

[54] PADLOCK CONSTRUCTION

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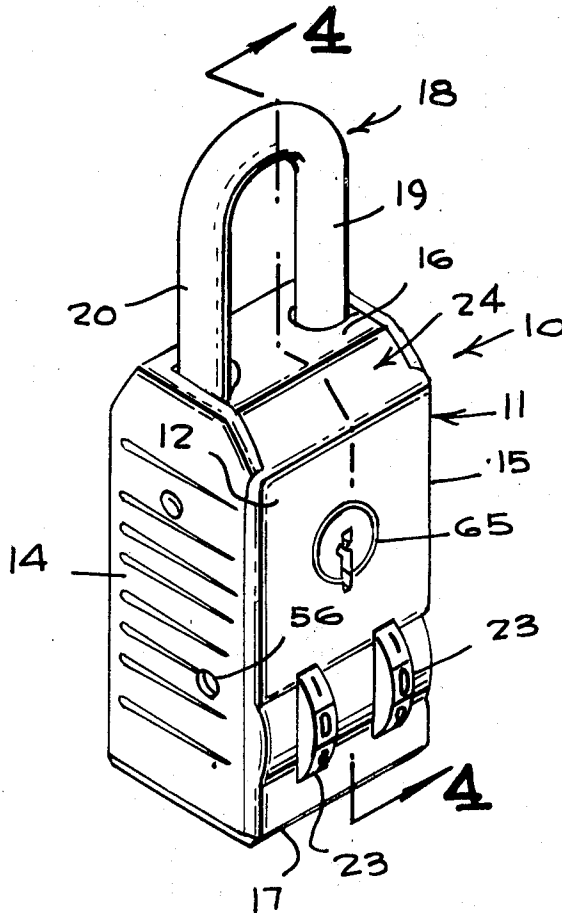
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[57] ABSTRACT

An exposed shackle combination padlock having a padlock body and a U-shaped shackle capable of lateral swinging movement to shift a shackle leg through an arcuate path between locking and unlocking positions. The padlock body includes an outer shell portion and a core portion reciprocally movable relative to each other. The other shackle leg is journaled in the core portion and the shell portion includes a barrier wall portion normally blocking the shackle in locking position when said shell and core portions occupy a selected registering position and shifted out of such blocking position when said shell and core portions are shifted to a displaced relative position. Combination dial wheel assemblies and a fence member selectively interlock the shell and core portions in the registering position. A key locking mechanism may also be provided in the padlock to make both combination locking and key locking available in the same padlock, or key locking alone.

19 Claims, 6 Drawing Figures



PADLOCK CONSTRUCTION

BACKGROUND AND OBJECTS OF THE INVENTION

The present invention relates in general to padlocks, and more particularly to padlocks of the combination lock type having a plurality of rotatable combination dial wheels arranged along a common axis of rotation to be set to a predetermined combination of dial numbers for releasing the padlock so that the shackle can be shifted to open position, and optionally also including key locking means.

While the type of lock construction commonly referred to as exposed shackle padlocks has been known and in commercial use for many years, it has been customary to construct the exposed shackle padlocks in such a way that the shackle, usually formed of a U-shaped rod of circular cross-section, has a longer leg and a shorter leg, both of which are received in sockets or openings in the top of the lock body, with the longer shackle leg supported in the lock body in a manner permitting both axial and rotary movement of the shackle relative to the axis of the longer leg. The shorter shackle leg is customarily latched by a dog member or latching formation in the padlock body with the end portion of the shorter shackle leg nested in its associated socket in the padlock body, and the longer shackle leg is restrained so that, when the padlock is unlocked, the shackle can be moved outwardly to a position withdrawing the end of the shorter shackle leg from its socket whereupon the shackle can be rotated angularly about the axis of the longer leg to decouple the shackle from or couple the shackle with a hasp assembly or other cooperating members to be locked. In some arrangements, the entire shackle can be withdrawn from the padlock body when the padlock is in unlocked condition, rather than having a longer shackle leg which is continuously restrained in the padlock body but allowed to undergo some axial movement.

It has been known in the prior art to provide locking mechanisms for such padlocks which are of either the key lock type or the combination lock type. In any event, the locking structure commonly comprised a relatively complex arrangement of locking members to latch and release the shackle relative to the padlock body. Also, where combination lock mechanisms were used in such padlocks, they frequently were of relatively complex and expensive construction, involving a plurality of peripherally gated tumbler wheels operated from a single dial, and often having expensive provisions for guarding the lock mechanism against unauthorized operation.

