4 Sheets—Sheet 1.

A. W. O. KLEINAU.

LOCKS FOR DOORS, &c.

No. 184,875. Patented Nov. 28, 1876.

Fig. 1.

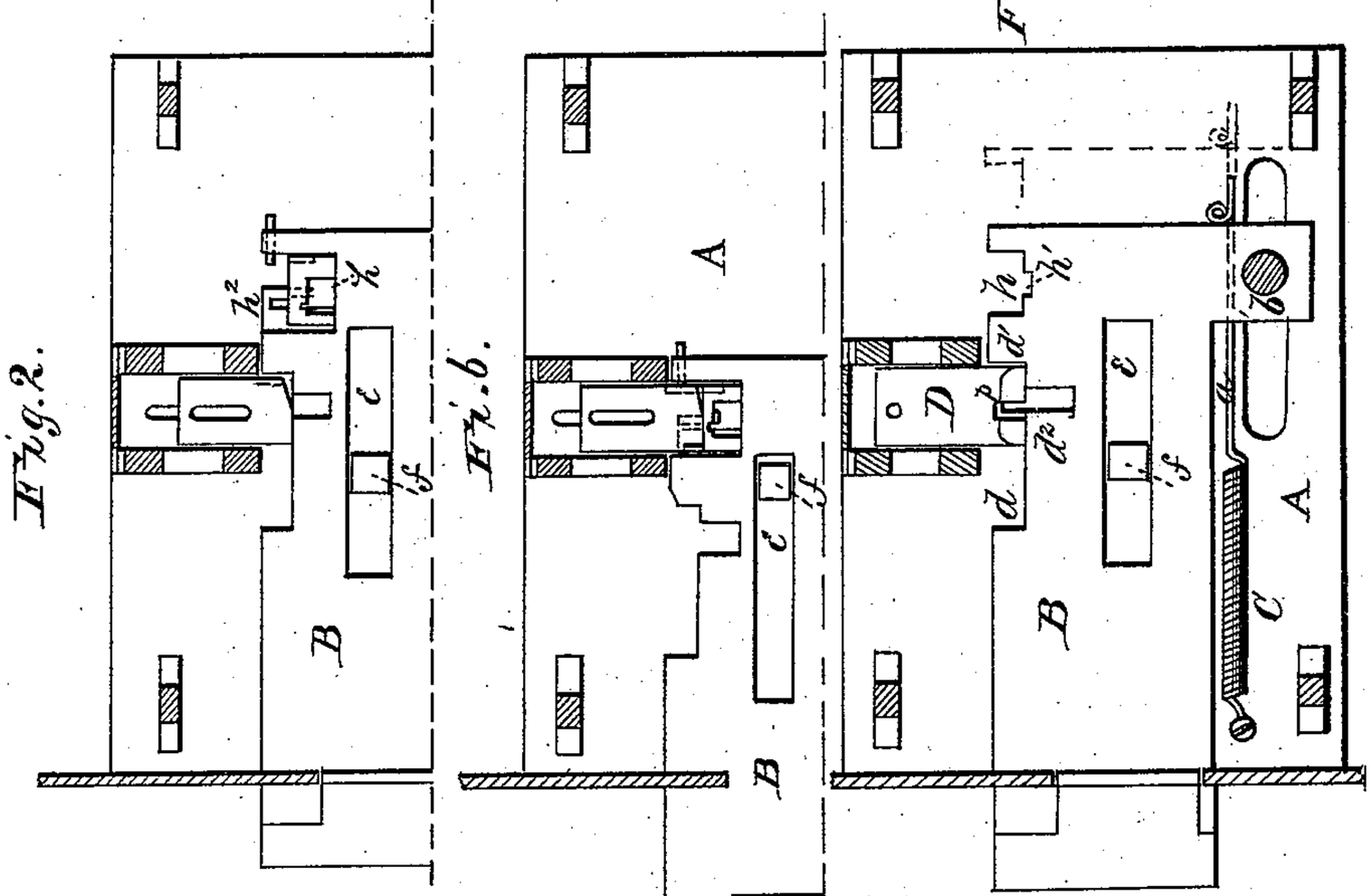


Fig. 2.

Fig. 3.

