Dec. 3, 1957 F. E. BEST 2,814,941

LOCK CORE

Filed Feb. 26, 1953

FIG. 1

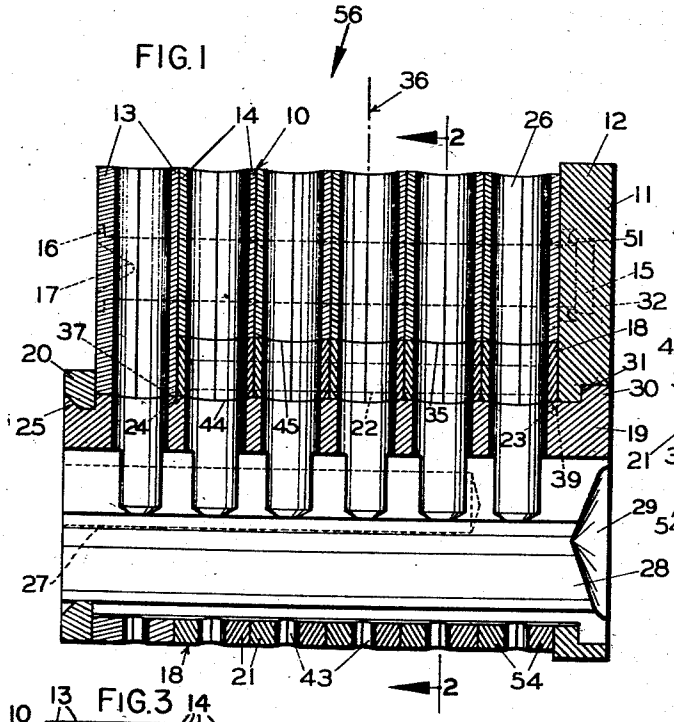


FIG. 2

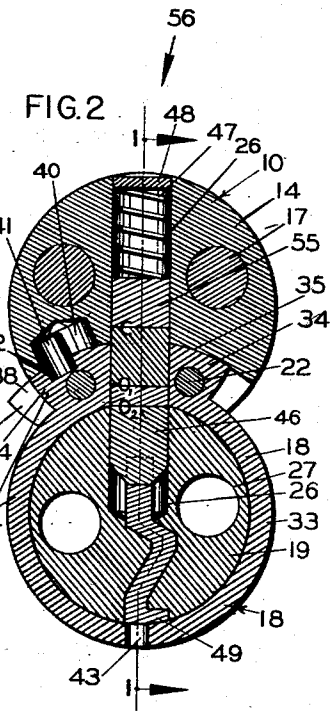


FIG. 3

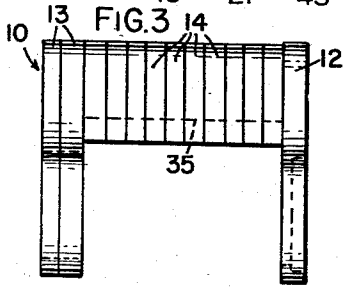


FIG. 4

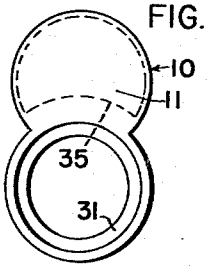
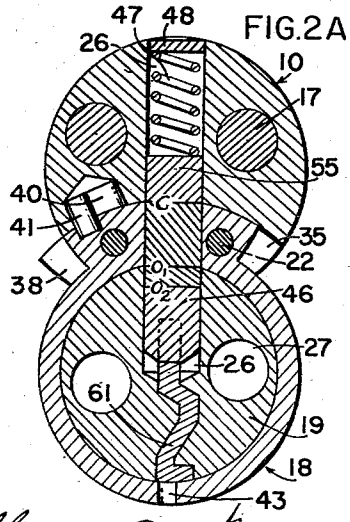


