

UNITED STATES PATENT OFFICE.

EDUARD MEISE, OF ALLEGHENY CITY, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO OSCAR ZISTEL, OF SANDUSKY, OHIO.

PERMUTATION-PADLOCK.

SPECIFICATION forming part of Letters Patent No. 372,425, dated November 1, 1887.

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To all whom it may concern:

Be it known that I, EDUARD MEISE, of Allegheny City, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Permutation-Padlocks; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to locks, its object being to devise a permutation-padlock of simple construction which is specially applicable to the doors of freight-cars and for locking switches and like connections, and which is capable of change into many different combinations, so that a different combination may be employed for each lock and greater safety be obtained than in the devices now employed in locking cars, thus preventing the tampering with the contents of the cars, and at the same time obviating the necessity of carrying keys for locking them.

It is well known that in connection with the locking of freight-cars many different expedients have been employed for preventing the tampering with the locks and avoiding access to the contents of the car, regular car-locks being at first employed and the keys being intrusted to certain persons to unlock them; but, it being found that the keys were lost or duplicated in some way, this did not give sufficient protection. The next expediency was to employ seals in connection with the locks, these seals being frangible, and it was necessary to break the seal before the key-hole of the lock was exposed and before access could be obtained to the contents of the car. It was found, however, that these seals were duplicated, and that the desired protection was not obtained, and for that reason in late years locks have been practically dispensed with, the only devices in general use being lead seals, which are found best adapted for the purpose. It has been shown, however, that these lead seals could be opened and, after the contents of the car were tampered with, could be again closed, so that the fact of access to the car having been obtained was not shown by the loss of the seal, and it has become necessary to provide some means for locking these cars which shall be strong, which shall not require the use of keys, which are liable to become lost, and which will entirely exclude access to the contents of

the cars, except by those who are authorized and to whom it is desired to give access.

The object of my invention is to provide an improved combination or permutation padlock for this purpose, and in doing so to provide a padlock which is simple in construction, and yet which cannot be opened except by those knowing the combination, and at the same time provide a lock by which all the different cars can be provided with a separate or distinct combination, so that the knowledge of the combination for opening one car will not give access to any of the others.

To this end it consists, generally, in the combination of a hasp or bow having pivoted thereto a block, to which is pivoted the bolt or bar for engaging with the other end of the hasp, so that the bolt can be operated by a sliding movement and controlled by tumblers or similar devices fitting around the same, the hinging of the three parts together permitting the sliding of the bolt until it is withdrawn from the opposite arm or end of the hasp or bow.

It also consists in a sliding bolt hinged to a block, which in turn is hinged to one arm of the hasp and the bolt entering into a seat in the other end of the hasp by a sliding movement, and combining therewith a series of tumblers fitting around and having a rotary and a sliding movement on the bolt.

It also consists in providing the tumbler at the outer end of the bolt with a catch or similar device to prevent it from dropping from the bolt when the lock is open.

It also consists in providing the hinge portion of the hasp with an extending lug or lip, which so engages with the tumbler nearest the block as to prevent the opening of the lock until the proper combination is brought into position.

It also consists in other details of construction, as hereinafter more specifically set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view showing the lock in its locked position. Fig. 2 is a sectional view showing it in the same position. Fig. 3 is a view, partly in section, showing it unlocked.

Fig. 4 is a cross-section showing the parts when the lock is opened, and Figs. 5, 6, and 7 are detailed views of the sleeves, tumblers, and other parts.

5 Like letters of reference indicate like parts in each.

The body of the padlock is formed of three parts—the hasp or bow *a*, the hinged block *b*, which is hinged or pivoted thereto, and the bolt *c*, which is hinged or pivoted to the block *b*, the outer end of this bolt entering longitudinally into the seat *c'* at the other end of the hasp or bow. As the space between the block *b* and the other end, *a'*, of the bow is entirely filled by the tumblers forming the combination, as hereinafter referred to, it is evident that the only manner in which the bolt can be entered into or withdrawn from the seat *c'* is by the swinging of the hinge-block *b*, as shown in Fig. 3, the hinge *e* between the block and the hasp permitting this block to be drawn into the position shown in said figure, and the block thus acting to draw the bolt out of its seat, the bolt swinging on its hinge *f* during such movement, and so being withdrawn from the seat, after which the bolt can be swung out to one side and permit the hasp to be placed within the staple *g* of the car or other lock.

