This invention relates to an improved flexible shackle lock in which the length of the flexible shackle may be adjusted at will by the operator prior to positively locking the extremities thereof within the casing of the lock. This invention is a continuation-in-part of my prior application, Serial No. 554,435, filed September 21, 1955 and now abandoned.

The improved lock is so designed that the flexible shackle is wound upon a rotatable hub or spool within the casing and may be unwound therefrom freely when the lock core tumblers are retracted and disengaged from the containing housing structure by insertion of the key into the keyhole in the lock core.

In one embodiment of the invention a slotted head is provided at the outer extremity of the flexible shackle and seats within a receiving slot in the wall of the casing, the rotatable spool-latch plate being provided with quadrantly arranged upstanding stop segments to close the slotted receptor in the casing when the slotted extremity of the shackle is fitted therewithin and the spool-latch plate is locked in position by the tumblers of the lock core upon removal of the key from the lock core.

In this embodiment a cylindrical lock core is provided rotatably mounted within a cylindrical lock core housing permanently affixed within the interior of the casing. The lock core housing is quadrantly slotted longitudinally of its inner periphery which slots receive the aligned tumblers of the lock core where they are moved outwardly by removal of the key from the lock core.

In this embodiment the inner extremity of the lock core is permanently affixed at the center of the hub of the rotatable spool-latch plate of the lock structure so that the spool-latch plate may be freely rotated by the key inserted in the lock core, to take up or extend the flexible shackle which is wound thereupon at its inner extremity. When the key is removed from the lock core the lock core tumblers extend outwardly through the wall of the lock core and the lock core and spool-latch plate are locked in desired position by the seating of the lock core tumblers in one of the slots in the lock core housing. With the lock core tumblers withdrawn within the lock core by insertion of the key into the lock core the flexible shackle may be freely withdrawn through the casing, rotating the spool-latch plate, to extend the flexible shackle to the desired length through the lock casing. The flexible shackle cable may be taken up or extended by rotating the key, the lock core and the spool-latch plate, as desired.

Alternative embodiments of the invention are shown in Figs. 6-12, inclusive. In these embodiments the lock core is shown provided with a single tumbler or tongue member retractable into the core by insertion of a key thereinto and fitting into one of a series of recesses disposed along the end periphery of the lock core housing to lock the spool-latch plate. Further, modified securing means for the cable head within the lock casing are shown, a modified spool-latch plate is shown and various friction means for the spool-latch plate are shown. Various alternative shapes for the lock casing are also shown.
Base plate 16 is shown provided with a central boss 17 within which is fitted curved tension spring 18 which bears within boss 17 against the inner face 19 of hub 8 to closely and resiliently maintain the entire structure in operative condition.

When the entire structure has been assembled base plate 16 is inserted within the open rear face of casing 6 and the edges of casing 6 are then cramped over the peripheral edges of base plate 16 to maintain the lock structure in positively assembled condition.

Key 20 is provided, fitting within the keyhole in lock core 11, to extract the aligned tumblers 21 thereof, as will hereinafter be discussed at more length.

Referring to casing 6 of the lock structure, it is preferably formed of metal and is cylindrical in shape to provide a cup-like container or casing for the balance of the lock structure. Casing 6 is provided at its center face with a circular orifice 22 within which is appropriately fixedly mounted, as by crimping or brazing, cylindrical lock core housing 10. Lock core housing 10 is preferably longitudinally slotted at its quadrants to provide locking slots 23, 24, 25 and 26 therewithin designed to receive the aligned tumblers or dogs 21 of lock core 11 when the key 20 is removed therefrom to move the tumblers outwardly of lock core 11.

Casing 6 is provided at its outer surface, about orifice 22 with quadrant lines or indicia 1, aligned with slots 23, 24, 25 and 26 of lock core housing 10.

Casing 6 is provided in its lateral wall with a shackling orifice 26 which is appropriately lined with a grommet 27, through which flexible shackling cable 9 extends outwardly through the wall of casing 6 from the hub 8 of spool-latch plate 7.