FIG. 2A



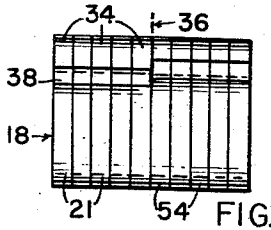


FIG. 6

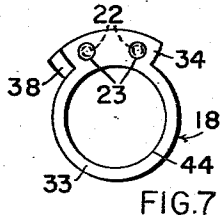


FIG. 7

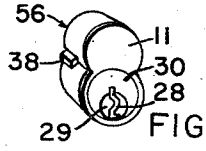


FIG. 5

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LOCK CORE

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5 Claims. (Cl. 70—340)

Nature and objects

My invention comprises improvements in lock cores and relates to key-operated pin tumbler locks having the lock-controlled assembly feature in which the assembly, of a primary lock core mechanism, into a core receptacle of a complementing secondary lock mechanism, is lock-controlled.

Description of drawings

I am illustrating my invention by the accompanying drawings, Figures 1 to 7 inclusive.

Figure 1 shows an uncombinated lock core **56** in longitudinal vertical center section, enlarged to approximately four times the scale of Figure 5, as taken on plane 1—1 of Figure 2.

Figure 2 shows a combinated lock core **56** in transverse vertical section, drawn to the scale of Figure 1, as taken on plane 2—2 of Figure 1.

Fig. 2A is a cross sectional view similar to Fig. 2 except that it shows a control key instead of an operating key in the lock and shows breaks in the tumbler pins lined up on a different shear line.

Figure 3 shows a side elevation of the body **10** drawn to a scale of approximately twice that of Figure 5.

Figure 4 shows an end elevation of the body **10** drawn to the scale of Figure 3.

Figure 5 shows a perspective view of the combinated lock core **56**.

Figure 6 shows a side elevation of the sleeve **18** drawn to the scale of Figure 3.

Figure 7 shows an elevation of the said sleeve **18** drawn to the scale of Figure 6.

General description

In the various views, lock core **56** comprises body **10**, face **11**, sleeve **18**, key plug **19** and key stop **20**. The body and sleeve are preferably built up of thin laminations. In Figures 1 and 3 the body laminations preferably comprise central stampings **14**, rear end stampings **13** and face stamping **12**. Likewise, the sleeve, as viewed in Figures 1 and 6, is preferably built up of laminations comprising rearward stampings **21** and forward stampings **54** uniting at division surface plane **36**. The rearward stampings **21**, as viewed in Figures 2, 5 and 6, have a wider upper extension **34** than the forward stampings **54** forming locking lug **38** as best seen in Figures 2, 5 and 6.

The body laminations are held together by rivets **17** having heads **15** staked in face lamination holes **32** at **51** upon which the whole stack of remaining laminations is assembled and then riveted rigidly together at **16**. Sleeve **18** constitutes an annular ring **33**, Figures 2 and 7, with its upper extension **34** housed in recess **35** in body **10**. The laminations thereof are held together by rivets **22** riveted at **23** and **24** into lamination recesses **39** and **37** respectively, Figures 1 and 7.

By means of the extension of laminations **21**, beyond the outline of laminations **54**, as shown in Figures 2, 5, 6 and 7, a locking lug **38** is provided that extends outwardly

from the regular figure-8 shaped core when the core is combinated and in locked position as best seen in Figures 2 and 5, but which may be retracted by a "control" key **61**, Figure 2A, to the figure-8 boundary surface.

To limit the rotative movement of the said sleeve **18** relative to body **10**, a hole **40** is provided in body **10**, Figure 2, and a smaller diametered pin **41** is secured in a hole **42** in sleeve **18**. However, when laminations are used, a notch-shaped recess somewhat like hole **40** is stamped in one or more of the said body laminations **14** and a boss, shaped like the exposed outline of pin **41**, is correspondingly formed on one or more mating laminations **21** and **54** to accomplish the same purpose.

Key plug **19** is of the conventional type and is preferably made of a solid piece of material. This key plug **19** preferably has the conventional paracentric fluted keyway **28** and key guide **29**. It also preferably has the conventional head **30** seated in face or body recess **31** and is trapped in place by annular key stop and retaining washer **20** riveted thereon at **25**.