30 The locking devices employed consist of a number of tumblers, *i*, fitting around the bolt *c*, which is cylindrical, the bolt having at certain points thereon the lugs *m*, and the tumblers having the annular depressions or seats *n*, preferably on one side, within which these lugs *m* fit, so that the tumblers can be turned or revolved upon the bolt-shaft, the tumblers also having the longitudinal grooves or slots *p*, through which these lugs *m* on the bolts pass, so as to permit the longitudinal movement of the bolt through the tumblers or the tumblers upon the bolt, it being necessary, in order to slide the tumblers over the bolt, to cause the lugs *m* and the slots *p* to coincide, when the bolt can be drawn through the tumblers, the lugs *m* entering within the slots *p*.

Fitting around the tumblers *i* are the sleeves *h*, these sleeves being connected to the tumblers by key-and-slot connections, so that the sleeves will turn the tumblers and yet will slide over the same, so that in case of longitudinal movement or play of the sleeves there is no such movement imparted to the tumblers, and there is no opportunity of any person, by a longitudinal movement of the sleeves, feeling the location of the slots *p* of the tumblers and throwing the lugs *m* into said slots, so that the lock can be opened. In order to change the combination employed, the sleeves *h* have formed therein a series of slots or keyways, *k*, into which the keys *l* on the tumblers fit, and outer grooves, *k'*, corresponding thereto, for indicating the position of the keyways, these keyways and grooves corresponding to the number of figures or letters placed upon the sleeves *h*, so that by turning the sleeves they

can be caused to pass over and engage the tumblers in any desired position, and the combination thus be changed. As the sleeves *h* are liable to slide over onto the adjoining tumblers, the keys *l* are made shorter than the full length of the tumblers, thus giving movement for such play and preventing the keys from engaging with any tumbler except the one with which it is intended to engage; and in this way I am enabled to prevent the connecting of two or more tumblers and prevent the feeling of the parts composing the lock in such way as to discover the combination of the lock, even though there may be a slight longitudinal play of the parts when the device is locked.

In order to hold the tumblers upon the bolt *c*, the end of the slot *p* in the last tumbler is closed by a plate, *p'*, which strikes against the lug *m*, so confining the end tumbler upon the bolt, though permitting a sufficient movement of said tumbler for the operation of the lock. The annular recess or seat *n* of this end tumbler is also closed by means of a flange, *n'*, which fits closely around the bolt and prevents the entrance of dirt or the examination of the construction of the lock.

In order to confine the sleeves *h* upon the tumblers, the end sleeve is rigidly secured to the end tumbler by any suitable device—such as a set-screw—this set-screw or other like device being employed because it is desirable to open the lock and change the combination.

In order to prevent the swinging of the block *b* until the proper combination is arranged, I employ a lug upon the hinged end of the hasp *a*, as at *r*, which extends down a sufficient distance to press against the inner tumbler, or, as preferred by me, against the washer *r'*, which is employed between the tumbler and the block *b*, this lug *r* preventing the swinging of the hinge *e* until the washer *r'* is drawn from its position against the lug, and this lug so acting to hold the device in its locked position, the lug *r*, when the padlock is in its locked position, fitting within a seat, *s*, in the block *b*, but being thrown from said seat as soon as the block moves on its hinge, and so pressing against the washer as to prevent the opening of the padlock. This lug *r* prevents the opening of the padlock without forming the combination for which the lock is set, in the following manner: If for any cause the bolt *c* is released from its seat in the end of the bow, as by sawing it through near the latter, the bolt cannot be swung down or the bow upward to open the padlock, because sufficient room is not given between the outer surface of the last tumbler or the washer *r'* and the block *b* to permit the lug *r* to move out of its seat in the block, which it must do when the block is turned on its pivot on the bow, or vice versa. As soon, however, as the combination is formed, the tumblers slide along the bolt and leave ample room for the movement of the lug out of its seat in the block.

Thus, until the combination is formed, the bolt cannot be swung down or the bow up so as to release the padlock, as the lug *r* strikes against the end tumbler, which, being unmovable, prevents further movement.

