

P. W. KINDLESPIRE & J. R. CANNAN.

LOCK.

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978,899.

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Fig. 1.

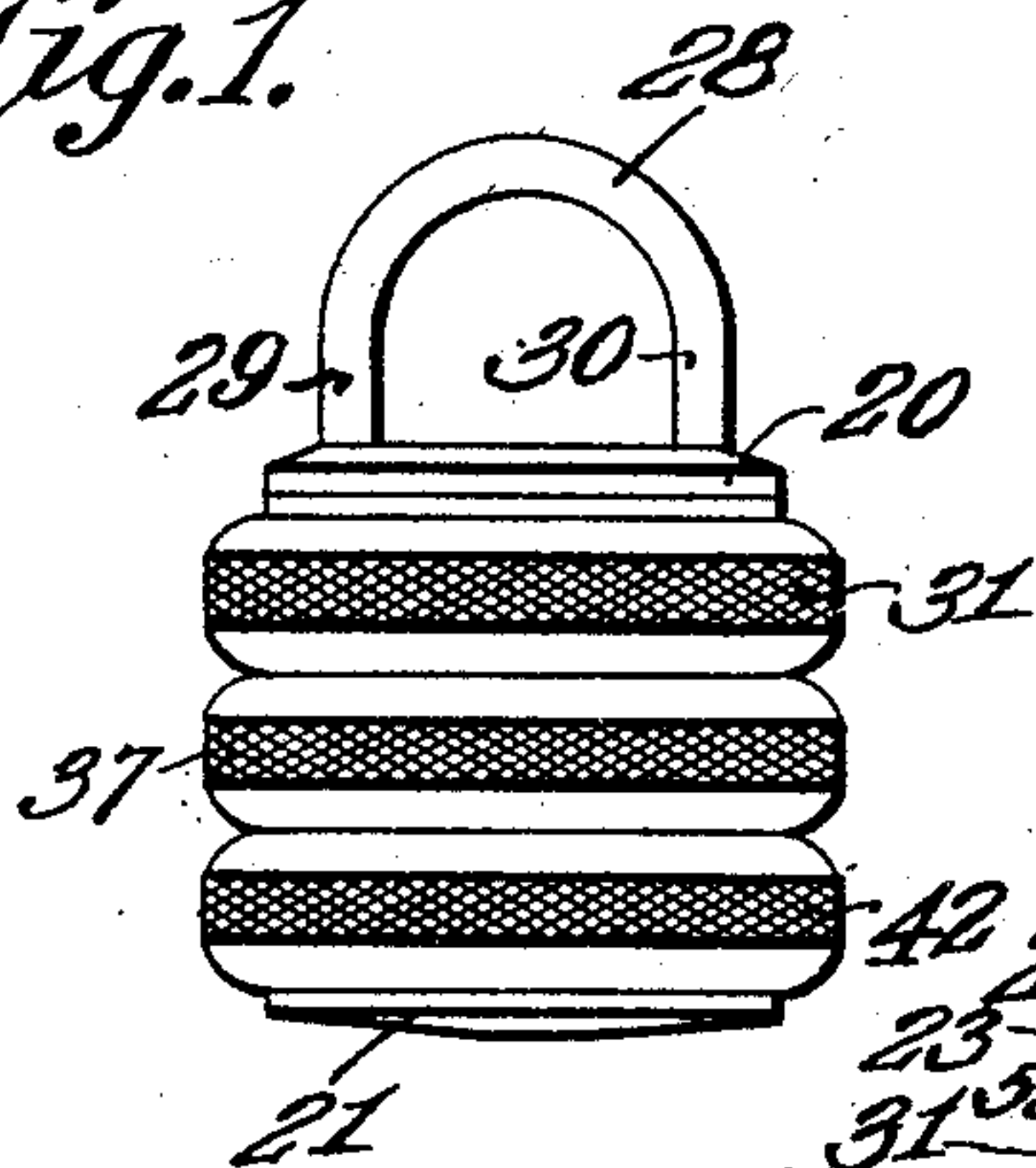


Fig. 3.