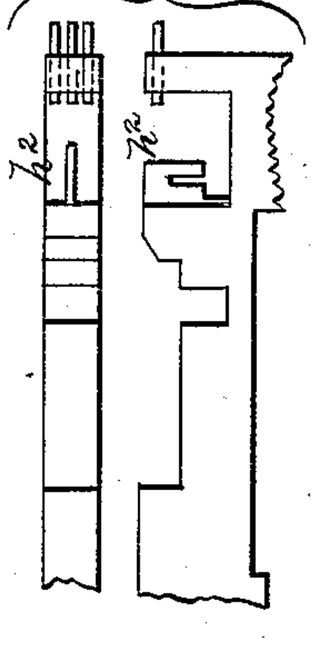


Fig. 4.

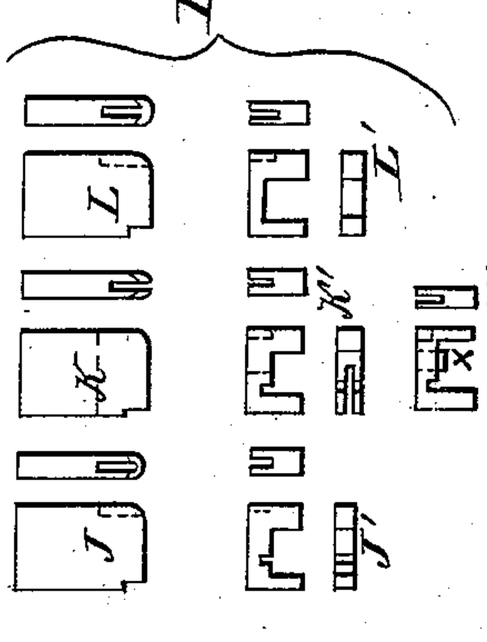


Fig. 5.

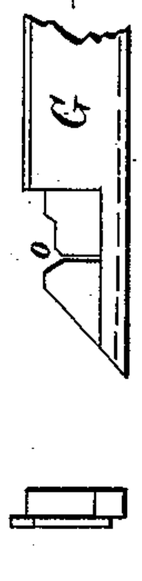


Fig. 6.

Fig. 7.

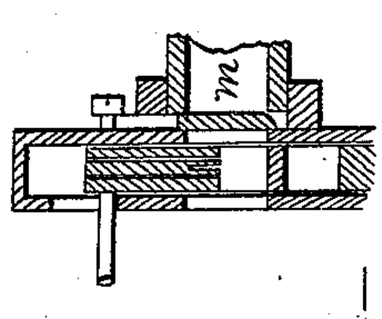
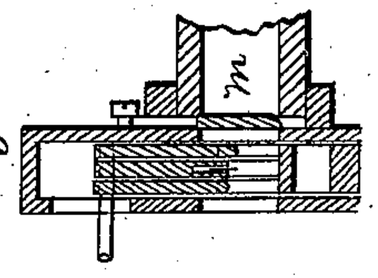


Fig. 8.



Witnesses.

Aug. Georg Hermann Beeck

H. R. Hamer

Inventor

August W. O. Kleinau

4 Sheets—Sheet 2.

A. W. O. KLEINAU.

LOCKS FOR DOORS, &c.

