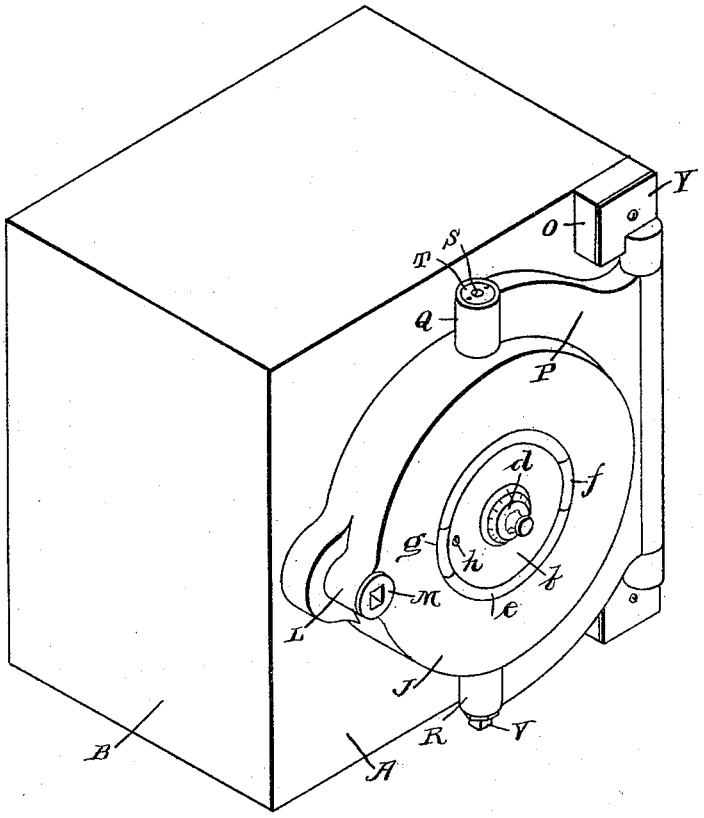
(No Model.) 2 Sheets—Sheet 1.

P. F. KING.

BURGLAR PROOF SAFE.

No. 457,122. Patented Aug. 4, 1891.

Fig. 1.



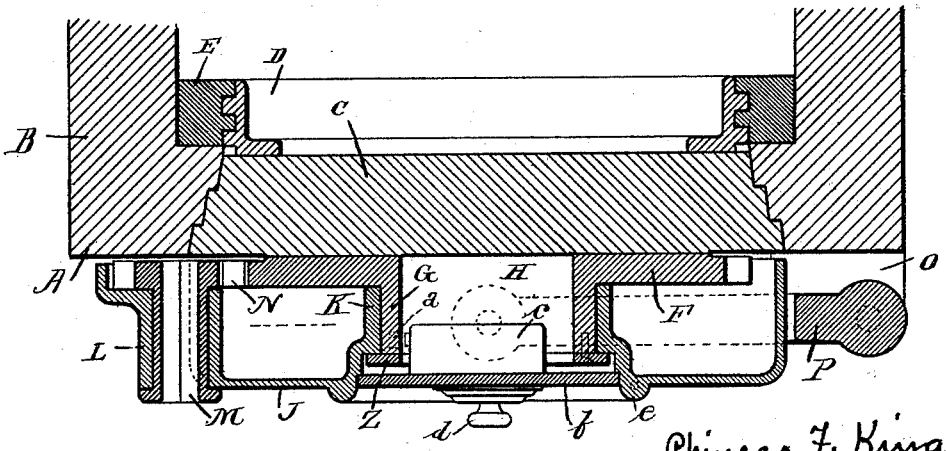


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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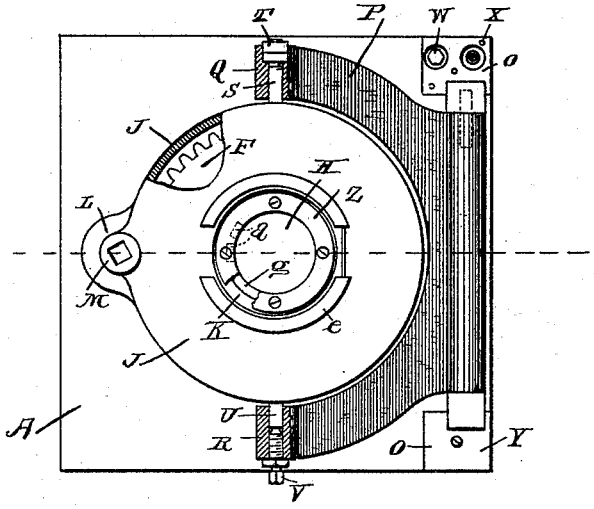
Fig. 3.