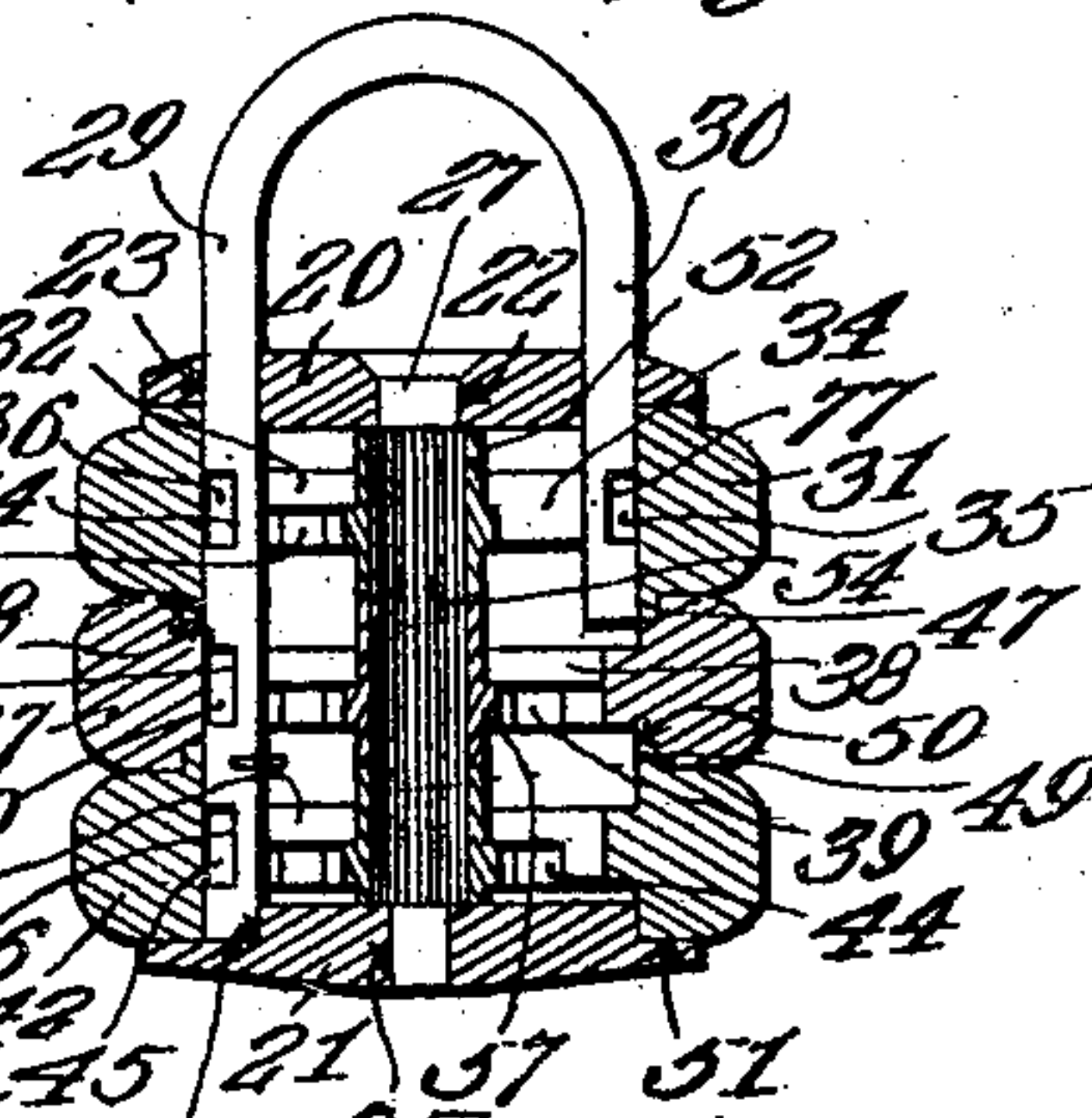


Fig. 2.

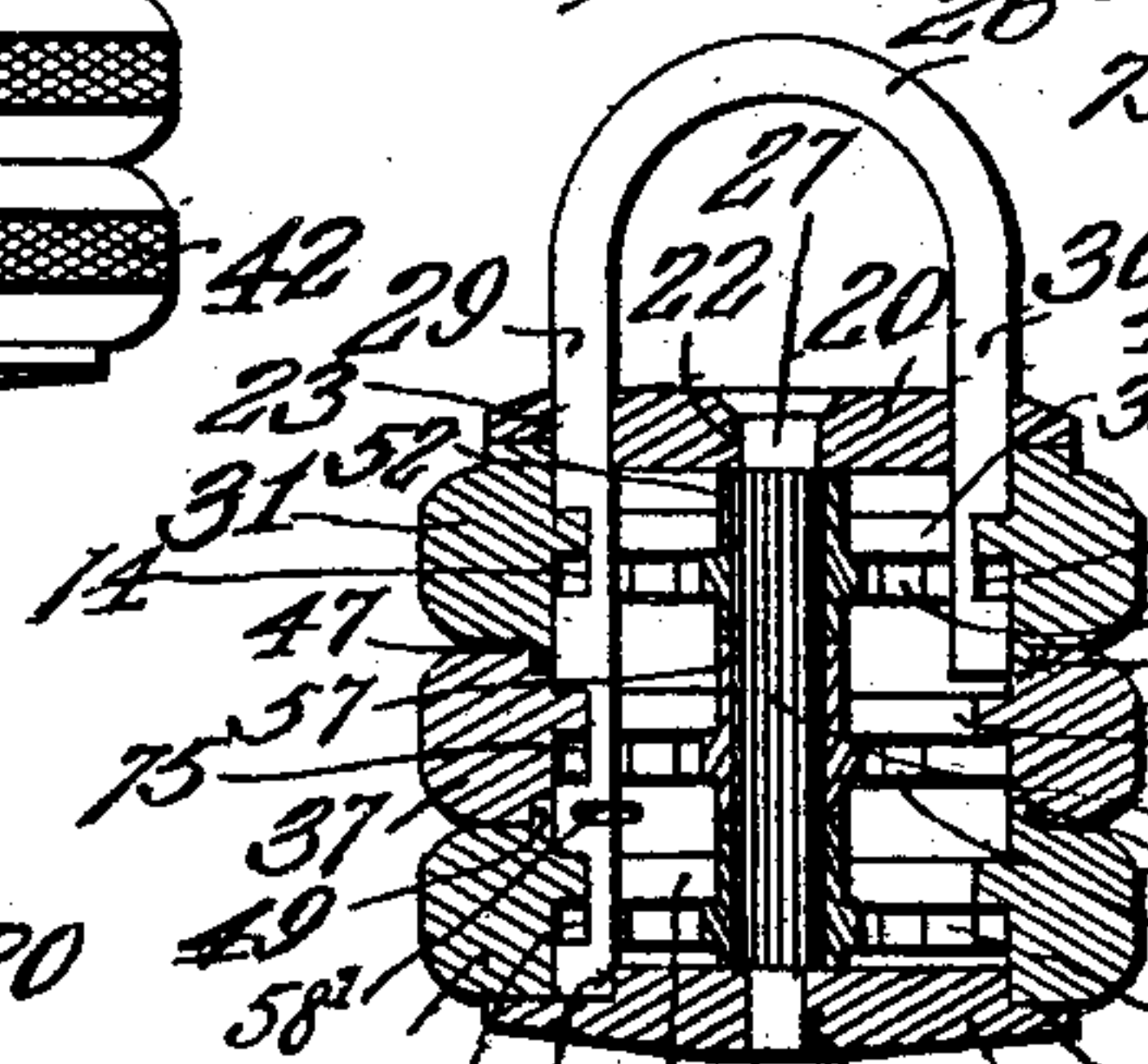


Fig. 4.