The present invention is concerned with a significantly simplified type of combination padlock wherein the shackle is released for movement to unlocking position in a completely different manner from arrangements heretofore provided, and wherein the combination locking mechanism is of a simplified type rendering the lock mechanism suitable for less expensive applications and facilitating manufacture of combination padlocks having 2, 3, 4 or more dial wheels. In the padlock mechanism of the present invention, a plurality of dial wheels are adapted to be angularly positioned to a predetermined combination number and are mounted in a main inner housing portion or core portion which is positioned within an outer housing portion in such a way as to normally prevent relative movement of the

inner and outer housing portions. The padlock is designed to admit movement of these housing portions relative to each other in a manner to release the shackle for rotatable movement about one of the legs to a released position when the proper combination number has been dialed. The dial wheels and their associated hubs are releasably intercoupled in such a way as to permit the combination to be changed when the two padlock housing portions are in the unlocked relative position. A key locking mechanism including a key controlled tumbler and mounting structure may be incorporated in the housing to provide key control as well as combination control, or key control alone.

An object of the present invention is the provision of a novel combination padlock construction applicable to a wide variety of installation conditions, which is relatively simple in construction and provides a novel structural arrangement and movement to achieve unlocking of the padlock shackle.

Another object of the present invention is the provision of a novel combination padlock construction which can be relatively inexpensively manufactured and wherein a plurality of adjustable dial members are rotatably supported side-by-side about a common axis of rotation on an inner padlock body portion which is movable relative to an outer padlock body portion when the dial members are in the proper combination position to permit releasing of the shackle to an unlocking position.

Other objects, advantages and capabilities of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings illustrating a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a perspective view of a combination padlock embodying the present invention, illustrating the same with the shackle and padlock body portions in closed or locked position;

FIG. 2 is a perspective view of the combination padlock embodying the present invention, illustrating the same in opened or unlocked position;

FIG. 3 is an exploded perspective view of the combination padlock;

FIG. 4 is a vertical section view taken along the line 4-4 of FIG. 1;

FIG. 5 is a vertical section view taken along the line 5-5 of FIG. 4; and

FIG. 6 is an exploded elevation view of the components making up the dial wheel and hub assembly for a three dial wheel installation, with certain components shown in partial section.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings, wherein like reference characters designate corresponding parts throughout the several figures, and particularly to FIGS. 1 to 4, there is illustrated an embodiment of a combination padlock, indicated generally by the reference character 10, having in accordance with usual practice the basic padlock components of a padlock body portion 11 of generally rectangular configuration having front and rear wall surfaces 12 and 13, side wall surfaces 14 and 15, and top and bottom surfaces 16 and 17. A generally U-shaped padlock shackle 18 extends upwardly in ex-

posed relation from the top surface 16 of the padlock body portion and includes a longer leg 19 and a shorter leg 20 each terminating at their lower ends within the padlock body and interconnected at their upper ends by an upwardly arched or curved intermediate portion 21 forming the bight of the shackle. Projecting through appropriate rectangular slots in the front wall surface 12 of the padlock body are segments of a plurality of dial wheels 23, two of which are shown in the embodiment of FIGS. 1 through 5, to permit observation of the numbers on the peripheries of the dial wheels and manual manipulation of the dial wheels to the desired combination positions.

The padlock body portion 11, as will be apparent from inspection of FIGS. 3, 4 and 5, is of a unique construction comprising a main inner body section 24 defining a frame for supporting most of the mechanical parts of the padlock, and an outer body section 25 forming a three sided shell or channel within which the inner body section 24 is reciprocally slidable vertically between locking and release positions. The outer body section 25 comprises channel side walls 26 and 27 and a channel base wall 28, forming respectively the side wall surfaces 14 and 15 and the rear wall surface 13 of the padlock body. Slidably movable vertically or longitudinally within the channel guideway defined by the walls 26, 27 and 28 is the inner body section 24, having a rectangular wall portion 29 defining the front wall surface 12 of the padlock body and having rearwardly extending integral side walls 30, 31 and top and bottom walls 32 and 33 defining a rectangular surround about a rearwardly opening mechanism chamber 34 which is normally covered by the base wall 28 of the outer body section 25.