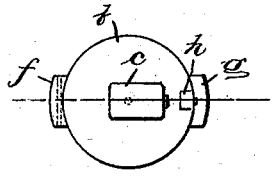


Fig. 4.

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UNITED STATES PATENT OFFICE.

PHINEAS F. KING, OF CINCINNATI, OHIO, ASSIGNOR TO THE MOSLER BANK SAFE COMPANY, OF SAME PLACE.

BURGLAR-PROOF SAFE.

SPECIFICATION forming part of Letters Patent No. 457,122, dated August 4, 1891.

Application filed February 4, 1891. Serial No. 380,205. (No model.)

To all whom it may concern:

Be it known that I, PHINEAS F. KING, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Burglar-Proof Safes, of which the following is a specification.

Some features of my present improvements in burglar-proof safes are applicable to such safes generally; but the invention has been devised with special reference to that class of burglar-proof safes in which the door is circular and held in closed position by an interior screw, such safes being commonly known as "screw-door" safes. When such a door is screwed home, and when a time-lock inside the safe locks the door against being unscrewed, the result is an air-tight safe having no external communication with its interior lock; but in such safes, while the interior time-lock, completely insulated from external communication, is depended upon to furnish the lock security when the safe is under full guard, it is often desirable to provide for temporarily locking the safe. Such temporary locking need not be especially burglar-proof, as its main intention is to guard against unauthorized meddling — as, for instance, when a bank-safe is temporarily closed during business hours. Such temporary locking will be referred to as the "day-locking," as distinguished from the full guard which is given by the action of the time-lock at night. Again, in the use of time-locks it is quite usual to so set them that they will go into action at a given hour in the evening—say six o'clock—and it may be that the safe is closed and deserted at four or five o'clock. In such case the day-locking is depended upon to guard the safe till the hour of duty of the time-lock arrives. The day-locking mechanism should have three conditions, namely: first, that of complete unlocking; second, that of complete locking so far as the day-lock is concerned, but of such nature that the time-lock cannot go into action and accidentally make day-locking too permanent, and, third, complete locking of such nature that the time-lock can perform its full duty when its hour of duty arrives.

My present improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a safe exemplifying my improvements; Fig. 2, a horizontal section through the front wall and door of the safe in a plane cutting the center of the circular door; Fig. 3, a front view, the hinged plate or door which carries the day-lock being entirely removed, vertical sections appearing at a portion of the rim of the gear-case and at the arm-journals of the crane, the cover-plate being also omitted from the upper hinge-block; and Fig. 4 a view of the back of the plate or door which carries the day-lock.

In the drawings, A indicates the front of the safe; B, the side walls; C, the circular door, provided with peripheral steps and fitting into the circular stepped jamb of the safe front; D, the usual screw firmly secured to and forming a part of the door; E, the usual nut, fitting this screw and secured to and forming a part of the front wall of the safe; F, a spur-gear rigidly secured to the outer face of the circular door; G, a large hollow journal projecting outwardly at the center of the spur-gear and door; H, the cavity or hollow of this journal open at the front; J, a disk-like case inclosing the spur-gear and completely covering it, the open back of this case coming near the front face of the door; K, a bearing projecting inwardly from the front of the case and engaging the central journal G of the spur-gear; L, a pinion-bearing mounted upon or formed at the periphery of the case; M, a pinion-spindle journaled in this bearing and adapted to be turned by some suitable implement, preferably a removable plug wrench or crank; N, a pinion on the inner end of this spindle engaging the spur-gear; O, a hinge-block, secured one at the upper and one at the lower corner of the safe at one side of the door, these blocks projecting outwardly from the safe to furnish bearings for a crane-hinge; P, an integrally-formed bifurcated crane, pivoted to the hinge-blocks and having its arms extending freely around the periphery of the case to points thereon above and below the center of the case; Q, a bearing formed at the extremity of the upper arm of the crane; R, a similar bearing on the lower arm; S, a trunnion secured in and projecting upward from the case and journaled in the bearing Q and projecting through that bearing; T, lock-