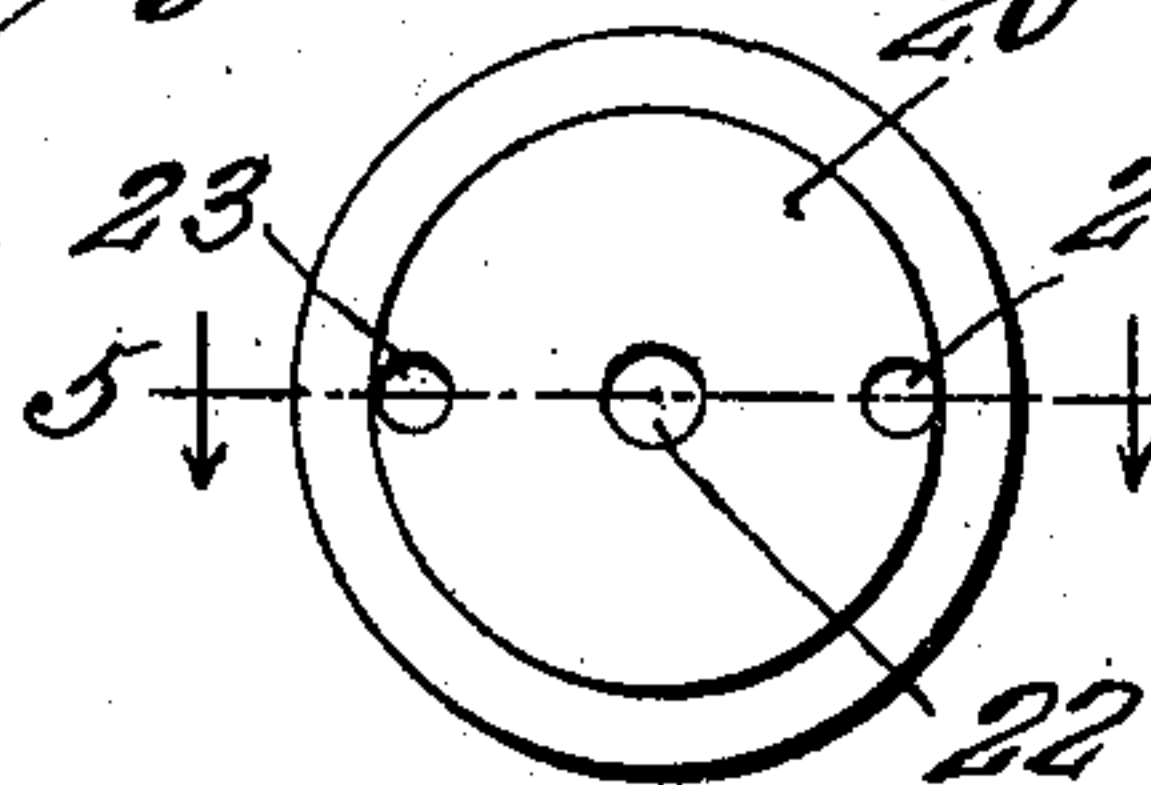


Fig. 8.

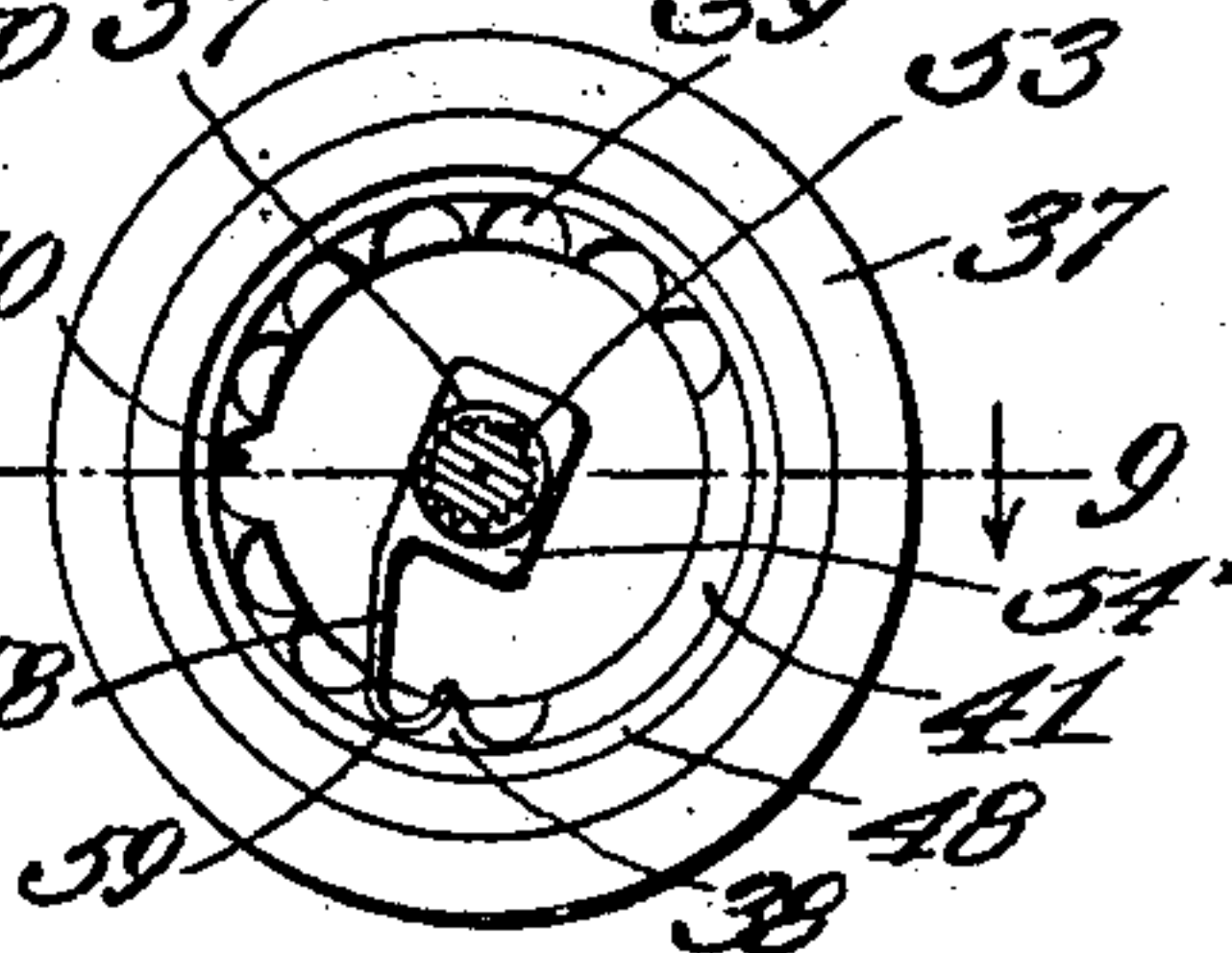


Fig. 5.



