

(No Model.)

2 Sheets—Sheet 1.

J. T. MARLIN.
LOCK.

No. 534,273.

Patented Feb. 19, 1895.

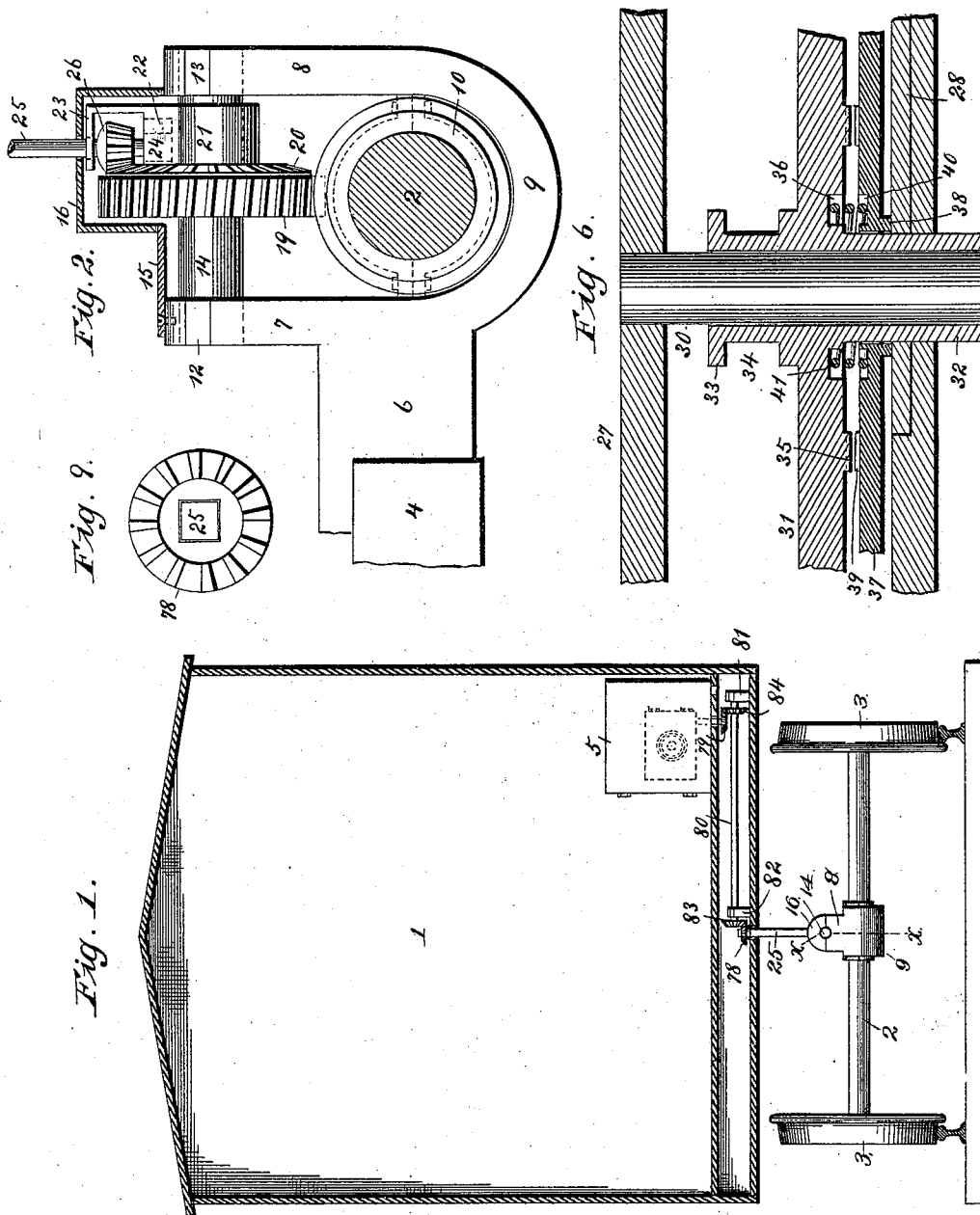


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 6.