nuts on the trunnion S, over the bearing Q; U, a trunnion projecting from the case downwardly into bearing R; V, a set-screw screwed upward in bearing R and forming a step for the lower trunnion; W, bolts securing the hinge-blocks O to the front of the safe, these bolts having preferably their heads let into counterbores in the faces of the blocks and having their bodies fitting loosely through their holes in the blocks, whereby the blocks would be capable of a slight amount of movement transversely to the bolts; X, dowel-pins engaging the hinge-blocks and safe front and securing the blocks against any transverse shifting on the safe front; Y, mask-plates secured against the outer faces of the hinge-blocks and covering the bolts W; Z, a flange bolted against the outer end of the journal G of the spur-gear, the outer projection of this flange engaging the front end faces of the case-bearing in which the journal is mounted, this case-bearing having a frontal counterbore or recess to receive the flange; *a*, a couple of mortises in the wall of the bore of the hollow journal of the spur-gear; *b*, a plate or door at and closing the front of this central recess or counterbore in the case, this door being hereinafter termed the "day-lock" plate; *c*, a combination-lock mounted on the back of the day-lock plate, the bolt of this lock being adapted to engage either of the two mortises *a*; *d*, the knob of this combination-lock, disposed at the center of the outer face of the day-lock plate; *e*, a circular bead margining the facial recess or counterbore in the case around the day-lock plate, and having at opposite sides gaps to receive intermembering portions formed upon the day-lock plate; *f*, one of these intermembering portions of the bead formed upon the day-lock plate and engaging one of the gaps in the bead and pivoted therein on a hinge-pin; *g*, a similar bead portion on the day-lock plate to fill the other gap in the bead, and *h* a small lock on the day-lock plate to serve in locking it in closed position.

It is to be understood that the engagement of the circular door with the safe-front and its mode of operation and its mode of securing by the time-lock will be as usual, and it will be presumed that the reader of this specification is familiar with the ordinary construction of screw-door safes, and that the present description may therefore in its particularity be limited to novel points.

If pinion N be turned, the spur-gear and the door will be rotated and will unscrew and come out from the opening in the safe front. During this operation the door is supported by the central bearing K in the case, and the case is supported by the crane. As the door starts to move outwardly its movement is an arc of which the crane is the radius. The parts are so proportioned and arranged that when the door is home this radius is at right angles to the axis of the door, or, in other words, that the axis of the door is tangent to the crane arc. As the door starts to open, its axis tends to move toward the fixed axis of the crane a distance equal to the versed sine of the arc movement; but the disposition just mentioned is such that the versed sine corresponding to the first increment of door motion is of infinitely small value. As the door first leaves its seating, then the value of the versed sine of the arc of movement becomes greater; but, owing to the tapering of the door-steps, the door then has capacity for a sufficient amount of transverse motion to compensate for the versed sine of the arc; but it is highly important that the disposition of the main hinge-pivots of the crane should be exactly right. This is secured by means of the adjustable hinge-blocks. The door being seated home, with the bolts W not screwed up tight, the blocks may be adjusted to exactly the right position and then the bolts screwed firmly home. Tests of door-movement may then be made and the blocks readjusted, if required. Then the dowel-holes for the pins X are drilled and the pins are put in place, and thereafter it may be insured that the main hinge of the crane is properly located. The shifting of the hinge-blocks also permits them to be adjusted vertically to properly clamp the crane between them. The mask-plates Y cover the block-bolts.

The adjustment of the hinge-blocks provides for the sidewise adjustment of the axis of the door, and this adjustment is not liable to future disturbance by wear; but the door must also be vertically adjusted with great accuracy to correspond with the door-opening, and this adjustment is liable to disturbance by wear. Therefore means must be provided for raising the door, the tendency of the wear being downward. This adjustment is made by means of the set-screw V, which raises the case, and consequently the door in the crane. It is desirable that the weight of the heavy door be equally borne by both arms of the crane. Therefore, instead of carrying the load entirely on the set-screw V, the lock-nuts T may be adjusted to bring the trunnion S under tension and impose a share of the load on the upper arm of the crane.