Fig. 6.

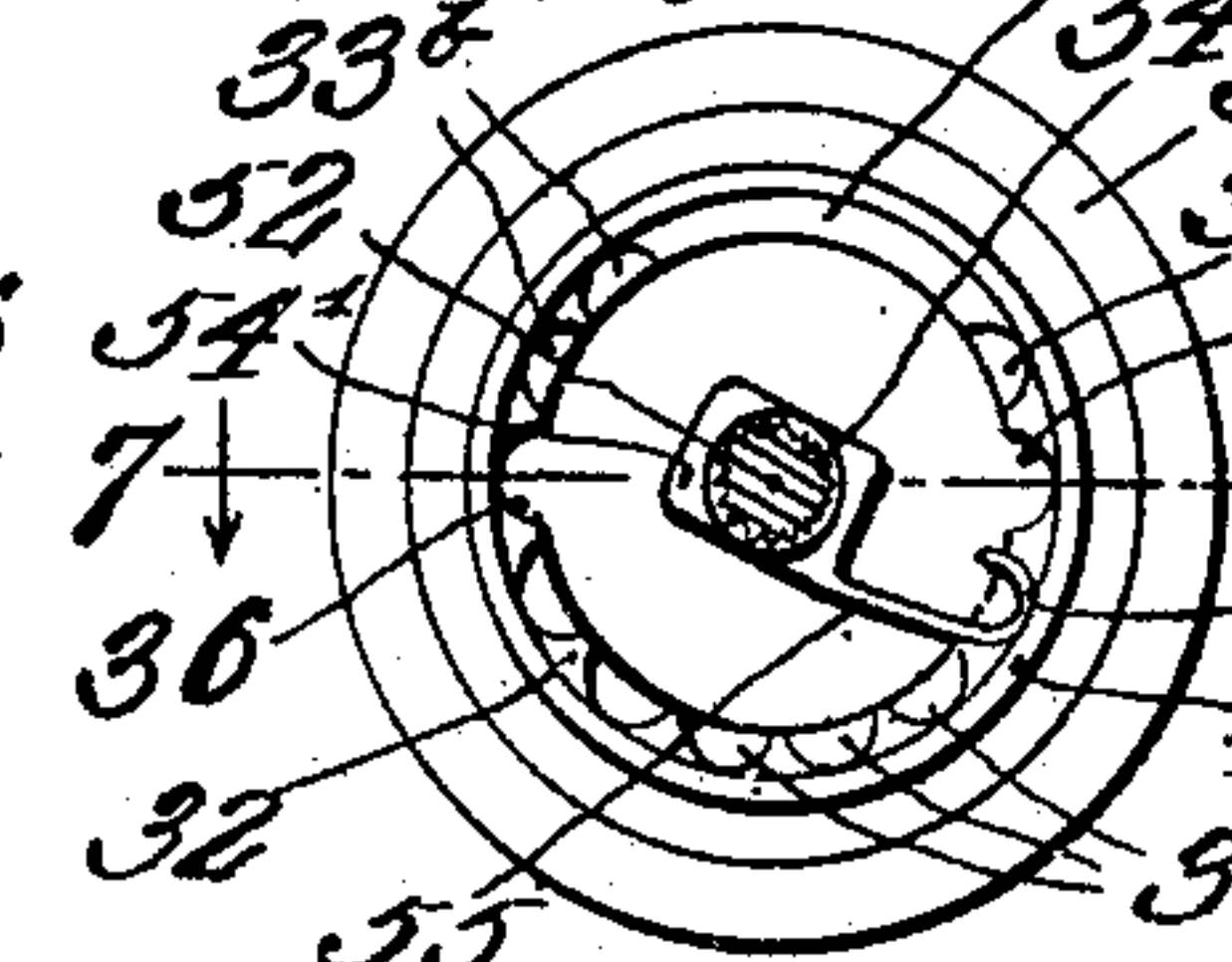


Fig. 9.

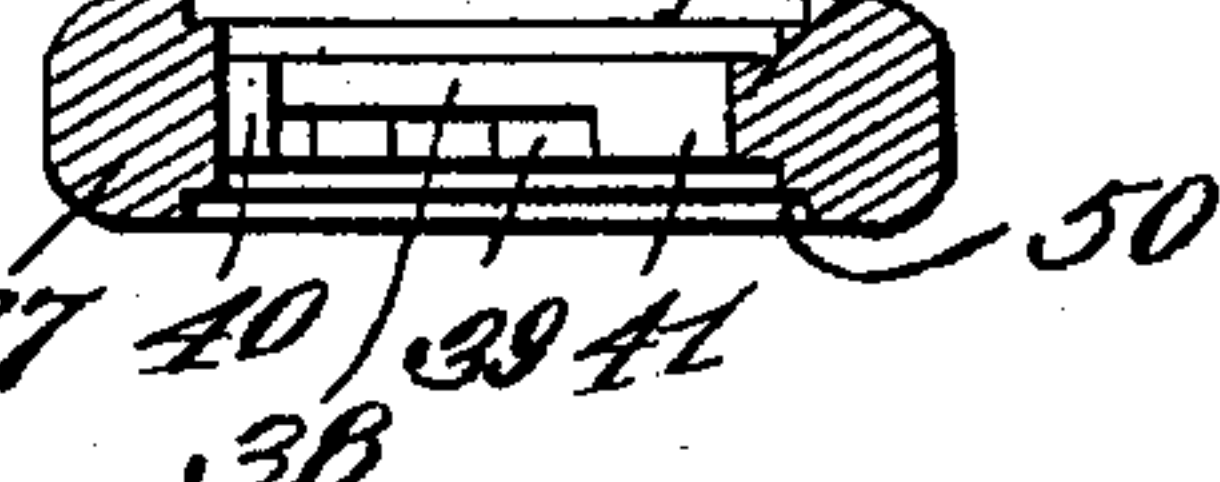


Fig. 10.