The top wall 32 of the inner body section 24 has a first segmental socket 35 for the longer leg 19 of the shackle 18. The segmental socket 35 opens through the surface of the side wall 30 and is normally closed by the confronting side wall 27 of the channel shaped body section 25, and has an enlarged socket portion 35a spaced inwardly from the upper open end of the socket for accommodating the radially projecting foot formation 19a at the lower end of the shackle leg 19 to retain the lower end portion of the shackle leg 19 in the socket 35 while permitting rotation of the shackle about the axis of the shackle leg 19. At the opposite side portion of the top wall 32 of inner body section 24 is a recess 36 for the lower end portion of the shorter shackle leg 20 having an enlarged recess portion 36a spaced inwardly from the upper end of the recess for accommodating the radially projecting foot 20a extending from the bottom of the shorter shackle leg 20. The recess 36 includes a portion aligned with the medial transverse plane of the padlock body and with the socket 35 for receiving the circular cross-section shackle leg 20 when the shackle is in locking position and includes a lateral access passage or extension 36b extending along a curved path through the rear edge of the top wall 32 confronting the base wall 28 of the channel shaped body section 25 along an arc centered on the axis of the socket 35, to permit rotation of the lower end portion of the shorter shackle leg 20 from the normal locking position aligned with the diametric axis of the padlock body so as to swing laterally to an exposed position permitting coupling or decoupling of the shackle with suitable hasps or mating locking members of a closure or other device to be protected by the

lock. An upwardly and inwardly curving ear formation or shoulder 28a is provided at the upper end of the base wall 28 of the channel shaped outer body section 25 adjoining the channel side wall 26 and complementing the adjacent portion of the lateral extension 36b to fill the latter when the inner and outer body sections 24 and 25 are in the normal locking position illustrated in FIG. 1 to form a barrier to opening movement of the shorter leg 20 of the shackle 18.

The dial assembly for the combination lock mechanism is indicated generally by the reference character 40, and in the embodiment illustrated in FIGS. 1 to 5, comprises two dial wheels 23 of annular cylindrical configuration, having dial numerals on the peripheries thereof so as to be visible to the operator from the front of the padlock body, and having shallow V-shaped grooves transversely spanning the dial wheel peripheries in parallelism with the axes of the dial wheels and located between the successive numbers on each dial wheel 23. The dial wheels 23 may be part of dial wheel assemblies including a dial wheel and a hub, similar to the dial wheel assemblies illustrated and described in my earlier U. S. Pat. No. 3,555,860 granted Jan. 19, 1971, wherein each of the dial wheels 23 has an axial bore 41 extending therethrough provided with a plurality of concave notches in the inwardly facing surface thereof, 10 of such notches being present in the illustrated example. Interfitted into the bore 41 of each dial wheel 23 is a hub member 42, the several hub members being of like exterior construction but varying in some minor details as later described. Each of the hubs 42 includes a relatively smaller diameter, substantially cylindrical body portion 43a of a diameter corresponding to the minimum diameter of the bore 41 in the associated dial wheel 23 for relative rotation therein, and also includes a larger diameter collar formation 43b of larger diameter than the minimum diameter of the bore 41 adapted to normally butt against the confronting face of the adjacent dial wheel 23. One or more eccentrically located, axially elongated interlocking pins or lugs 43c project axially from the collar formation 42b to be received in the notches in the inwardly facing surface of the bore 41 and interlock the associated dial wheel 23 with the hub 42 against relative angular movement at any of the 10 selected angular positions corresponding to the ten dial numbers on the periphery of the dial wheel 23.

In the embodiment illustrated in FIGS. 3, 4 and 5, the left hand hub 42a has a solid cylindrical body portion 43a which is of an axial length sufficient to extend entirely through the bore 41 of the associated dial wheel 23 and be journaled in circular opening 44a in the side wall 30 of the inner core or body section 24 of the padlock body portion when the collar 43b bears against the confronting face of the associated dial wheel 23. The hub 42a also includes an integral, smaller diameter stub shaft 43d which is surrounded by a coil spring 45 and extends loosely into a cylindrical bore 43e opening through the collar end of the right hand hub 42b as illustrated in FIG. 3. The hub 42b also has a cylindrical body portion 43a which is closed at its outer end opposite the collar formation and is of sufficient axial length to project entirely through the bore 41 of the right hand dial wheel 23 as illustrated in FIG. 3 and into the journal opening 44b in the side wall 31 of the inner core section 24 of the padlock body portion. In this manner, the two hubs 42a and 42b are journaled in coaxial

alignment along a common transverse axis of the padlock body with the smaller diameter ends of the cylindrical body portions 43a journaled in the openings 44a and 44b and with the collar formations 43b adjacent each other but with the hubs biased oppositely outwardly by the intervening spring 45 surrounding the stub shaft 43d.