The case J completely incloses the spur-gear and pinion, and the case would have no other offices than those described were it not for the fact that some provision for temporary locking is desired. Day-lock plate *b* may be looked upon as a rigidly-supported portion of the front of the case. Therefore as the spur-gear and door rotate the combination-lock *c* is stationary. The bolt of the combination-lock may be thrown into either of the mortises *a*. One of these mortises is in such position that the bolt of the combination-lock will enter it only when the door is screwed completely home and ready to come under the control of the time-lock inside the safe. The other mortise is earlier in time, corresponding to the position of the door

when it is not screwed so completely home as to come under the control of the time-lock. When the bolt of the combination-lock is thrown into either of these mortises, it prevents the rotation of the door and therefore locks the door with as much security as is consistent with a lock exterior to the safe. If temporary day-locking is desired, not wishing the time-lock to enter upon its duty, the door is screwed up and the bolt of the combination-lock is thrown into the earlier mortise. The door may then at any time be unscrewed by retracting the bolt of the combination-lock; but if I wish to put the door under the control of the time-lock I screw it completely home and throw the bolt of the combination-lock into the later mortise. If the hour of duty of the time-lock is already at hand the time-lock will go on duty and the door cannot be again opened till the time-lock goes off duty. If the duty-hour of the time-lock has not arrived the time-lock will go on duty when the hour does arrive, the door in the meantime being under the guard of the combination-lock.

The removability or opening of the day-lock plate permits proper access to the combination-lock for the purpose of changing its combination. The day-lock plate may be swung open and the desired changes made. The small lock *h* guards against unauthorized meddling when the combination-lock is off duty, and when the combination-lock is on duty then the day-lock plate is held to place by the combination-lock as well as by the small lock. As the combination-lock is an agent to resist the rotation of the door it follows that its supporting-plate must be firmly attached to the case. The bead portions *f* and *g*, closely fitting the gaps in the bead of the case, give to the day-lock plate a firm support against rotation without imposing strains on the small lock or on the hinge-pin which unites the day-lock plate to the case.

I claim as my invention—

1. In a safe, the combination, substantially as set forth, of a circular door provided with a journal, a bearing for said journal, a bifurcated crane connected with said bearings by trunnions, and two independent hinge-blocks secured to the safe-body and independently adjustable thereon and engaged by said crane.

2. In a safe, the combination, substantially as set forth, of a circular door provided with a journal, a bearing for said journal, an integrally-formed crane-plate hinged to the safe and presenting a vertical trunnion-bearing above and one below said journal, a trunnion connected with said journal-bearing and projecting up through and beyond the upper trunnion-bearing of the crane and having a suspension-nut over said trunnion-bearing, a trunnion connected with said journal-bearing and projecting downwardly part way into the lower trunnion-bearing of the crane, and an adjustable step-screw projecting upward into said lower trunnion-bearing.

3. In a safe, the combination, substantially as set forth, of a circular door, a journal on the door, a disk-like case in front of and covering the door and having a bearing for said journal, and a crane hinged to the safe and trunnioned to said case.

4. In a safe, the combination, substantially as set forth, of a circular door, a gear and journal on the door, a disk-like case in front of and covering the gear and having a bearing for said journal and having also a pinion-bearing, a pinion journaled at said pinion-bearing, and a crane hinged to the safe and trunnioned to said case.

5. In a safe, the combination, substantially as set forth, of a circular door, a crane hinged to the safe and supporting said door free for rotation, and a lock supported against rotation by the crane and arranged to lock the door against rotation in the crane.

6. In a safe, the combination, substantially as set forth, of a circular door having a hollow journal, a crane hinged to the safe and supporting the door free for rotation on said journal, a plate supported against rotation by the crane and closing the front of said hollow journal, and a lock mounted on the back of said plate within the hollow journal and arranged to lock said journal against rotation.

7. In a safe, the combination, substantially as set forth, of a circular door having a journal, a bearing for said journal, a crane hinged to the safe and supporting said bearing, a non-rotary plate secured to the front of said bearing and arranged to open therefrom to expose the back of the plate, and a lock mounted on the back of the plate and arranged to lock the journal against rotation in the bearing.

8. In a safe, the combination, substantially as set forth, of a circular door having a journal, a bearing for said journal provided at its front end with an annular bead having two gaps, a plate closing the front end of said bearing and having bead portions to fill said gaps, a lock mounted on the back of said plate and arranged to lock said journal against rotation in said bearing, and a crane hinged to the safe and supporting said bearing.

9. In a safe, the combination, substantially as set forth, of a circular door having a journal provided with a mortise, a bearing for said journal, a crane supporting said bearing, a non-rotary plate at the front end of said bearing, and a lock mounted on said plate and arranged to lock into said mortise to prevent rotation of the journal in or separation of the plate from the bearing.

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