Adjacent orifice 26 casing 6 is slotted approximately halfway the cross its width to provide locking slot 28 for the reception of the slotted extremity of terminal head 30 of flexible shackling 9. Locking slot 28 is preferably downwardly extended into a T-shaped lower slot 29 in the outer face of casing 6, as shown in Figs. 1 and 3, designed to receive the terminal cap of shackling head 30.

Shackling head 30 is preferably provided adjacent its outer extremity with an enlarged shoulder 31, the face of which is flattened, and is extended into a narrow neck 32 and then enlarged into an outer, flattened cap 33 designed to bear against the inner wall of casing 6 under slot 28, the flattened surface of shoulder 31 thereof bearing against the outer face of casing 6 over slot 28 thereof. Neck 32 of shackling boss 30 is preferably of slightly smaller width than slot 28 to freely and slidably engage therewith.

Flattened housing piece 41 is provided within casing 6 beneath slots 28 and 29 and is appropriately soldered or brazed at its extremities therewithin to provide a snug reception for cap 33 of shackling head 30 when neck 32 thereof is inserted within slot 28.

As shown, lock core housing 10 in casing 6 extends inwardly thereby to a distance approximately equal to two-thirds of the depth of casing 6 and lock core 11 extends therethrough to a distance equal to substantially the full depth of casing 6. Its balanced inner extremities 12 and 13 fitting through holes 14 and 15 of hub 8 of spool-latch plate 7 and being cramped at their extremities thereover. Slots 23 and 25 of lock core housing 10 are vertically aligned with slots 28 and 29 in casing 6.

Lock core 11 is preferably cylindrical in shape and carries all orifices. It is provided with aligned retractable tumblers or dogs 21 issuing from its upper surface, as shown in Fig. 5, which are actuated inwardly or outwardly thereby is insertion or removal of key 20. Lock core 11 is of conventional construction and is provided about its outer extremity with a shoulder, as shown, which bears against the face of casing 6 outwardly of orifice 22. Lock core 11 fits closely and rotatably within lock core housing 10 and is so designed that removal of key 20 from its keyhole will extend aligned tumblers 21 to their outer, locking position outwardly of lock core 11.

Spool-latch plate 7 is preferably formed of metal and is of slightly smaller diameter than casing 6. It is provided at its center with upstanding cylindrical hub 8 which is of larger diameter and height than lock core housing 10, whereby hub 8 is freely rotatable over lock core housing 10 within casing 6. As previously indicated, hub 8 is provided at its face 19 with spaced holes 14 and 15 which receive studs 12 and 13 respectively, provided on the extremity of lock core 11 and which are cramped therewith.

Spool-latch plate 7 is preferably flattened to bear against the inner surface of casing 6 and is provided about its periphery with four inwardly curved lock segments 34, 35, 36 and 37 which are arranged at the four quadrants of the flattened base plate of spool-latch plate 7 and which are curved upwardly at an angle of approximately 45° thereto to conform to the inner curvature of casing 6 at its peripheral line, as shown in Fig. 3.

As shown, lock segments 34, 35, 36 and 37 are preferably of a width slightly less than one-eighth of the circumference of spool-latch plate 7 and are separated by cut-out peripheral spaces of slightly greater width in the periphery of spool-latch plate 7.

Hub 8 is provided with a lateral orifice 39 designed to receive the inner extremity of flexible cable 9, which is inserted therethrough, a sleeve 40 being then applied over the extremity of cable 9 and therewithin to maintain the inner extremity of cable 9 fixedly in position within hub orifice 39. As shown in Figs. 3 and 4, flexible cable 9 is preferably evenly wound about hub 8 of spool-latch plate 7 to make it freely windable therethrough.

Curved tension spring 18 is shown designed to fit over the outer surface 19 of hub 8 of base plate 16 of the assembly to maintain the spool-latch plate assembly 7 under tension in closer rotative bearing condition over lock core housing 10 within casing 6. Base plate 16 is preferably of metal and is slightly concave and of a slightly smaller diameter than casing 6 to permit its being cramped therewithafter the entire lock structure has been assembled. Base plate 16 is provided with central boss 17 of slightly greater diameter than hub 8 of spool-latch plate 7 and provides a terminal bearing surface, with tension spring 18 interposed, for the outer surface 19 of hub 8.