The conventional pin tumbler holes **26**, ejection holes **43** and throw pin holes **27** are preferably drilled and reamed after the core is fully assembled.

In the pin tumbler holes **26** are placed the conventional stacks **55**, of pin tumblers **46**, driver springs **47** and retaining caps **48**.

Thus is provided a core with two shears **44** and **45**, the former of which comprise the "operating" shears with which breaks in the stacks **55** of tumbler pins may be aligned by the insertion of an operating key **49** to permit rotation of a key plug **19** and actuate the secondary lock mechanism, while the latter of which comprise the "control" shears with which breaks, such as break C in Fig. 2A, in the stacks **55** of tumbler pins may be aligned by the insertion of a control key **61** to permit rotary movement of the sleeve **18** solely for extending and retracting locking lug **38** beyond and within, respectively, the said figure-8 boundary surface of said body **10**.

In all the pin tumbler holes and stacks except the rearmost, there are two pairs of shears; namely, "operating" shears **44** and "control" shears **45**. However, in the last position there is only one pair of shears which I designate the "common" shears because they must necessarily form an integral part with each of the other shears; namely, "operating" shears **44** and "control" shears **45**. The single shear in the rearmost tumbler pin barrel shown in Fig. 1 is coincident with the outer surface of the key plug **19** and the inner surface of the bore in the sleeve **18** and is thus aligned with the operating shears **44**. The notch nearest the end of all keys to be used in the lock is bitted so that it will line up the tumbler pins in said rearmost barrel with this shear. The addition of these "common" shears obviously adds an element of security to the locking means of both said shears **44** and **45**.

It is thought unnecessary and undesirable to show the core combinated in Figure 1, since uncombinated cores are catalogued and sold as such and hence an uncombinated core is a completed commercial product and also since some of the claims are drawn to uncombinated cores.

All of the pin tumbler holes **26** of the core as shown in Figures 2 and 2A, may be considered as variously combinated, and "operating" and "control" keys **49** and **61** respectively are shown inserted in the keyway **28** therein, which align various pin tumbler stack breaks on one or both of said "operating" shears **44** and "control" shears **45**. For instance, in Figure 2, "operating" key **49** which may be a "master," "sub-master" or "private" key is so bitted at this particular pin tumbler hole position as to bring break O_2 of the pin stack **55** thereof, in operating register with "operating" shears **44**. Figure 2A shows a control key **61** which is unlike key **49** in that it is bitted at this particular pin tumbler hole position, so that

when it is used the whole said stack 55 drops down under the urge of spring 47 so as to bring break O_1 in operative register with "operating" shears 44 and break C in operative register with "control" shears 45.

In this instance, the same identical bitting serves as an "operating" as well as a "control" bitting, and breaks in pin stacks of other pin tumbler holes are left to selectively differentiate its use either in an "operating" or "control" combination.

Thus key 49 is an "operating" key and key 61 may be either an "operating" or "control" key.

It is obvious that other breaks may be used to facilitate the use of other keys or distinctively different bittings in the master keying of either or both said "operating" and "control" shears. It is by this means that the various ramifications of master keying is accomplished.

It will be noted, Figure 1, as has been previously pointed out, that there is no "control" shears 45 in the rearmost pin tumbler hole, so that all "operating" and "control" combinations must use the one shears in this rearmost stack position.

It is thought, however, that it is not objectionable to have one less pin tumbler hole on the "control" shears 45 than is provided on the "operating" shears 44, particularly since relatively little master keying is usually resorted to on said "control" shears 45 and hence its practical security with one less pin tumbler will be quite comparable with the somewhat impaired "master keyed" security resulting from more breaks in the pin tumbler stacks of the "operating" shears 44 of one more pin tumbler stack.