Each of the collar formations 43b have a flat or relieved portion 43b' at a selected angular position thereon whereby, when the associated dial wheels and hubs are angularly positioned so that the flats are parallel to each other and face toward the rear wall portion 13 of the padlock body, the flats aline with the downwardly extending leg portion 46 of a pivoted fence lever 47 having rearwardly extending apertured ears 48 through which extends a pivot pin 49, rivet or similar structural member. An upwardly extending end portion 50 of the fence lever 47 projecting above the axis of the pivot pin 49 terminates in a tongue 50a extending into a slot in a leaf spring member 51 having upper spring legs 52a which bear against the inner surface of the padlock housing wall 29. The spring 51 has depending lower legs 52b terminating in slightly rounded end portions forming detent fingers to engage the peripheries of the dial wheels 23 and frictionally interfit in the V-shaped grooves on the dial wheel peripheries to restrain them at the angular positions to which they are manually adjusted. The lower end of the fence lever leg portion 46 terminates in a rearwardly projecting flange or foot 46a defining a shoulder or stop surface which normally laps under a forwardly projecting integral stationary lug or stop formation 53 on the base wall 28 defining the rear wall surface 13 of the outer body section 25 to thereby restrain the inner core or body section 24 from upward movement relative to the channel shaped outer body section 25 from the normal locking position illustrated in FIGS. 1 and 4.

The inner and outer padlock body sections 24 and 25 are coupled together for relative vertical reciprocative movement from the registered or normal locking position of FIG. 1 to the displaced or unlocking position of FIG. 2 by suitable fastening means, such as the fastening pin or rivet 54 having its opposite end portions fixed in openings in the channel side walls 26 and 27 of the outer padlock body section 25 and extending through vertically elongated slots 55 in the side walls 30, 31 of the inner core section 24, the slots 55 being of sufficient length to accommodate the desired range of relative vertical movement between the registered and displaced positions.

To provide for key locking of the padlock, as well as combination locking, a key lock mechanism indicated generally by the reference character 60 is provided in the inner core section 24, and comprises essentially a laterally slidable key controlled tumbler mechanism or bolt 61 guided for lateral sliding movement parallel to the axis of the dial wheels by a generally box-like housing 62 having upper and lower mounting flanges 63 provided with holes for studs 64 to mount the housing on the wall portion 29 of the padlock body. The padlock body 11 is suitably apertured to journal a conventional key bushing 65 having a constricted portion which extends through the aperture in the wall portion 29, and the horizontal upper and lower surfaces of the box-like portion of the housing 62 at the roots of the flanges 63 define guide surfaces for the upper and lower edges of the tumbler 61 to constrain the latter to

rectilinear movement. The tumbler 61 has a loop portion 61a apertured to receive the key bit, and is spring biased downwardly within the housing by the spring 66 to resiliently restrain the bolt in a locking or an unlocking position wherein one or the other of the opposite bolt portions 61b and 61c of the tumbler projects from the housing. The detent formation 61b' bears against the lower edge of a slot in housing 62 and restrains the bolt in two positions. The bolt portion 61b when projecting from the housing in the locked position, extends through an accommodating slot 67a in the side wall 31 of the padlock core portion and into a locking recess 68 forming a keeper recess for the bolt to interlock the core portion 24 and the outer body section 25 against relative movement from the locking position illustrated in FIG. 1. A slot 67b is provided in the wall 30 opposite the slot 67a to receive the opposite bolt portion 61c of the tumbler to accommodate movement of the tumbler to an unlocking position wherein the bolt portion 61b is withdrawn from the recess 68 freeing the core portion 24 and outer body portion 25 for relative movement to the unlocking position illustrated in FIG. 2.