The manner of assembly of this embodiment of the lock structure is as follows: with the flexible shackling 9 affixed at its inner extremity in orifice 39 of hub 8 of spool-latch plate 7 and with cable 9 wound about hub 8 to the desired length, the extremity of cable 9 is passed through orifice 26 of casing 6 and spool-latch plate 7 is then placed within casing 6, hub 8 thereof fitting over lock core housing 10 in rotative position thereover. Lock core 11, with key 20 inserted and its aligned tumblers 21 thus in retracted position, is then inserted through lock core housing 10 and studs 12 and 13 thereof are passed through holes 14 and 15. In the face 19 of hub 8 and the extremities of studs 12 and 13 are then cramped downwardly about holes 14 and 15 to unite the extremity of lock core 11 and hub 8.

As paired studs 12 and 13 of lock core 11 are disposed at 90° to the plane of tumblers 21 and as holes 14 and 15 of hub 8 are at 90° to lock segment 34 of spool-latch plate 7 and slots 23, 24, 25 and 26 are arranged quadrantly in lock core housing 10, with slots 23 and 25 lying in the vertical plane of locking slot 28 in casing 6, when tumblers 21 of lock core 11 seat in one of slots 23, 24, 25 and 26 of housing 10 one of locking segments 34, 35, 36 or 37 of spool-latch plate 7 is disposed inwardly of the T-shaped lower extremity 29 of slot 28.

Tension spring 18 is then placed against face 19 of hub 8 and end plate 16 is then placed in position over the assembly with boss 17 centered over tension spring 18 and face 19 of hub 8. The peripheral edges of the
open extremity of casing 6 are then crimped downwardly over the peripheral edges of base plate 16 and the assembly of the lock structure is complete. Slotted head 30 is then applied over the extremity of flexible shackle cable 9 and crimped thereover to provide the terminal slotted locking extremity therefor.

With the structure thus assembled and with key 20 inserted in lock core 11 and aligned tumblers 21 of lock core 11 retracted therewithin cable 9 may be freely withdrawn outwardly of casing 6 through orifice 26 thereof, rotating spool-latch plate 7 within casing 6. Cable 9 may then be placed about the structure to be locked in position and the slotted extremity of shackle head 30 then is inserted into slots 25 and 29 in casing 6, key 20 having been turned until one of the open spaces between locking segments 34, 35, 36 or 37 of latch plate 7 is aligned with slots 28 and 29 in casing 6. Key 20 is then turned to vertical or horizontal position in alignment with one of the quadrant lines 1 on the face of casing 6, bringing one of the locking segments of latch plate 7 into position behind slot 29. The key is then removed from the keyhole in lock core 11, tumblers 21 then seating in one of the slots 23, 24, 25 or 26 of lock core housing 10, locking spool-latch plate 7 in casing 6, and the locking operation is complete.

To unlock the lock the reverse of this operation is followed. Key 20 is inserted in the keyhole in lock core 11, withdrawing tumblers 21 into lock core 11 and freeing spool-latch plate 7. Key 20 is then turned some 45° until the locking segment of spool-latch plate 7 is removed from behind slot 29 and the slotted head of cable 9 is then withdrawn from slots 25 and 29.

In view of the fact that slots 23, 24, 25, 26 are arched at 90° or quadrantly about the inner periphery of lock core housing 10, the relative movement of spool-latch plate 7 and hub 8 thereof, prior to the locking operation, is relatively small. In order to wind up cable 9 on hub 8 it is merely necessary to turn key 20 in a clockwise direction. With key 20 in position in the keyhole of lock core 11 and with tumblers 21 thereof this withdrawn cable may be freely pulled off rotating spool-latch plate 7 by hand, or may be removed therefrom by counterclockwise rotation of key 20.