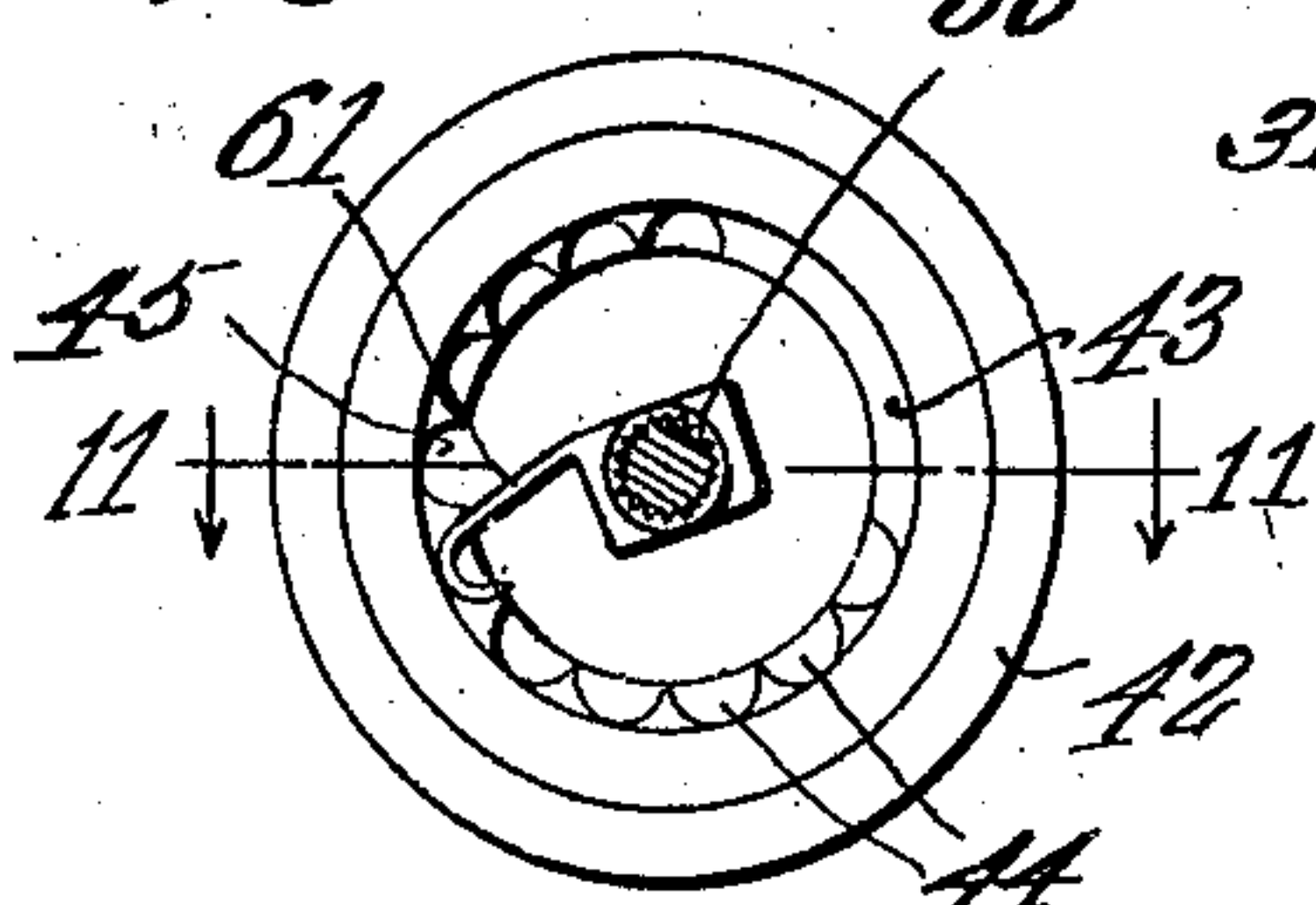


Fig. 7.

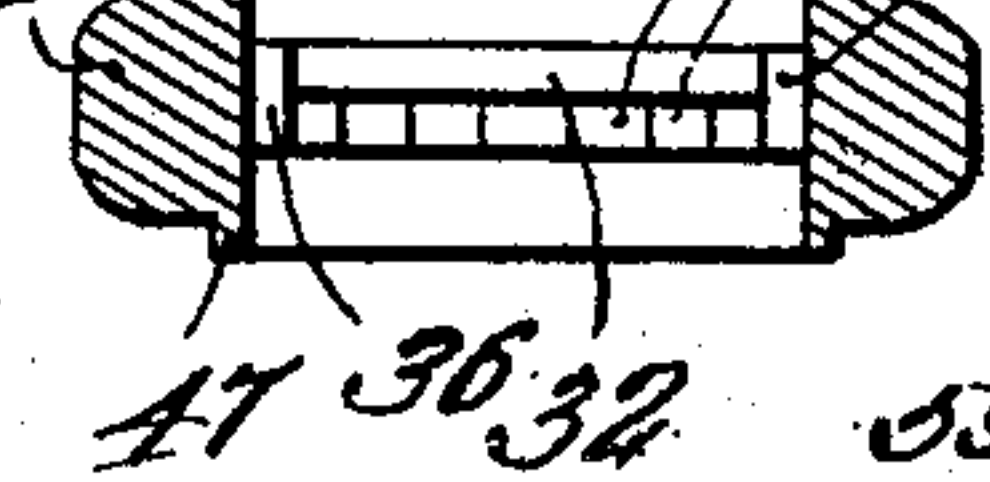


Fig. 12.