In the initial assembly of the combination padlock, the dial wheel assemblies each including a dial wheel 23 and a hub 42 are assembled together, for example by interfitting the hubs 42 in the dial wheel bores 41 of the associated dial wheels 23, and fitting the spring 45 over the stub shaft 43d of hub 42a and positioning the free end of the stub shaft in the bore 43e of the companion hub 42b, assuming a two dial wheel installation is being assembled. The hub portions 42a and 42b with the wheels assembled thereon are moved sufficiently close together, compressing the spring 45 therebetween, to permit the outer ends of the hub body portions 43a to be fitted in the axis grooves 44c in the confronting inner faces of the side walls 30 and 31 of the inner core section 24, whereupon the dial wheel assemblies can be moved toward the front wall surfaces 12 until the smaller diameter hub body portions 43a register with and spring outwardly into journaled relation in the openings 44a and 44b. The leaf spring 51 is then assembled with the fence lever 47 by interfitting the tongue portion 50a into the slot of the leaf spring and these assembled components may then be positioned within the mechanism chamber 34 and pinned into position by the pivot pin or rivet 49 extended through the openings therefor in the side walls 30 and 31 of the inner core section 24. The shackle 18 may then be assembled with the inner core section 24 by fitting the foot portion 19a of the longer leg 19 into the enlarged base portion 35a of the socket 35 which opens laterally through the surface of the side wall 30 of the core section 24, and the shackle can then be rotated about the axis of the leg 19 to move the lower portion of the shorter leg 20 through the lateral extension or access passage 36b into fully seated relation in the recess 36 with the foot portion 20a in the enlarged recess portion 36a. The inner core section 24 with these assembled components is then slidably interfitted in the channel defined between the side walls 26, 27 and base wall 28 of the outer body section 25 and the pin or rivet 54 is passed through the slots 55 and into the openings therefor in the outer section side walls 26 and 27 and are staked or otherwise fastened therein.

In the locked or registered condition of the inner core section 24 and outer body section 25, as illustrated in FIGS. 1 and 4, the shorter shackle leg 20 is re-

strained in locked condition with the padlock body because of the closing of the access passage 36b by the barrier portion 28a of the outer section base wall 28, forming a barricade against opening swinging movement of the shackle 18. When the dial wheels 23 are displaced from the proper combination positions, the larger radius portions of the hub collars 43b about the leg 46 of the fence lever 47 maintaining the fence lever in the solid line position illustrated in FIG. 4 wherein the stop flange 46a is hooked under the stationary lug 53 and prevents relative upward movement of the core section 24 and shackle 18 with respect to the outer body section 25. When the proper combination numbers are dialed, the flats 43b' on the hub collar formations then face toward and parallel the leg 46 of the fence lever 47, permitting angular movement of the fence lever leg 46 toward the front surface 12 of the lock body to the broken line position illustrated in FIG. 4. When the hub flats 43b' assume this position, the stop flange 46a is withdrawn from beneath the stationary lug 53 by the action of the spring 51 resiliently shifting the fence lever to this release position. The operator may then pull upwardly on the shackle 18 while holding the channel shaped outer body section 25, thereby drawing the shackle 18 and the inner core section 24 upwardly relative to the outer body section 25 to assume the condition illustrated in FIG. 2, wherein the barrier portion 28a of the outer body section 25 is relatively displaced downwardly out of intercepting position in the access passage 36b to permit manual rotation of the shackle 18 about the axis of the longer leg 19 and thereby swing the shackle to the release position illustrated in FIG. 2.

A pair of small diameter openings 56 are provided in the channel side walls 26, 27 of the outer body section 25 at locations to register with the outer ends of the hub body portions 43a in the openings 44a, 44b, when the body sections 24, 25 are at the relatively displaced unlocking positions to permit change of the combination by the operator when desired. The operator merely inserts a small circular tool or instrument through the opening 56 to press the end of the adjacent hub 42 inwardly toward the center of the lock body a sufficient distance to decouple the lugs 43c from the notches in the dial wheel bore 41 so that the dial wheel can then be rotated to the new combination position desired. During this movement, the hub is restrained against rotation because of engagement of the flat 43b' on the collar formation against the confronting surface of the fence lever leg 46 which is held outwardly by abutment of its stop flange 46a with the forwardly facing surface of the stationary lug 53. The relative setting of the dial wheel and hub for either or both of the dial wheel assemblies can be changed, as desired, in this manner when the padlock is in unlocked condition with the inner and outer body sections 24, 25 in the displaced or unlocking relation.