The chief utilitarian ends of this improvement are the ease and cheapness of manufacture and assembly and the strength, ruggedness, good appearance and added security thereof.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States are as follows:

1. In a lock core, consisting of a key-operable primary lock mechanism adapted to be releasably locked to, and to complement, a secondary lock mechanism, the combination of elements comprising a body, having a notched recess on the underside thereof, a sleeve in said recess, said body and sleeve having coaxial key plug holes lengthwise therethrough, a key plug in said key plug holes, head and washer means on said key plug trapping said body, sleeve and key plug together in operable assembly, a number of vertical pin tumbler holes of extension downward through said body and sleeve, said body and sleeve having arcuate mating surfaces forming "control" shears at locations where the pin tumbler holes intersect said arcuate mating surfaces, a lug on said sleeve of arcuate extension around said sleeve and beyond the profile outline of the body as viewed in end elevations when the respective pin tumbler holes through said body and sleeve are in aligned relation and of such narrowness of said arcuate extension as to be retractable within the said profile outline by rotation of said sleeve, and stacks of pin tumblers in said pin tumbler holes having breaks between the individual pin tumblers thereof, said pin tumblers and breaks being adapted to the selective locking against rotation and releasing for rotation of said sleeve by the alignment of said pin tumblers across said "control" shears and the alignment of "control" breaks at said "control" shears respectively, said lug on said sleeve being capable of locking said lock core to a secondary lock mechanism when the lug is projected beyond the outline of said body by rotary movement of said sleeve.

2. In a lock core, consisting of a key-operable primary lock mechanism adapted to be releasably locked to, and to complement, a secondary lock mechanism, the combination of elements comprising a body, having a notched recess on the underside thereof, a sleeve in said recess, said body and sleeve having coaxial key plug holes lengthwise therethrough, a key plug in said key plug holes, head and washer means on said key plug trapping said body, sleeve and key plug together in operable assembly, a number of vertical pin tumbler holes of extension downward through said sleeve and into said key plug, said sleeve and key plug having mating arcuate surfaces forming "operating" shears where the pin tumbler holes intersect said mating arcuate surfaces, said key plug having means adapted to the transfer of rotative motion of said key plug to a secondary lock mechanism, and stacks of pin tumblers in said pin tumbler holes having breaks between the individual pin tumblers thereof, said pin tumblers and breaks being adapted to the selective locking against rotation and releasing for rotation of said plug by the alignment of said pin tumblers across said "operating" shears and the alignment of "operating" breaks at said "operating" shears respectively, whereby when breaks in the pins register with the operating shears said key plug may be rotated in operating secondary lock mechanism.

3. In a lock core consisting of a key-operable primary lock mechanism, the combination of elements comprising a body, having a notched recess in the underside thereof, a sleeve in said recess, said body and sleeve having coaxial key plug holes lengthwise therethrough, and a key plug in said key plug holes, head and washer means on said key plug trapping said body, sleeve and key plug together in operable assembly, a number of vertical pin tumbler holes of extensions downward through said body and sleeve and into said key plug, said sleeve and key plug having mating arcuate surfaces forming "operating" shears at the locations where the pin tumbler holes intersect the mating arcuate surfaces of said sleeve and key plug, said body and sleeve having mating arcuate surfaces forming "control" shears at the locations where said pin tumbler holes intersect the arcuate mating surfaces of said body and sleeve, a lug on said sleeve of arcuate extension around said sleeve beyond the profile outline of the body as viewed in end elevation when the respective pin tumbler holes through said body and sleeve are in aligned relation and of such narrowness of said arcuate extension as to be retractable within the said profile outline by rotation of said sleeve, said key plug having externally engageable rotary motion transmitting means and a suitable keyway therein.

4. A primary lock core as set forth in claim 3 in which the body comprises relatively thin laminations parallel with the face riveted together.

5. A primary lock core as set forth in claim 3 in which the sleeve comprises relatively thin transverse laminations riveted together.

References Cited in the file of this patent

UNITED STATES PATENTS

396,628	Hoevenbergh	Jan. 22, 1889
806,361	Pickop	Dec. 5, 1905
1,433,364	Freysinger	Oct. 24, 1922
1,433,591	Abell	Oct. 31, 1922
1,487,307	Best	Mar. 18, 1924
1,575,092	Best	Mar. 2, 1926
1,866,342	Best	July 5, 1932