In order to automatically open the padlock when the combination is formed, and keep the tumblers and sleeves in close contact with each other and so cause them to remain in any position on the bolt to which they are turned, I insert a spring, *t*, between the block *b* and the first tumbler, or, when the washer *r'* is used, between it and the tumbler, which spring, when the parts are locked, is compressed between the block *b* and the tumblers; but as soon as the lugs *m* on the bolt are in line with the slots *p* in the tumblers—that is, when the combination is formed—the spring expands backward, forcing the block *b* outward and drawing the bolt *c* from its seat in the bow *a*. A suitable index-finger may be employed with the lock to indicate the position of the tumblers with the lock upon the same.

The operation of my improved padlock is as follows: When the same is to be locked, the hasp *a* is passed through the staple and the tumblers are moved upon the bolt until the proper combination is obtained—such, for instance, as the combination 75924—in which case the tumblers can be moved longitudinally upon the bolt, and by swinging back the hinged block *b* the bolt can be brought in line with the seat *c'* in the opposite end of the hasp or bow, and by pressing upon the bolt it will be caused to pass through the tumblers, which are still held in proper line, and enter said seat, the lugs *m* of the bolt sliding out of the slots *p* and into the annular seats *n* of the tumblers. The tumblers are then turned so as to destroy the combination. In opening the padlock it is necessary, by means of the sleeves *h*, to draw the tumblers into proper position, so that the lugs *m* on the bolt will coincide with the slots *p* in the tumblers, and then by pressing on the block *b* the bolt can be drawn through the tumblers to the position shown in Fig. 3, the block *b* swinging on the hinge *e*. The bolt can then be swung outwardly by means of its hinge *e*, and the padlock thus opened, as in Fig. 4. In case, however, any person attempts to open the padlock who does not know the combination, as the sleeves *h* slide over the tumblers, it is evident that he cannot by feeling discover the positions of the tumblers or to bring them into coincidence with the lugs on the bolt; and as he is not able to bring them into such line that the bolt can slide through the tumblers, if he draws upon the bolt he carries back with the bolt one or more tumblers, and the tumblers cause the washer *r'* to press against the lug *r* at the end of the hasp, which prevents the swinging of the

hinged block *b*, and so prevents the opening of the padlock. As the tumbler and its sleeve at the end of the bolt are connected together, as above described, there is no liability of the parts of the padlock dropping off the bolt when it is withdrawn from the hasp.

My improved padlock, though applicable to any suitable padlock or staple connection, is specially applicable to the use, before referred to, on railroad cars, as it provides a padlock which can be arranged in an infinite number of combinations, and which, in connection with the number of the car or by some other means, can indicate to the person desiring to open them the numbers of the proper combination in the locks on the different cars; and as it dispenses entirely with keys, a great objection to the lock on freight-cars is entirely overcome. At the same time it gives ready access to the proper person to the car, and as it can be secured to the hasp and locked in position it prevents the tampering therewith by any persons in filling the car or emptying it. The padlock is simple in construction and can be made heavy, so that there is no liability of it getting out of order.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a permutation-padlock, the combination of a bow, a block hinged thereto, a bolt hinged to said block and adapted to enter a seat in the end of said bow, and a series of locking-tumblers fitting around the bolt for locking the same in said seat, substantially as and for the purpose set forth.

2. In a permutation-padlock, the combination of a hasp or bow, a block hinged thereto, a bolt hinged to said block, a series of tumblers fitting around the bolt and engaging with devices thereon, and a spring between the block and the tumblers, substantially as and for the purpose set forth.

3. In a permutation-padlock, the combination of the hasp or bow having the lug *r* at the hinge end, the block *b*, hinged to said hasp, and the bolt *c*, hinged to said block and carrying a series of locking-tumblers, substantially as and for the purposes set forth.

4. In a permutation-padlock, the combination of the hasp or bow having the lug *r* at the hinge end thereof, the block *b*, hinged to said hasp, the bolt *c*, hinged to said block, a series of locking-tumblers, *i*, thereon, sleeves *h*, fitting on said tumblers, and the washer *r'*, substantially as and for the purposes set forth.

In testimony whereof I, the said EDUARD MEISE, have hereunto set my hand.

EDUARD MEISE.

Witnesses:

N. S. STOCKWELL,
JAMES I. KAY.