Key operation of the lock is provided by inserting a key in the bushing 65 to position the key bit in the opening in bolt 61 and rotating the key to throw the bolt to either project end 61b into recess 68 to establish locking condition or to retract the bolt to unlocking position. By the construction herein described, both combination locking and key locking are provided in a unique manner having many advantages, but key locking alone is contemplated.

It will be appreciated that the same basic lock construction can be provided with three, four or more dial wheels and a corresponding number of hubs, depending only upon the size of the lock body and the dimensions of the dial wheels and hubs. An exploded view of an assembly of three dial wheels and three hubs is illustrated in FIG. 6, wherein both of the outermost hubs, indicated by the reference character 42b are of like construction similar to the construction of the hub 42b illustrated in FIG. 3, each having an inwardly opening cylindrical bore 43e. The other hub, indicated by the reference character 42c, is similar to the hub 42a of FIG. 3, in that it includes a stub shaft 43d extending from the collar end thereof to project through a coil spring 45 into the bore 43e of the right hand hub 42b. The smaller cross-section cylindrical body portion 43a of the middle hub 42c, rather than being a solid cylinder as in the FIG. 3 embodiment, is of annular cylindrical configuration defining a bore opening to the left as viewed in FIG. 6 corresponding substantially in axial depth and diameter to the bore 43a in the left hand hub 42b to receive a spacer pin 57 whose opposite ends project into the confronting bores in these two adjacent hubs. The fence and leaf spring for use with such a three dial wheel assembly are modified to be compatible with this construction, for example by providing a cut-out slot in the leg 46 of the fence lever 47 to accommodate the segment of the middle dial wheel 23 which needs to extend therethrough. It will be apparent that with such a three dial wheel construction, the combination may be changed when the inner and outer body sections 24 and 25 are in displaced or unlocking position in a manner similar to that described in connection with the preceding embodiment, by extending a small cylindrical instrument or tool through the adjacent opening 56 to press inwardly the right hand hub 42b illustrated in FIG. 6 until it is decoupled from its dial wheel 23, followed by rotation of the dial wheel to the new combination position, and by inserting the tool through the opposite opening 56 to displace inwardly the left hand hub 42b as viewed in FIG. 6, and thereby decouple both the left hand hub and the center hub from their associated dial wheels for manipulation of those dial wheels to the new combination positions.

An assembly of four dial wheels and hubs could be employed in a manner similar to the assembly illustrated in FIG. 6, with the addition of another dial wheel, and a hub similar to the hub 42b but having the bore extending entirely therethrough, disposed between the left hand wheel and hub and the center wheel and hub as viewed in FIG. 6. In that modification, the pin 57 would be somewhat longer than that illustrated in FIG. 6, as it must extend from the left hand hub 42b entirely through the next adjacent hub and into the bore in the hub similar to hub 42c. In that installation, pressing inwardly on the left hand hub 42b as viewed in FIG. 6 would decouple that hub as well as the next two adjacent hubs progressing to the right thereof from their associated dial wheels for manual adjustment of those dial wheels to the new combination positions.

What is claimed is:

1. An exposed shackle combination padlock comprising a padlock body and a U-shaped shackle having first and second legs, the shackle being capable of lateral swinging movement about the axis of the first leg to shift the second leg through an arcuate path between locking and unlocking positions, the padlock body in-

cluding an outer shell portion and a core portion reciprocally movable relative to each other in directions paralleling said axis, said core portion including means supporting said first leg for lateral swinging movement relative to the core portion and for reciprocative movement with said core portion relative to the shell portion, the shell portion including a barrier wall portion having a normal blocking position barring movement of said second leg from said locking position when said shell and core portions occupy a selected registering position, said barrier wall portion being moved out of such blocking position when said shell and core portions are shifted to a displaced relative position along said axis to permit movement of the second shackle leg to unlocking position, a fence member carried by said core portion, and combination dial wheel assemblies for normally holding the fence member at a position restraining the core and shell portions against displacement from said registering position and having relieved portions for accommodating movement of the fence member to a release position when the dial wheel assemblies assume a selected combination condition to permit movement of the shell and core portions to the displaced relative position.