In assembling the structure it will be noted that locking segments 34, 35, 36 and 37 of spool-latch plate 7 are aligned with slots 23, 24, 25 and 26 of the lock core housing 10 in such fashion that when tumblers 21 of lock core 11 seat in one of the slots 23, 24, 25 or 26 of lock core housing 10 the appropriate locking segment 34, 35, 36 or 37 of spool-latch plate 7 is in position over the T-shaped extremity 29 of slot 28 to lock cap 33 of head 30 of cable 9 therewithin. Thus, in assembling the structure locking segments 34, 35, 36 and 37 of spool-latch plate 7 are aligned vertically with slots 23 and 25 of lock core housing 10 and lateral locking segments 35 and 37 of spool-latch plate 7 are aligned horizontally with slots 24 and 26 of lock core housing 10. The rectangular disposition of studs 12 and 13 in lock core 11 and the disposition of holes 14 and 15 in hub 8 assure that this proper alignment of locking segments and slots will be maintained, as shown in Fig. 5. Thus, whenever tumblers 21 of lock core 11 seat in one of slots 23, 24, 25 or 26 one of the appropriate aligned locking segments 34, 35, 36 or 37 of spool-latch plate 7 will cover the T-shaped lower extremity 29 of slot 28 in casing 6. With the cap 33 of boss 30 thus locked within slot 28 rotation of key 20 in lock core 11 will withdraw tumblers 21 of lock core 11 and will free spool-latch plate 7 to permit alignment of one of the cut-away portions thereof with slot 29 to allow removal of cap 33 of head 30 from slot 29 to free the extremity of cable 9.

This embodiment lock core 11 may be modified as desired. Further, the number of slots in lock core housing 10 may be varied at will and the nature of the connection between lock core 11 and spool-latch plate hub 8 may be varied as desired.

Referring to the embodiment of the invention disclosed in Figs. 6 and 7, these figures show a modified lock core and lock core housing, a modified spool-latch plate and friction means and modified securing means for the head of the cable within the casing.

Thus, in Fig. 6, an alternative construction for the lock structure is shown in which the lock core housing 43 is, as in the embodiment shown in Figs. 1–5, centrally mounted in casing 44. As shown, lock core housing 43 is permanently mounted over a central, circular orifice in casing 44 and extends inwardly thereof to distance equal to about two-thirds of the depth of casing 44. Cas ing 44 is provided in its lateral wall 46 with cable orifice 47 and locking orifice 48, orifice 47 being designed for the passage of cable 9 to and from the spool of the spool-latch plate and locking orifice 48 being designed to receive the tongue of the terminal head of cable 9 for locking purposes, as will hereinafter be discussed at more length.

Lock core housing 43 is provided about its inner extremity with a series of recesses 49 which are preferably five in number, but which may be of any desired number. Lock core housing 43 is designed to rotatably receive lock core 50, which is preferably cylindrical in shape and is provided at its outer extremity with an engaged shoulder 51 closely and rotatably fitting against the outer surface of end wall 45 of casing 44. Lock core 50 may be of pin tumbler or of any other appropriate and well known type and is provided at its upper, inner extremity with a single tumbler or tongue 52. Lock core 50 is so constructed that upon the insertion of key 53 into the keyhole thereof tumblers 52 will be retracted into core 50. Tumbler 52, as shown, is of such dimensions as to closely fit within terminal recesses 49 of lock core housing 43, as shown in Figs. 6 and 7, when key 53 is removed from the central keyhole of lock core 50. Tumbler 52 is so positioned in lock core 50 that it is aligned with recesses 49 of lock core housing 43 when lock core 50 is fully seated in housing 43. Lock core 50 preferably extends inwardly beyond the inner extremity of lock core housing 43 and is provided at its inner extremity with a pair of deformable studs 53 and 54, for a purpose hereinafter to be discussed.

Also illustrated in Fig. 6 is modified spool-latch plate 55, which is preferably circular at its base 56 to closely and rotatably fit within casing 44 against end wall 45 thereof. Spool-latch plate 55 is provided at its end with a rectangularly disposed hollow spool member 57, which, as shown, may be octagonal in configuration and which is designed to rotatably fit over lock core housing 43 and lock core 50. Spool member 57, as shown, is preferably rectangular in outer configuration and provided with beveled or rounded corners 58 and is designed to receive cable 9 of the lock structure, which, as shown in Fig. 7, is preferably evenly wound thereupon. Spool 58 is preferably of a length slightly greater than lock core 50 and slightly less than the depth of casing 44. At its apex 59, which is preferably flattened, spool 57 is provided with aligned holes 60 and 61 designed to receive, respectively, studs 53 and 54 of lock core 50, which studs after insertion through holes 60 and 61 are then crimped downwardly over the apex 59 of spool 57 to join lock core 50 and lock core 50 will rotate together upon insertion of key 53 into lock core 50 and rotation thereof.