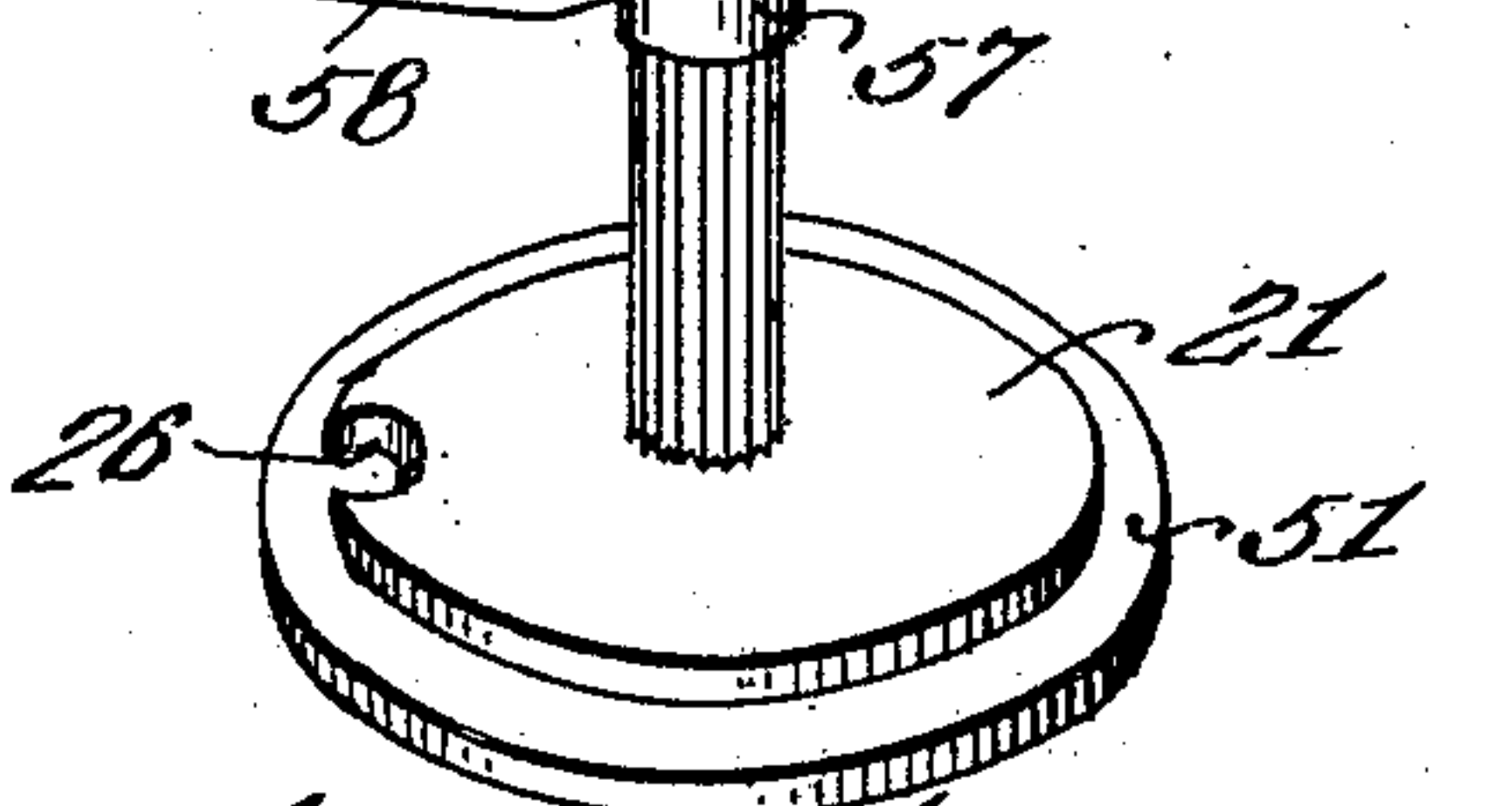
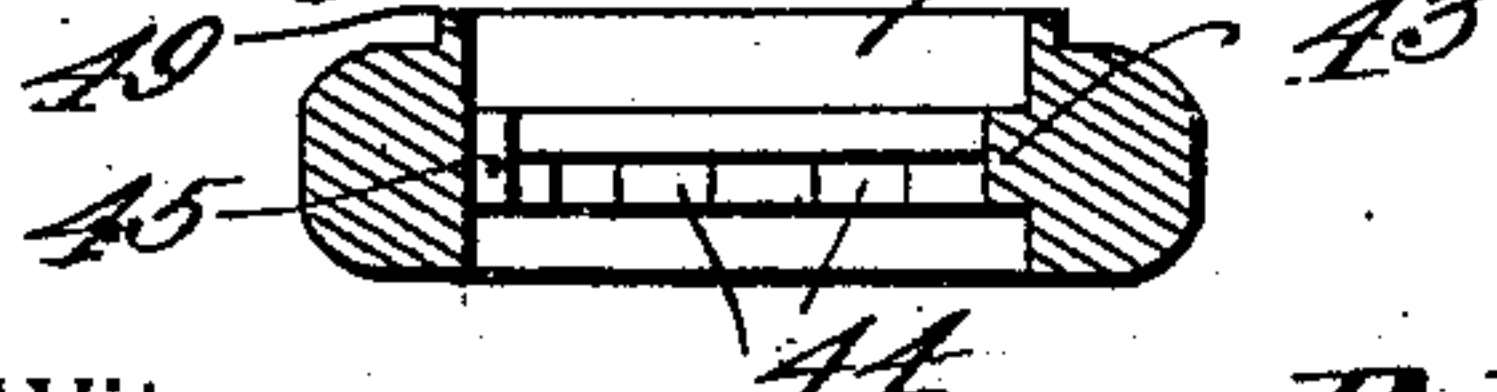


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

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LOCK.

978,899.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, PETER W. KINDLESPIRE and JAMES R. CANNAN, citizens of the United States, residing at Wapakoneta, in the county of Auglaize, State of Ohio, have invented a new and useful Lock, of which the following is a specification.

It is the object of the present invention to provide an improved lock of the permutation type.

It is one aim of the present invention to provide a lock of this type and class very simple in construction and embodying but a minimum number of lock rings which however are so relatively arranged that it will be as difficult to open the lock as if a greater number of such rings were employed.