2. An exposed shackle combination padlock as defined in claim 1, wherein said core portion has a recess for accommodating said second leg at the locking position thereof and a curved access passage communicating with said recess to accommodate a portion of said second leg during its movement through said arcuate path to unlocking position, and said barrier wall portion being integral with the shell portion and occupying said access passage when the shell and core portions are in said registering position.

3. An exposed shackle combination padlock as defined in claim 1, wherein said shell portion is of elongated channel shaped configuration defining a base wall portion and channel side wall portions surrounding three sides of said core portion and defining a slide channel within which the core portion is relatively movable along a slide axis between said registering position and said displaced relative position.

4. An exposed shackle combination padlock as defined in claim 2, wherein said shell portion is of elongated channel shaped configuration defining a base wall portion and channel side wall portions surrounding three sides of said core portion and defining a slide channel within which the core portion is relatively movable along a slide axis between said registering position and said displaced relative position.

5. An exposed shackle combination padlock as defined in claim 1, wherein said first and second legs of said shackle have laterally extending feet at the lower ends, thereof, and said core portion having means defining socket formations opening through an end wall thereof for accommodating the lower end portions of said shackle legs and having enlarged socket portions spaced inwardly from said end wall for accommodating said feet and restraining the shackle against movement outwardly of said end wall in the direction of said axis.

6. An exposed shackle combinations padlock as defined in claim 3, wherein said first and second legs of said shackle have laterally extending feet at the lower ends thereof, and said core portion having means defining socket formations opening through an end wall thereof for accommodating the lower end portions of said shackle legs and having enlarged socket portions

spaced inwardly from said end wall for accommodating said feet and restraining the shackle against movement outwardly of said end wall in the direction of said axis.

7. An exposed shackle combination padlock as defined in claim 5, wherein one of said socket formations defines a recess for accommodating said second leg when the shackle is in locking position and includes a curved access passage extending along said arcuate path for movement of the lower end portion of said second leg to said unlocking position, and said barrier wall portion being integral with the shell portion and occupying said access passage when the shell and core portions are in said registering position.

8. An exposed shackle combination padlock as defined in claim 1, wherein said core portion includes socket formations opening through an end wall for accommodating the lower end portions of said first and second legs, said first and second legs having laterally projecting feet extending from the lower ends thereof, and the socket formation for said first leg extending laterally through a side of said core portion and being closed by an adjacent side portion of said shell portion when the shell and core portions occupy said registering position.

9. An exposed shackle combination padlock as defined in claim 3, wherein said core portion includes socket formations opening through an end wall thereof for accommodating the lower end portions of said first and second legs, said first and second legs having laterally projecting feet extending from the lower ends thereof, and the socket formation for said first leg extending laterally through a side of said core portion and being closed by an adjacent side portion of said channel shaped shell portion when the shell and core portions occupy said registering position.

10. An exposed shackle combination padlock as defined in claim 1, wherein said dial wheel assemblies are disposed in axially spaced coaxial relation along a common dial wheel axis transverse to said axis of said first leg, each dial wheel assembly comprising an outer annular wheel member having a central bore and an indicia bearing periphery and an inner hub slidably and rotatably journaled for movement relative to said common axis and extending entirely through the bore of the associated wheel member, a pair of the hubs having cylindrical end portions journaled in said core portion and each of the hubs having a circumferential portion coacting with said fence member to restrain the latter in locking position and having a flat at a selected angular position for admitting unlocking movement of the fence member.

11. An exposed shackle combination padlock as defined in claim 2, wherein said dial wheel assemblies are disposed in axially spaced coaxial relation along a common dial wheel axis transverse to said axis of said first leg, each dial wheel assembly comprising an outer annular wheel member having a central bore and an indicia bearing periphery and an inner hub slidably and rotatably journaled for movement relative to said common axis and extending entirely through the bore of the associated wheel member, a pair of the hubs having cylindrical end portions journaled in said core portion and each of the hubs having a circumferential portion coacting with said fence member to restrain the latter in locking position and having a flat at a selected angular position for admitting unlocking movement of the fence member.

12. An exposed shackle combination padlock as defined in claim 3, wherein said dial wheel assemblies are disposed in axially spaced coaxial relation along a common dial wheel axis transverse to said axis of said first leg, each dial wheel assembly comprising an outer annular wheel member having a central bore and an indicia bearing periphery and an inner hub slidably and rotatably journaled for movement relative to said common axis and extending entirely through the bore of the associated wheel member, a pair of the hubs having cylindrical end portions journaled in said core portion and each of the hubs having a circumferential portion coacting with said fence member to restrain the latter in locking position and having a flat at a selected angular position for admitting unlocking movement of the fence member.