Witnesses:

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Inventor:
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(No Model.)

2 Sheets—Sheet 2.

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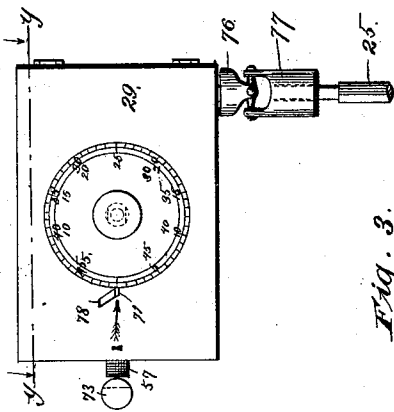
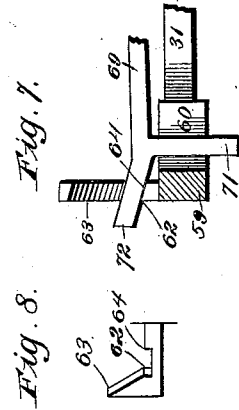
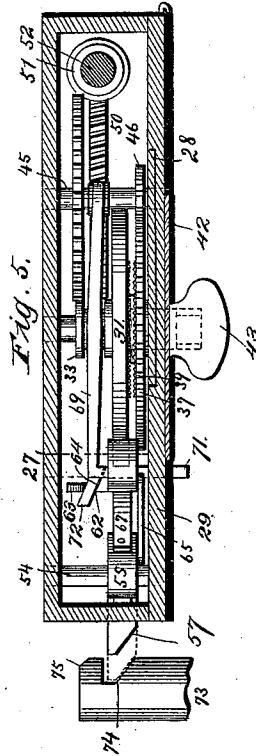
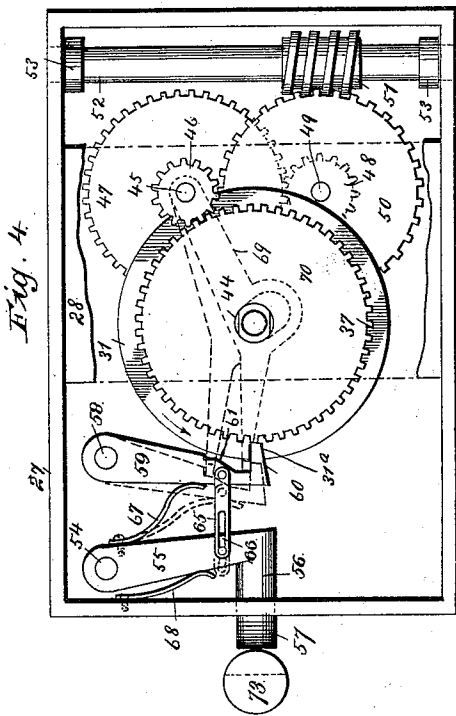
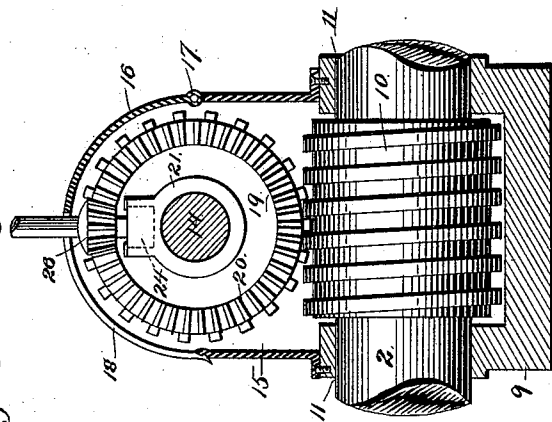


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES T. MARLIN, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO
ALFRED BLAKER, OF KANSAS CITY, KANSAS.

LOCK.

