strong backing-piece, C′, having an outline adapted to match thereto, I am able to guard the door very efficiently against being forced inward by hydraulic pressure or otherwise, without interfering with the capacity of the door for revolving or greatly incumbering the available space for books and valuables. Sixth, by reason of the flattened form of the front of the door, as shown, I am able to allow the end of the shaft E to project and remain projecting sufficiently to allow the works of the safe to be operated from the outside without striking the edge of the shell or in any manner interfering with the motion of the door. It also allows the projection of as many small knobs as may be required to operate one or a number of dial-locks or analogous locking means.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The spherical rotating door D mounted within the spheroidal shell C and adapted to protect the contents of the safe within surfaces which are everywhere spheroidal, and to expose them for convenient access by simply turning the door and its attachments, as herein set forth.

2. A spherical safe having a door released for opening by moving inward, substantially as and for the purposes herein set forth.

3. The pintle d, made in sections and fitting within the spherical door D, as shown, with the adjusting means d^2 for supporting the door therein, as herein specified.

4. The reciprocating movement of a safe-door forward and backward, in connection with a rotating or swinging motion thereof

when the door in opening moves within the main body or shell of the safe, substantially as specified.

5. The backing-piece C′ in the shell C, arranged and adapted to serve relatively to the bail D¹ on the revolving door D, as and for the purposes herein set forth.

6. The flattened or equivalent form of the door when mounted and operated as shown, and serving to allow the knobs or other projections to be seized and worked while within the sweep of the motion, as shown.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

WILLIAM CORLISS.

Witnesses:

CAMPBELL C. LIVINGS,

ARNOLD HOERMANN.