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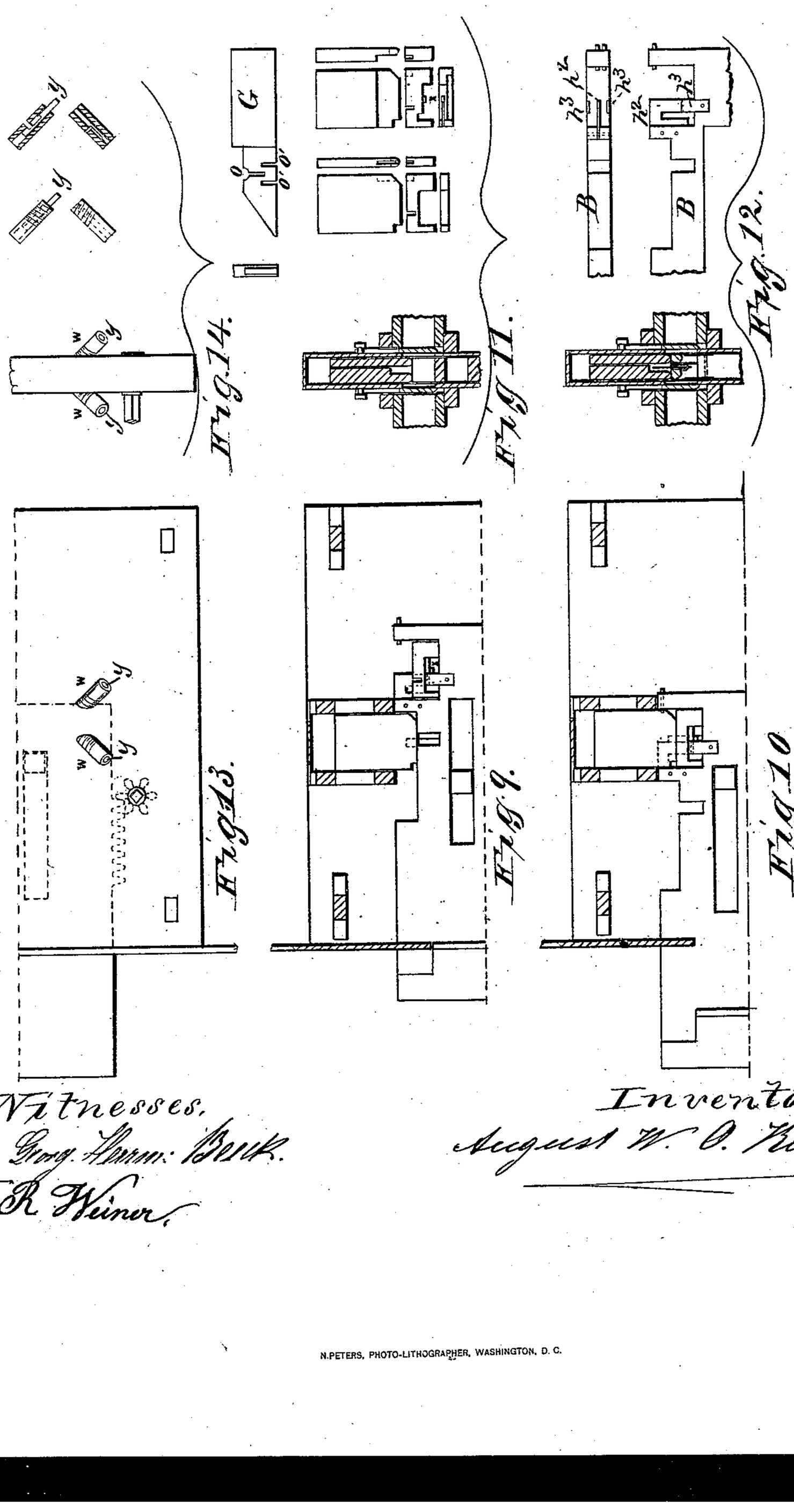


Witnesses.
Aug. Groy. Herm. Berk.
T. R. Weiner.

Inventor
August W. O. Kleinau

4 Sheets—Sheet 3.

A. W. O. KLEINAU.

LOCKS FOR DOORS, &c.

No. 184,875. Patented Nov. 28, 1876.

Fig 14.

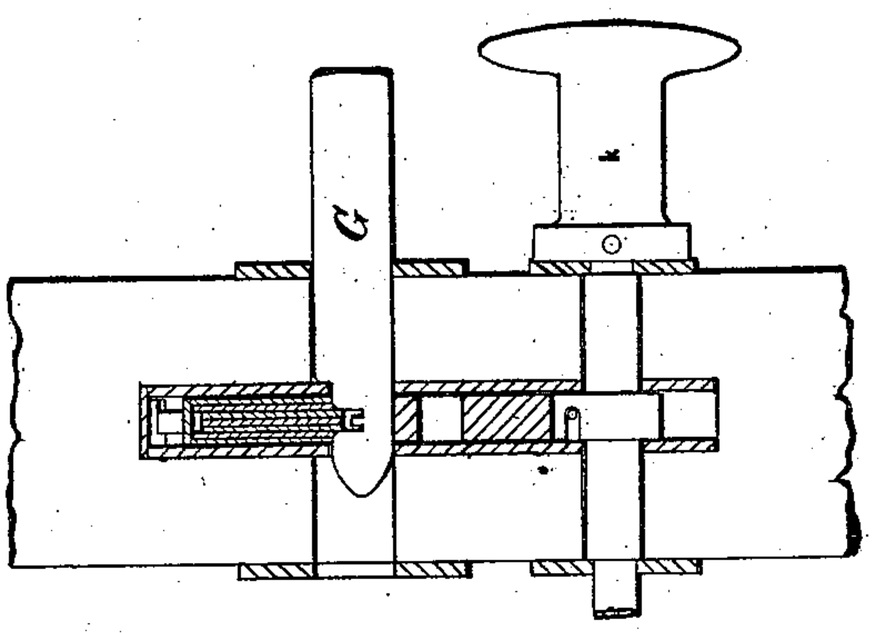


Fig 18.