Spool-latch plate 55 is provided about its outer periphery with a series of rectangularly and inwardly bent locking projections 62, which are preferably evenly spaced about its periphery and extend inwardly an appreciable distance, for a purpose hereinafter to be discussed in more detail. Locking projections 62 are preferably six in number, to conform with the number of locking re-
cesses 49 disposed about the inner periphery of lock core housing 43. As shown, locking projections 62 are so disposed about the periphery of spool-latch plate 55 that when the spool-latch plate 55 is affixed to the extremity of lock core 50 by means of studs 53 and 54 a locking projection 62 will be aligned with each of the recesses 49 of lock core housing. Further, as shown in Figs. 6 and 7, the top and bottom, or "one" and "four," recesses 49 of the lock core housing are disposed in the same vertical plane as locking orifice 48 of casing 44. Thus, when tumbler 52 of lock core 50 is seated within one of the recesses 49 of lock core housing 43 an appropriate locking projection 62 will be aligned with and disposed inwardly of locking orifice 48 in casing 44 to register with the slot in the tongue of cable head 63 at the extremity of cable 9, as will be discussed more fully hereinafter.

The manner of assembly of this embodiment of the invention is identical with that illustrated in Figs. 1–5 of the drawings. Thus, to assemble the lock structure lock core 50 is first placed within lock core housing 43 with key 53 therein to hold tumbler 52 in retracted position within lock core 50. Spool of plate 55 is then inserted into casing 44 with spool 57 thereof closely and rotatably fitting over lock core housing 43 and lock core 50, studs 53 and 54, respectively, being passed through holes 60 and 61 in the apex of spool 57. Studs 53 and 54 are then cramped downwardly over apex 59 of spool 57 about holes 60 and 61 to closely join the extremity of lock core 50 and the apex of hub 57 of spool-latch plate 55. The inner extremity of cable 9 is then affixed to the surface of spool 57 in any desired fashion and the cable is wrapped thereabout in even coils, to any desired length. The extremity of cable 9 is then passed outwardly through orifice 47 in casing 44 and then cramped or otherwise applied thereward. With the lock thus partially assembled, circular base plate 64 is inserted into the open rear extremity of casing 44, and the lateral edges of the open extremity of casing 44 are then cramped downwardly about the periphery of base plate 64, as shown in Fig. 7. Base plate 64 is preferably provided with a central boss 65 positioned over apex 59 of spool 57 and adapted, as shown in Fig. 7, to extend thereover. If desired, a rubber ring or grommet 66 or other friction means may be inserted between apex 59 of spool 57 and boss 65 of base plate 64 at the time of assembly to provide frictional contact therebetween and prevent backlash of spool-latch plate 55 when key 53 is inserted into lock core 50 to rotate the lock core 50 and spool-latch plate 55. Rubber grommet 66 or an analogous resilient frictional element acts as a substitute for spring 18 shown in the embodiment of the invention illustrated in Fig. 5 of the drawings.

If desired, base plate 64 may be welded, brazed or otherwise affixed within the open extremity of casing 44.

Head 63 of cable 9 is provided at its center with a rectilinear circular shoulder 67 and at its inner extremity with a tongue portion 68 designed to fit closely within locking orifice 48 in casing 44 and to extend inwardly therethrough into casing 44. Tongue 68 is preferably provided, as shown, with a peripherally disposed slot 69 of such width as to closely receive one of the rectilinearly bent locking projections 62 of spool-latch plate 55. As shown in Fig. 6, the slot 69 is of greater width than locking projections 62 to prevent binding thereof in slot 69 upon rotation of the spool-latch plate within casing 44. Further, locking projections 62 are slightly curved to conform to the peripheral curvature of the inner surface of casing 44, which curvature eliminates binding of locking projections 62 within slot 69 of tongue 68.