It is a still further aim of the invention to provide a lock of this type devoid of either an inner or an outer casing, the lock rings and their related parts being assembled between spaced heads rigid at the ends of a connecting shank.

With the above and other objects in view, the invention consists in the general construction and arrangement of parts shown in the accompanying drawings, in which,

Figure 1 is a view in elevation of the lock embodying the present invention. Fig. 2 is a vertical sectional view, the locking rings being shown in position to prevent withdrawal of the shackle of the lock. Fig. 3 is a view similar to Fig. 2 but illustrating the rings so relatively positioned as to permit of the withdrawal of the shackle. Fig. 4 is a bottom plan view of the upper head of the lock. Fig. 5 is a vertical sectional view therethrough on the line 5—5 of Fig. 4. Fig. 6 is a bottom plan view of the upper one of the locking rings. Fig. 7 is a transverse sectional view therethrough on the line 7—7 of Fig. 6. Fig. 8 is a bottom plan view of the intermediate one of the locking rings. Fig. 9 is a transverse sectional view therethrough on the line 9—9 of Fig. 8. Fig. 10, is a bottom plan view of the lowermost one of the locking rings. Fig. 11 is a vertical transverse sectional view therethrough on the line 11—11 of Fig. 10. Fig. 12 is a perspective of one of the heads of the lock and several of the associated elements.

In the drawings, the upper head of the lock is indicated by the numeral 20 and the lower head by the numeral 21, the upper head being specifically shown in Figs. 4 and

5 of the drawing as having an axial opening 22 and diametrically oppositely located openings 23. The lower head of the lock is clearly shown in Fig. 12 of the drawings and is indicated by the numeral 21 and is formed axially with an opening 25 and to one side of the opening 25 and adjacent the periphery, with a seat 26 the function of which will be presently explained. A shank indicated by the numeral 27 is riveted at its ends to the heads 20 and 21 and serves to connect these heads in rigid spaced relation, it being understood that the ends of the said shank, at the time of being riveted to the head, are inserted through the openings 22 and 25 in the said heads 20 and 21 respectively.

From an inspection of Figs. 2 and 3 of the drawings it will be observed that when the heads are properly assembled with the shanks, one of the openings 23 will be directly in alinement with the seat 26 in the head 21 and the shackle of the lock, indicated by the numeral 28 and of U-shape with one arm shorter than the other, has its two arms inserted through the openings 23 in the upper head 20 and, when in locked position, has the end of its longer arm, indicated by the numeral 29, resting in the seat 26 in the lower head 21. At this point, it will be understood that when the shackle 28 is released, by the locking rings of the lock, in the manner to be presently explained, it may be withdrawn so that its shorter arm indicated by the numeral 30, will clear the upper head 20 and the shackle may then be swung around upon its longer arm 29 as a center, to permit of engagement of the shackle with the member to be locked. The uppermost one of the lock rings is clearly shown in Figs. 6 and 7 of the drawings as well as in the two vertical sectional views of the lock as a whole and this ring is indicated by the numeral 31 and is formed upon its inner periphery with a flange 32 located about midway between its top and underside. This flange 32 is formed in its underside with a series of notches 33, the series extending nearly entirely around the flange but not wholly therearound so that a blank portion 34 is left between the ends of the series of notches. For convenience in description, one of the notches 33 is indicated specifically by the reference numeral 33^a and several others of the notches are in-

indicated by the reference numeral 33^b. The notch 33^a is one end notch of the series and the notches 33^b are the other end of the series. In addition to the notches 33, 33^a, and 33^b, the flange 32 is formed directly inwardly of the notch 33^a with a master notch indicated by the numeral 35 and inwardly of the notches 33^b with a second master notch 36.

The intermediate or second locking ring is clearly shown in Figs. 8 and 9 of the drawings and is indicated by the numeral 37, this ring being formed, as in the case of the ring 31, with a flange 38 corresponding to the flange 32 of said ring 31. The flange 38 of the ring 37 is formed with a series of notches 39 corresponding to the notches 33 and the fifth one from one end of the series is in the form of a master notch 40, it extending entirely through the flange 38 as do also the master notches 35 and 36. As in the case of the notches 33, the series 39 does not extend entirely around the flange 38 so that a blank portion 41 is left between the end notches of the series.

In Figs. 10 and 11 of the drawings there is clearly shown the lower or third lock ring of the device and this ring is indicated by the numeral 42 and is formed with a flange 43 as is the case in the other two locking rings just described. This flange 43, like the flanges of the other rings is formed with notches 44 in its under side and the fifth one from one end of the series 44 is in the nature of a master notch 45.

It will be observed that the upper head 20 is formed in its under side, peripherally, with a rabbet indicated by the numeral 46 and in assembling the locking ring 31 with this head, the ring is disposed against the head in the manner shown in Figs. 2 and 3 of the drawings with its upper edge seating in the said rabbet, it being understood that by thus assembling the ring with the head, the former may have rotative movement with respect to the latter. The ring 31 is formed upon its under side with a depending narrow flange 47 and this flange fits in a rabbet 48 formed in the inner periphery of the disk 37 so that the two disks 31 and 37 may have independent rotative movement although held against lateral displacement with respect to each other and with respect to the head 20. Also, the upper side of the ring 42 is formed with an upstanding flange 49 similar to the flange 47 of the ring 31 and this flange 49 fits in a rabbet 50 formed in the under side of the ring 37 at the inner periphery thereof. The lower head 21 is formed in its upper side with a rabbet 51 extending peripherally and this rabbet receives the lower edge of the ring 42. It will thus be understood that all three of the rings 31, 37 and 42 are held between the heads 20 and 21 for independent rotative

movement and against lateral displacement with respect to each other as well as with respect to either or both of the heads.