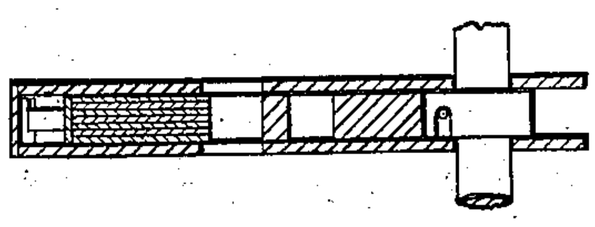


Fig 16.

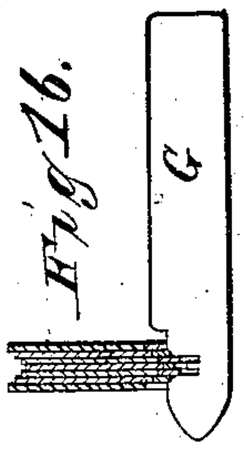


Fig 15.

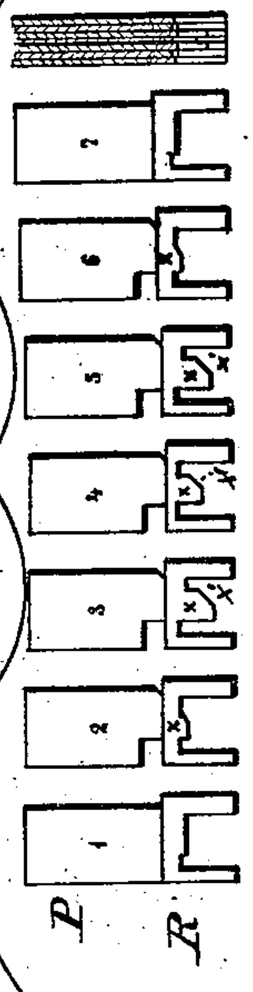
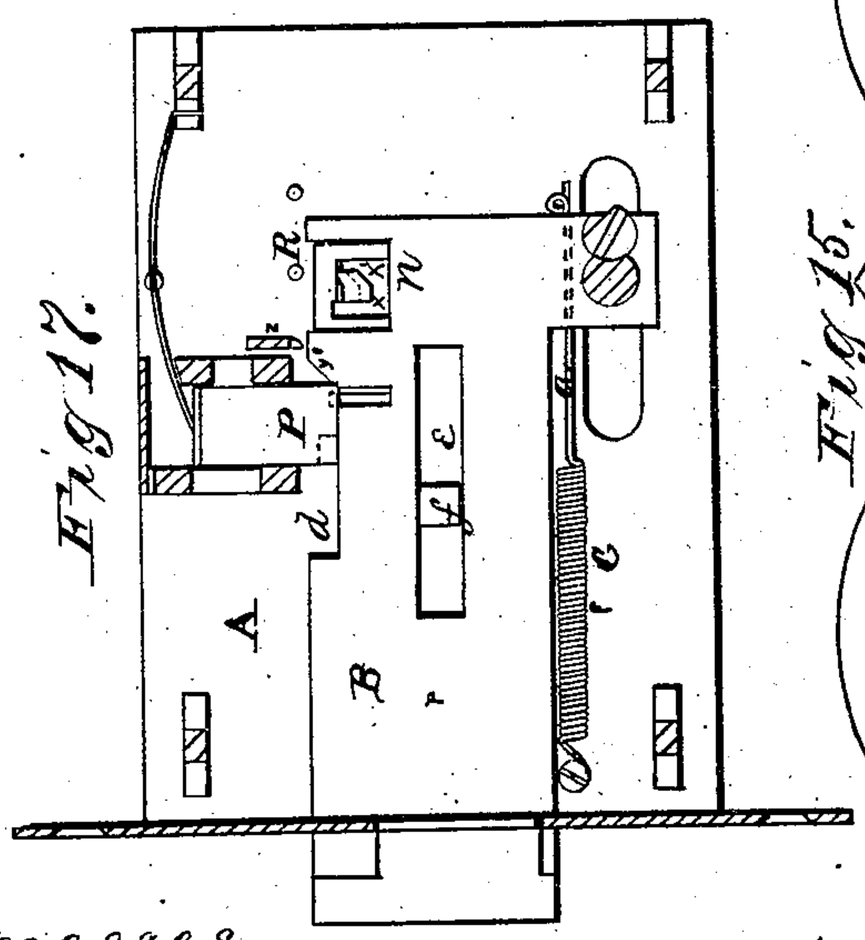