Illustrative embodiment of the friction means for the spool-latch plate is shown in Fig. 8 of the drawings. In this embodiment of the invention the lock core and housing and the spool-latch plate are similar to the structure shown in Figs. 6 and 7, the friction means being provided to prevent slippage or backlash when the spool-latch plate 55 is rotated to extend or retract cable 9. In this figure the spool 57 is shown as cylindrical, although it may be hexagonal, as in Fig. 6, if desired. The friction means, as shown, comprises a flexible leaf spring 70 which is fixedly mounted at its extremity within a recess 71 in the outer wall of lock core housing 43. At its outer extremity 72 leaf spring 70 is preferably curved to conform to the inner peripheral curvature of spool-latch plate 55 and bears thereagainst to maintain spool-latch plate 55 against loose rotation over lock core housing 43. Curved spring 70 acts as a substitute for grommet 66 illustrated in Fig. 7 between the apex of spool 57 and boss 65 of base plate 64.

Any other well known type of resilient friction means may be applied between lock core housing 43 and the inner periphery of hub 57 of the spool-latch plate, or, if desired, other types of frictional resilient means may be applied between the apex 59 of spool 57 and the inner surface of base plate 64 to prevent backlash and loose rotation of spool-latch plate 55 within casing 44. This embodiment of the invention operates as follows: with key 53 inserted in the keyhole of lock core 50 and tumbler 52 retracted into core 50 spool-latch plate 55 is freely rotatable and cable 9 may be drawn outwardly through orifice 47 to any desired length. Conventionally, by turning key 53 in clockwise direction, cable 9 will be taken up on spool 57, as desired. When the cable is of the desired length, tongue 68 of cable head 63 is inserted through orifice 48 and key 53 may be further turned to register one of locking projections 62 of spool-latch plate 55 within slot 69 of tongue 68. If one of locking projections 62 is blocking orifice 48 key 53 is turned until orifice 48 is open and tongue 68 is then inserted therein. Key 53 is then turned until one of locking projections 62 registers in slot of tongue 68 of cable head 63. When the cable is of the desired length key 53 is removed from the lock core and tumbler 52 seats in one of recesses 49 in the lock core housing, thus locking the spool-latch plate 55 and the cable head 63 in the casing and making it impossible to withdraw cable 9. It may be necessary to turn key 53 back and forth slightly to register tumbler 52 with one of housing slots 49 prior to its withdrawal from the lock core. By partially withdrawing the key from the lock core and then turning it, tumbler 52 will immediately register in the closest slot 49.

Various alternative casing configurations are shown in Figs. 9–12, inclusive. Thus, in Fig. 9 a casing is shown which is roughly rectangular in shape with rounded corners, cable 9 issuing through orifice 73 in one of the rounded upper corners, tongue 68 of cable head 63 being inserted through locking orifice 48 in the opposite upper corner. In this embodiment of the invention, tongue 68 of cable head 63 must be of sufficient length to register slot 69 thereof with the locking projections 62 of the spool-latch plate 55. A similar embodiment is shown in Fig. 10 in which the overall configuration of the casing is rectangular with rectangularly beveled corners, the cable issuing from orifice 74 at one of the upper corners, tongue 68 of cable head 63 being inserted through locking orifice 48 in the opposite upper corner. Here again, tongue 68 must be of sufficient length to allow registration of its slot 69 with locking projections 62 of the spool-latch plate.

A rectangular embodiment of the lock is shown in Fig. 11, cable 9 issuing through an orifice 75 in the upper surface of the rectangular casing and tongue 68 of cable head 63 extending downwardly into the interior of the casing through the locking orifice 48, also positioned on the upper surface of the casing. Tongue 68 must be of sufficient length to permit registration of slot 69 thereon with the locking projections 62 of the spool-latch plate.

Lastly, in Fig. 12, there is illustrated an embodiment of the invention in which the casing is of figure eight configuration, the locking mechanism being disposed with-
in the upper extremity, the cable issuing forth from orifice 76 in the upper extremity of the casing and tongue 68 of head 63 being disposed integrally into the casing through orifice 48 at the opposite side of the curved upper extremity thereof.