SPECIFICATION forming part of Letters Patent No. 534,273, dated February 19, 1895.

Application filed November 7, 1894. Serial No. 528,159. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. MARLIN, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Distance-Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to locking mechanism.

Owing to the frequency of train-robberies, it has become extremely hazardous, in certain parts of this country to ship by express large sums of money or other valuable property. These robberies take place usually in unfrequented localities, remote from populous centers, and the express messenger is compelled at the point of a rifle to open the safe and deliver over to the robbers the money or other valuable property therein.

To frustrate attempts at train robbery is the primary object of my invention, by the provision of mechanism which can only be unlocked by the rotatable movement of the car axle, and will only be unlocked after the car has moved a predetermined distance, so that it will be impossible for the messenger, even if so inclined, to open the safe door until the car has traveled the proper distance and the bolt of the safe is automatically released by the locking mechanism, which, therefore, I will hereinafter term a distance lock.

A further object of my invention is to provide a mechanism of this character which is simple, strong, durable, and comparatively inexpensive of construction.

With these objects in view, the invention consists in certain novel and peculiar features of construction and combination of parts, as will be hereinafter described and claimed.

In order that the invention may be fully understood, I will proceed to describe the same with reference to the accompanying drawings, in which—

Figure 1. represents a vertical section of an express car provided with a distance lock embodying my invention. Fig. 2. is a vertical section enlarged, taken on the line $x-x$ of Fig. 1. Fig. 3. is an enlarged sectional view of the casing inclosing a part of the operating mechanism of the lock, and showing in elevation the face plate or door of the casing

inclosing the part of the distance lock which is located within the safe. Fig. 4. is an enlarged view with said face-plate removed. Fig. 5. is a horizontal section taken on the line $y-y$ of Fig. 3, and to the same scale as Fig. 4. Fig. 6. is an enlarged sectional view of a part of the casing within the safe and of the mechanism within said casing. Fig. 7. is a sectional view of a part of the mechanism within said casing, and showing the same in the position it occupies when the bolt of the safe is secured in its advanced position. Fig. 8. is a detail view to show a cam which operates the lever, which in turn throws certain mechanism in and out of gear, and Fig. 9. shows a gear-pinion mounted non-rotatably but slidingly upon a shaft.

In the said drawings, 1 designates an express-car of any construction, 2 designates the axle thereof, and 3 designates the wheels supporting said axle.

4 designates a portion of the truck, preferably a portion of one of the main truss-bars, and 5 designates a safe, which is located, as usual, near one side of the car.

6 designates a casting or bracket, which is secured rigidly in any suitable manner to the bar 4, and comprises the vertical and parallel arms 7 and 8, and the depending semicircular portion 9, which connects the arm 8 with the body-portion of said casting, and snugly encircles the worm 10, shrunk or otherwise rigidly secured upon the axle 2. The end-portions of said casting are provided with openings 11, which circumferentially surround the axle 2 snugly, so as to prevent the entrance of dust or other small particles within said casing. The upper ends of said arms 7 and 8, in conjunction with the caps 12 and 13 secured thereon, form a bearing for the shaft 14, and secured upon said casting is an arch-shaped box 15, which is provided also with an arched or approximately U-shaped lid 16, hinged at 17 to the upper end of the said box, and provided with a slot 18, which extends from a point adjacent to its center entirely through the free margin thereof.

Mounted rigidly upon the shaft 14, and meshing with the worm 10, is a worm-wheel 19, which projects up into the arched cover 16, and said worm-wheel is provided at one

side with a circular series of beveled cog-teeth 20. At the same side the sleeve 21 is mounted loosely upon the shaft 14, and is formed with a depression or cavity 22, and with an angle-arm 23, the horizontal portion of which projects inwardly or toward the worm-wheel 19.