Fig 17.



Witnesses.
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4 Sheets—Sheet 4

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LOCKS FOR DOORS, &c.

Patented Nov. 28, 1876.

No. 184,875.

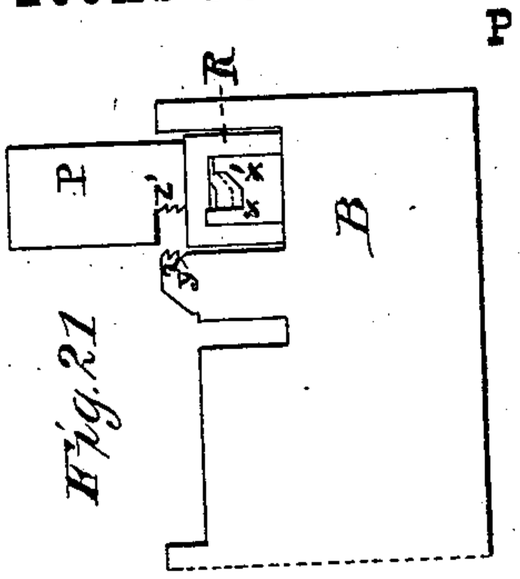

Fig. 21

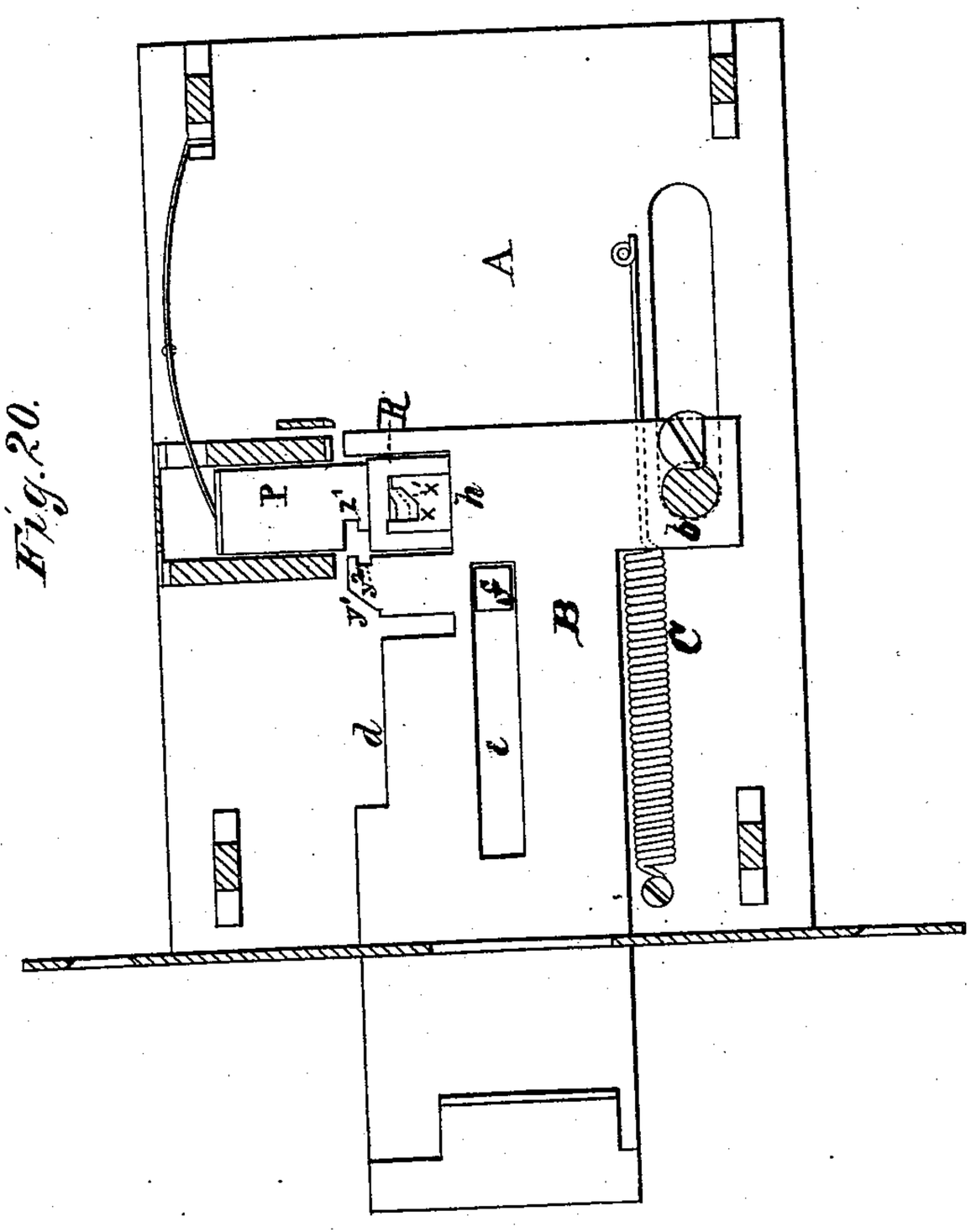

Fig. 20.

Witnesses.
Paul Müller
Schneider

Inventor.
August Wilhelm Otto Kleinau

UNITED STATES PATENT OFFICE.

AUGUST W. O. KLEINAU, OF HAMBURG, GERMANY.

IMPROVEMENT IN LOCKS FOR DOORS, &c.

Specification forming part of Letters Patent No. **184,875**, dated November 28, 1876; application filed November 4, 1876.

To all whom it may concern:

Be it known that I, AUGUST W. O. KLEINAU, of the city of Hamburg, Germany, have invented certain Improvements in Locks, of which the following is a specification:

The nature of my invention relates to the construction and arrangement of a lock; and consists, more particularly, in the bolt having recesses and a slotted tongue, in combination with a series of gravitating-tumblers partly in, and acting in, combination therewith; and in certain appliances whereby the bolt cannot be thrown out of place by the overturning of the lock, as when it is used on a trunk or box; and in the novel combination and arrangement of the several parts, whereby the lock will operate very effectively, and also cannot be easily picked, all as will hereinafter be more fully set forth.

In the accompanying drawing, A represents the lock-case, and B is the bolt, which also acts as a latch. C is a spiral spring, fastened at one end to the lock-case, and the other end *a* passing through a projection on the bolt B. The bolt B is provided with a slot, *e*, and a lug, *f*, on the case projects into the same to limit the movement of the bolt. In the upper edge of the bolt are recesses *d*, *h*, and h^1, as shown in Figure 