In each of the foregoing embodiments of the lock the locking and spool mechanism operate in precisely the same manner as that disclosed in Figs. 6 and 7 of the drawings.

The foregoing embodiments of the invention are susceptible of numerous modifications without departing from the spirit thereof. Thus, the configuration and number of the locking projections disposed about the periphery of the spool-latch plate may be varied at will, as may the recesses in the lock core housing. It will be seen that the more recesses provided in the lock core housing the more refined may be the adjustment of the length of the cable issuing from the casing and the more readily this length may be adjusted.

As aforesaid, many different types of friction elements may be utilized between the lock core housing and the inner periphery of the spool-latch plate or between the apex of the spool and the base plate of the lock to prevent backlash or slippage.

Many different types of lock cores may be utilized without departing from the spirit of the invention. As aforesaid, the pin tumbler type of core may be utilized or any conventional lock core of the type as which the tumbler of the lock is retracted upon insertion of the key.

The configuration of the casing of the lock may be varied, as desired, as shown in Figs. 9–12, inclusive, the only proviso being that the length of tongue 68 of head 63 of the casing is so adjusted in each embodiment as to assure registration between locking projections 62 of the spool-latch plate 55 and slot 69 of the tongue.

The size of the casing and spool-latch plate may be varied within wide limits to accommodate any length of cable desired and the lock may be as heavily constructed as is required for the particular usage to which it is to be put.

Mechanical equivalents may be substituted for each of the embodiments of the invention.

Attention is directed to the appended claims for a determination of the scope of the invention.

What is claimed is:

1. In a flexible shackel lock, a circular, cup-shaped casing, a cylindrical lock core housing centrally mounted within said casing provided with quadrantly disposed longitudinal slots in its inner periphery, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a cylindrical hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, quadrantly disposed locking projections on the periphery of said spool-latch plate normally aligned with the slots in said lock core housing and extending to the peripheral edge of the end wall of said casing, a cylindrical lock core closely and rotatably fitted over said lock core housing and affixed at its inner extremity to the hub of said spool-latch plate to rotate therewith, a line of retractable dogs longitudinally disposed in said lock core selectively engageable within one of said slots in said lock core housing when in outward position and adapted to be retracted into said lock core by a key, a cable wound on the hub of said spool-latch plate and passing through an orifice in the side wall of said casing, a slotted head at the extremity of said cable fitting within a slot in the side wall of said casing periodically covered by one of said locking projections, a base plate fitted into said hub of said spool-latch plate and hub to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate over or clear of said slot in said casing.

2. In a flexible shackel lock, a circular, cup-shaped casing, a cylindrical lock core housing centrally mounted within said casing provided with quadrantly disposed longitudinal slots in its inner periphery, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a cylindrical hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, quadrantly disposed locking projections on the periphery of said spool-latch plate normally aligned with the slots in said lock core housing and extending to the peripheral edge of the end wall of said casing, a cylindrical lock core closely and rotatably fitted over said lock core housing and affixed at its inner extremity to the hub of said spool-latch plate to rotate therewith, a line of retractable dogs longitudinally disposed in said lock core selectively engageable within one of said slots in said lock core housing when in outward position and adapted to be retracted into said lock core by a key, a cable wound on the hub of said spool-latch plate and passing through an orifice in the side wall of said casing, a slotted head at the extremity of said cable fitting within a slot in the side wall of said casing periodically covered by one of said locking projections, a base plate fitted into said hub of said spool-latch plate and hub to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate over or clear of said slot in said casing.

3. In a flexible shackel lock, a circular, cup-shaped casing, a cylindrical lock core housing centrally mounted within said casing provided with a plurality of equally spaced longitudinal slots in its inner periphery, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a cylindrical hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, a plurality of equally spaced locking projections on the periphery of said spool-latch plate normally aligned with the slots in said lock core housing and extending to the peripheral edge of the end wall of said casing, a cylindrical lock core closely and rotatably fitted within said lock core housing and affixed at its inner extremity to the hub of said spool-latch plate to rotate therewith, a line of retractable dogs longitudinally disposed in said lock core selectively engageable within one of said slots in said lock core housing when in outward position and adapted to be retracted into said lock core by a key, a cable wound on the hub of said spool-latch plate and passing through an orifice in the side wall of said casing, a slotted head at the extremity of said cable fitting within a slot in the side wall of said casing periodically covered by one of said locking projections, a base plate fitted into said casing over the hub of said spool-latch plate whereby rotation of said lock core will rotate said spool-latch plate and hub to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate over or clear of said slot in said casing.