13. An exposed shackle combination padlock as defined in claim 4, wherein said dial wheel assemblies are disposed in axially spaced coaxial relation along a common dial wheel axis transverse to said axis of said first leg, each dial wheel assembly comprising an outer annular wheel member having a central bore and an indicia bearing periphery and an inner hub slidably and rotatably journaled for movement relative to said common axis and extending entirely through the bore of the associated wheel member, a pair of the hubs having cylindrical end portions journaled in said core portion and each of the hubs having a circumferential portion coacting with said fence member to restrain the latter in locking position and having a flat at a selected angular position for admitting unlocking movement of the fence member.

14. An exposed shackle combination padlock as defined in claim 8, wherein said dial wheel assemblies are disposed in axially spaced coaxial relation along a common dial wheel axis transverse to said axis of said first leg, each dial wheel assembly comprising an outer annular wheel member having a central bore and an indicia bearing periphery and an inner hub slidably and rotatably journaled for movement relative to said common axis and extending entirely through the bore of the associated wheel member, a pair of the hubs having cylindrical end portions journaled in said core portion and each of the hubs having a circumferential portion coacting with said fence member to restrain the latter in locking position and having a flat at a selected angular position for admitting unlocking movement of the fence member.

15. An exposed shackle combination padlock as defined in claim 1 including a key operable bolt member supported by one of said body portions for reciprocative movement between a locking and unlocking position, the other body portion having a locking recess to receive an end portion of said bolt member in interlocking relation when the bolt member is in said locking position and the shell and core portions occupy said registering position, and a key bushing journaled in said one of said body portions for admitting a portion of a key into operative engagement with the bolt member for moving the latter between its locking and unlocking positions.

16. An exposed shackle combination padlock as defined in claim 4 including a key operable bolt member supported by one of said body portions for rectilinear reciprocative movement between a locking and an un-

locking position, the other body portion having a locking recess to receive an end portion of said bolt member in interlocking relation when the bolt member is in said locking position and the shell and core portions occupy said registering position, and a key bushing journaled in said one of said body portions for admitting a portion of a key into operative engagement with the bolt member for moving the latter between its locking and unlocking positions.

17. An exposed shackle combination padlock as defined in claim 13 including a key operable bolt member supported by one of said body portions for rectilinear reciprocative movement between a locking and an unlocking position, the other body portion having a locking recess to receive an end portion of said bolt member in interlocking relation when the bolt member is in said locking position and the shell and core portions occupy said registering position, and a key bushing journaled in said one of said body portions for admitting a portion of a key into operative engagement with the bolt member for moving the latter between its locking and unlocking positions.

18. An exposed shackle padlock comprising a padlock body and a U-shaped shackle having first and second legs, the shackle being capable of lateral swinging movement about the axis of the first leg to shift the second leg through an arcuate path between locking and unlocking positions, the padlock body including an outer shell portion and a core portion reciprocatively movable relative to each other in directions paralleling said axis, said core portion including means supporting said first leg for lateral swinging movement relative to the core portion and for reciprocative movement with said core portion relative to the shell portion, the shell portion including a barrier wall portion having a normal blocking position barring movement of said second leg from said locking position when said shell and core portions occupy a selected registering position, said barrier wall portion being moved out of such blocking position when said shell and core portions are shifted to a displaced relative position along said axis to permit movement of the second shackle leg to unlocking position, and manually operable means for normally restraining the core and shell portions against displacement from said registering position, and movable to a release position for accomodating movement of the core portion relative to the shell portion to the displaced relative position to effect said unlocking position.

19. An exposed shackle padlock as defined in claim 18 wherein said manually operable means for normally restraining the core and shell portions against displacement from said registering position include a key operable bolt member supported by one of said body portions for reciprocative movement between a locking and unlocking position, the other body portion having a locking recess to receive an end portion of said bolt member in interlocking relation when the bolt member is in said locking position and the shell and core portions occupy said registering position, and a key bushing journaled in said one of said body portions for admitting a portion of a key into operative engagement with the bolt member for moving the latter between its locking and unlocking positions.

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