1, and as fully described in another application for patent, filed by me November 24, 1875. In Figs. 2 to 8, inclusive, I have shown one form of my lock in which three tumblers are used, each tumbler being made in two parts, and these I have lettered, respectively, J J′, K K′, and L L′. The lower parts J′ K′ L′ of the tumblers remain in the recesses *h* in the bolt, and move with it backward and forward. These tumblers have to be lifted to the height that their horizontal planes of contact of the two parts will be even with the top of the bolt. If any one of the tumblers is insufficiently raised, the upper part thereof prevents the bolt from moving; and if either tumbler is lifted too high the lower part thereof will act in the same manner. G represents the key, consisting simply of a flat piece of metal, beveled at its forward end, as shown in Fig. 5. This key is formed with a slot, *o*, and the bolt has in the recess *h* a tongue, h^2, of the form shown in Fig. 3. The key, by its introduction into the lock, lifts the tumblers, and at the same time assumes such a position that the slot *o* corresponds with the tongue h^2. The bolt has now to be moved a little by one of the knobs attached to the spindle *b*, passing through a part of the bolt, the inner part of the tongue then passing through the slot in the key. After this the key can be withdrawn through a slot made in said tongue, whereupon the bolt may be pushed back altogether. The lower part K′ of the center tumbler may be provided with a small tongue, *x*, as shown in Fig. 4, which tongue catches in the slot of the key, thus preventing the withdrawal of the key until the bolt is partially moved. The tumblers have a small square notch at their lower left-hand corners, which prevents their being held up by any pressure of the bolt, if an attempt is being made to pick the lock.