As heretofore stated, there is associated, with each of the locking rings, a pawl member and that member which is associated with the locking ring 31 and coöperates therewith is in the form of a sleeve 52 which is fitted upon the shank 27 of the lock and is formed interiorly with corrugations 53 fitting longitudinally extending corrugations 54 upon the said lock shank it being understood that the sleeve is in this manner held in a certain definite relation to the shank at all times. Integral with the sleeve 52 is a head 54' from which projects a resilient pawl tongue 55 the end of this tongue being bent upon itself as at 56 and arranged to ride successively in the notches 33, 33^a, and 33^b in the flange of the locking ring 31 and also to ride over the blank portion 34 of this flange.

The member which coöperates with the intermediate one of the locking rings shown in Figs. 8 and 9 of the drawings includes a sleeve 57 fitted upon the shank 27 in the same manner as is the sleeve 52 and projecting from the sleeve is a spring tongue pawl 58 having its end bent as at 59 in a manner similar to the end 56 of the spring pawl 55, the said pawl 58 being designed to have its end 59 coöperate with the notches and blank portion of the flange 38 of the said locking ring when the locking ring is rotated.

The member which coöperates with the locking ring shown in Figs. 10 and 11 includes in structure a sleeve 60 and a spring tongue pawl projecting therefrom and indicated by the numeral 61, this pawl coöperating with the notches and blank portion of the flange of the said locking ring in the same manner as in the instance of the pawl 58. It will be observed from an inspection of Figs. 2 and 3 of the drawings that the sleeves of the several pawl members are fitted in superposed relation upon the shank 27 and they are held in certain definite relation with respect to the shank by reason of the engagement of their corrugations with the corrugations of the shank, it being understood, however, at this point, that this relation between the sleeves and shank may be varied for the purpose of changing the combination of the lock.

The longer arm 29 of the shackle 28 is formed with a notch 74, a notch 75 and a notch 76, the notch 74 being located above the notch 75 and the said notch 75 being located above the notch 76. In a like manner, the shorter arm 30 of the shackle is formed near its extremity with a notch 77. It will be observed that the notches 74, 75 and 76 are so relatively positioned as to receive the flanges 32, 38 and 43 respectively. It will

also be observed from an inspection of Figs. 2 and 3 of the drawings and understood from the foregoing description, that the pawl 55 engages in the notches 33, 33^a, 33^b, 35, and 36 of the locking ring 31; that the pawl 58 engages with the notches 39 and 40 of the locking ring 37; and, that the pawl 61 engages with the notches 44 and 45 of the lock ring 42. Also it will be understood that before the shackle 28 can be withdrawn to unlocked position, it is necessary that the notches 36, 40 and 45 must be in vertical alinement and in a line with the longer arm 29 of the shackle 28. When the locking rings are in such position as to otherwise relatively locate the notches 36, 40 and 45 the walls of the notches 74, 75 and 76 in the said longer arm of the shackle will engage the flanges of the locking rings 31, 37 and 42 respectively and such engagement will prevent withdrawal of the shackle. Hence, the rings being in position to prevent withdrawal of the shackle and it being desired to unlock or release the shackle, it is necessary to so rotate each one of the locking rings as to bring its notch 36, 40 or 45, as the case may be, into registration with the longer arm of the shackle. To accomplish this, the locking rings being formed as illustrated, the upper ring 31 is first rotated until the pawl 55 rides upon its blank portion 34 and this rotation is continued, toward the left, until the pawl 55 clicks into three of the notches in the flange of the disk 31. Or more specifically speaking until it seats first in the notch 33^a, then in the master notch 35, and finally in that one of the notches 33 located immediately next the master notch 35. When the ring has been so rotated, this being ascertained by listening to the click of the pawl in the several notches, the longer arm of the shackle will be in registration with the master notch 36 and the shorter arm in registration with the master notch 35. The ring 37 is then rotated toward the left until the pawl 58 rides upon its blank portion and this rotation is then continued until the pawl 58 clicks into the notches 39^a and 39^b indicated specifically in Fig. 8 of the drawings at which time the master notch 40 will be in registration with the longer arm of the shackle 28. The locking ring 42 is then rotated to the left until the pawl 61 rides upon the blank portion of the flange 43 of this ring and this rotation of the ring 42 toward the left is then continued until the pawl 61 springs or clicks successively into the group of six notches shown in Fig. 10. As the pawl enters the last one of this group of notches, the master notch 45 will come into registration with the longer arm of the shackle 28 whereupon the shackle may be withdrawn until its stop pin 58' comes into engagement with the under side of the head 20 at which time the shackle

may be swung around upon its long arm as a pivot and may be engaged with a staple or other like element, the shackle after such engagement, being again inserted into position as illustrated in Fig. 3 of the drawings and the rings then promiscuously rotated to bring the master notches of the several locking rings out of registration with the longer arm of the shackle.

What is claimed is:—

1. In a lock, a shank, a head fixed at each end of the shank, locking rings held between the heads for rotation and formed each with a flange having a series of notches and a master notch, a shackle having an arm passing through one of the heads and formed with notches receiving the flanges of the locking rings, means for holding the shank against rotation when in normal locked condition, sleeves held upon the shank, and a pawl carried by each sleeve and coöperating with the notched flange of its corresponding locking ring.

2. In a lock, a shank, a head fixed at each end of the shank, locking rings held between the heads for rotation and formed each with a flange having a series of notches and a master notch, a shackle having an arm inserted through one of the heads and formed with notches receiving the flanges of the locking rings, means for holding the shank against rotation when in normal locked condition, sleeves held upon the shank, and a pawl carried by each sleeve, and coöperating with the notched flange of its corresponding locking ring, the flange of each locking ring having a blank portion for the coöperation therewith of the corresponding pawl.

3. In a lock, a shank, a head fixed at each end of the shank, locking rings held between the heads for rotation and formed each with a flange having a series of notches and a master notch, a shackle having an arm passing through one of the heads and formed with notches receiving the flanges of the locking rings, means for holding the shank against rotation when in normal locked condition, sleeves held upon the shank, and a pawl carried by each sleeve and coöperating with the notched flange of its corresponding locking ring, the shank being formed with longitudinally extending corrugations and each sleeve being formed interiorly with corrugations matching the corrugations of the shank.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

PETER W. KINDLESPIRE.
JAMES R. CANNAN.

Witnesses:

J. J. CONNAUGHTON,
WM. ZUCH.