4. In a flexible shackel lock, a circular, cup-shaped casing a cylindrical lock core housing centrally mounted within said casing provided with quadrantly disposed longitudinal slots in its inner periphery, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a cylindrical hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, quadrantly disposed locking projections on the periphery of said spool-latch plate normally aligned with the slots in said lock core housing and extending to the peripheral edge of the end wall of said casing, a cylindrical lock core closely and rotatably fitted within said lock core housing and affixed at its inner extremity to the hub of said spool-latch plate to rotate therewith, retractable dogs longitudinally disposed in said lock core se...
lectively engageable within one of said slots in said lock core housing when in outward position and adapted to be retracted into said lock core by a key, a cable wound on the hub of said spool-latch plate and passing through an orifice in the wall of said spool-latch plate whereby rotation of said lock core will rotate said spool-latch plate to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate into or out of contact with said head at the extremity of said cable.

5. In a flexible shackel lock, a casing, a lock core housing centrally disposed in said casing provided with a plurality of lock receiving recesses, a lock core rotatably mounted in said housing, locking means in said lock core rotatable by the insertion of a key thereinto and selectively registering with one of said lock receiving recesses in said lock core housing, a spool-latch plate rotatably mounted in said casing over said lock core and lock core housing affixed at its apex to the extremity of said lock core, a cable wound on spool-latch plate and passing through an orifice in said casing, a locking orifice in said casing, a head on said cable designed to fit in said locking orifice, locking projections on the periphery of said spool-latch plate engaging said cable head, whereby insertion of a key in said lock core frees said spool-latch plate for rotation in said casing and withdrawal thereof locks said spool-latch plate and cable head within said casing.

6. In a flexible shackel lock, a casing, a lock core housing centrally mounted within said casing provided with a plurality of lock receiving recesses about its extremity, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, a plurality of locking projections on the periphery of said spool-latch plate, a lock core closely and rotatably fitted within said lock core housing affixed at its inner extremity to the hub of said spool-latch plate, locking means in the extremity of said lock core selectively engageable within one of said lock receiving recesses in said lock core housing recesses in said lock core housing when in outward position and adapted to be retracted into said lock core by the insertion of a key thereinto, a cable wound on the hub of said spool-latch plate passing through an orifice in the wall of said casing, a head at the extremity of said cable fitting within an orifice in the wall of said casing periodically engaged by one of said locking projections, a base plate closing said casing and extending over the hub of said spool-latch plate whereby rotation of said lock core will rotate said spool-latch plate to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate into or out of engagement with said head at the extremity of said cable.

7. In a flexible shackel lock, a casing, a lock core housing centrally mounted within said casing provided with a plurality of lock receiving recesses about its extremity, a spool-latch plate closely and rotatably fitted within said casing against its inner end wall, a hub centrally disposed of said spool-latch plate rotatably fitting over said lock core housing, a plurality of rectangularly disposed locking projections on the periphery of said spool-latch plate aligned with said lock receiving recesses in said lock core housing, a lock core closely and rotatably fitted within said lock core housing affixed at its inner extremity to the hub of said spool-latch plate, locking means in the extremity of said lock core selectively engageable within one of said lock receiving recesses in said lock core housing when in outward position and adapted to be retracted into said lock core by the insertion of a key thereinto, a cable wound on the hub of said spool-latch plate passing through an orifice in the wall of said casing, a head at the extremity of said cable fitting within an orifice in the wall of said casing periodically engaged by one of said locking projections, a base plate closing said casing and extending over the hub of said spool-latch plate whereby rotation of said lock core will rotate said spool-latch plate to adjust the length of said cable outwardly of said casing and move the locking projections of said spool-latch plate into or out of engagement with said head at the extremity of said cable.

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