In Figs. 9 to 12, inclusive, I have represented the bolt B provided with two upward-projecting tongues, h^3 h^3, in addition to the tongue h^2, whereby the key-hole is covered completely at a certain point of the motion of the bolt, so that the possibility of keeping the tumblers lifted by any foreign instrument is entirely precluded. In this case the key G has one slot, *o*, from the top, and two slots, *o′* *o′*, from the bottom, corresponding with said tongues, as shown in Fig. 11.

It will be noticed that in the construction of this lock I dispense entirely with the use of springs, except the spiral spring C, and this is never in play except when the bolt is used as a latch. It will also be noticed that the lock can be operated by the key from either side, thus making the lock applicable for ordinary door-locks.

In case the lock is to be applied to portable boxes, it is necessary to provide some means to prevent the bolt from being released by turning the box bottom upward. For that purpose three small tubes, *w*, are screwed into the side plates of the lock, as shown in Figs. 13 and 14. In each of these tubes is a loose pin, *y*, which is prevented from falling out by a set-screw or other means; but the pins may partly enter the interior of the lock. The tubes are all inclined downward, so that in the proper position of the lock the pins will all be in the tubes. In any other position of the

k, where the tumblers may drop out of the t, one or more of the pins will fall into a tch or hole in the bolt, or behind it, and event it from moving. A large series of uble tumblers may be used, as shown in gs. 15 to 19, inclusive, where seven are rep-sented, they being respectively marked 1, 3, 4, 5, 6, 7. In this case the tumblers 1 and are alike, 2 and 6 are alike, and 3 and 5 are ke, so as to allow the key to act in the same anner on either side of the lock. When the rts are in the position shown in Fig. 17 and is desired to lock the bolt, the key is intro-ced, which lifts the parts P of the tumblers, d the spiral spring C then shifts the bolt ghtly forward, and the parts P of the tum-ers slide up an incline, y^1, on the bolt. The y being now withdrawn, the bolt may be shed out by one of the knobs, the parts P the tumblers falling down on the parts R d detaining the bolt. In unlocking, the mblers 1 and 7 are raised by the key; the lt is then slightly moved backward, when e other tumblers will slide up on the key by eans of the incline x' on the tongue x of the mbler, and allow all the upper parts P of e tumblers to ride up on top of the bolt, and soon as the tongues x have passed the ey the parts R of the tumblers fall down gain, and the key can then be withdrawn and e bolt retracted. As a further security gainst opening this lock by means of a hook r other foreign instrument, I have added the evice shown in Figs. 20 and 21. In this case he bolt B has near the incline y^1 a small otch, y^2, and the parts P of the tumblers have orresponding projections or toes z', which en-er into said notch, if the bolt is pushed back efore the tumblers have been completely aised. A successive lifting of the tumblers vithout the pressure of the bolt on the same s impossible, and as, by this additional device, the very pressure of the bolt serves to keep the tumblers down, there is no possibility of lifting them successively by hooks or other foreign instruments.

In place of one notch and corresponding projection, a series of teeth on the bolt and tumblers may be used, as shown in Fig. 21. This device may be applied to the lock, no matter how many tumblers are used.

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

1. In a lock, the combination of the bolt, having recesses d h, and slotted tongue h^2, with a series of gravitating-tumblers, all substantially as and for the purposes herein set forth.

2. The tongue x in the part K′ of the tumblers, for engaging with the slot o and holding the key, substantially as herein set forth.

3. The tongues h^3 h^3 on the bolt B, in combination with the slotted tongue h^2 and the slots o o' in the key, substantially as and for the purposes herein set forth.

4. In combination with the gravitating-tumblers, the incline tubes w and loose pins y, substantially as and for the purposes herein set forth.

5. The combination of the bolt, provided with incline y^1 and one or more notches, y^2, with the gravitating-tumblers, provided with inclined tongues x and one or more projections, z', substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST WILHELM OTTO KLEINAU.

Witnesses:
PAUL MÖLLER,
G. SCHNEIDER, Jr.