A box 24 fits within the recess or cavity 22, and is of such length that it may reciprocate within said recess or cavity in a direction parallel to the axis of the shaft 14. A shaft 25 projects through the slot 18 of said cover and finds a bearing in the sliding-box 24, and a loose bearing in the angle-arm 23, and mounted rigidly upon said shaft is a beveled pinion 26, which meshes with the beveled cog-teeth 20 of the worm-wheel. The said teeth 20 and the teeth of said pinion are of depth to accommodate a slight reciprocatory movement of the box 24, so that they shall always bear an operative relation to each other.

Referring now to the mechanism within the car, a casing comprises a rectangular box 27, having its front side open, and having a bearing-plate 28 connecting the top and bottom ends of the casing a slight distance inward of the front margins thereof, and a door 29, which may be held in place by hinges, as shown, and locked, or may be secured in any other suitable manner. Extending horizontally of said casing and secured rigidly to the rear wall or back-plate thereof, is the stub-shaft 30, and said stub-shaft projects at its front end through an opening in the bearing-plate 28 and the door 29. A disk 31 is mounted rotatably upon said shaft, and is provided with the hub-portion 32, which projects forwardly through the bearing-plate 28 and the door 29, and with the rearwardly projecting hub-portion 33, which is annularly grooved, as shown at 34. This disk is provided upon its front face with a circular series of radial teeth 35, and with a circular groove 36, which groove and series of teeth are arranged concentric to the axis of said disk.

A cog-wheel 37, of smaller diameter, preferably, than the disk 31, is mounted rotatably upon the front portion 32 of the hub of said disk, and is interposed between said disk and the bearing-plate 28. In order to reduce friction between the cog-wheel 37 and the bearing-plate 28 to the minimum, the cog-wheel 37 is provided with a forwardly projecting hub-portion 38, which bears against said bearing-plate 28. Said cog-wheel is also provided upon the face which opposes the disk with a similar circular series of radial teeth 39, and with an annular groove 40, and spirally and loosely encircling the hub-portion 32 of said disk, and retained in the grooves 36 and 40, is an expansion-spring 41, which bears at its opposite ends against said disk and said cog-wheel, and holds them with a yielding pressure apart.

A disk 42 corresponding in size diametrically to the disk 31, is provided with an open-

ing through which the hub-portion 32 of the disk 31 projects, and mounted rigidly upon said disk is a knob or turn-button 43, which is provided with an angular socket into which the front end of said hub-portion 32 projects, said hub-portion being also flattened at its opposite sides as shown at 44, Fig. 4, to fit snugly and non-rotatably within the socket of said knob or turn-button, as shown in dotted lines Fig. 3. A shaft 45 is journaled at its opposite ends in the back-plate of said casing, and in the bearing 28, and is arranged adjacent to the periphery of the disk 31 and a suitable distance above the plane of the axis thereof, and mounted rigidly upon said disk is the gear-pinion 46, which meshes with the cog-wheel 37. A large cog-wheel 47 is also mounted rigidly upon said shaft, and meshes with a gear-pinion 48, mounted rigidly upon a shaft 49, which is journaled also at its opposite ends in the back-plate of the casing and in the bearing-plate 28, and mounted rigidly also upon said shaft 49, is a worm-wheel 50, which meshes with a worm 51 upon the vertical shaft 52, which is journaled at its opposite ends in the top and bottom sides of said casing, and is provided with annular shoulders 53 to prevent any vertical movement thereof. Pivoted upon a stub-shaft 54, projecting from the back-plate of said casing and at the opposite side of the disk 31, is a pendent dog, comprising the arm 55 and the arm 56, which projects outwardly through an opening in the adjacent end-wall of the casing, and is beveled at one side, as shown at 57. Mounted pivotally upon a second stub-shaft 58 is a dog 59, the tooth 60 of which projects toward and occupies the same vertical plane as the disk 31. Said dog above said tooth is recessed to form the inclined or cam shoulder 61, and is furthermore provided with a laterally projecting arm having a groove 62 extending at an angle to said arm, and communicating with the lower end of the inclined surface or cam 63. The inner wall of said groove also forms an inclined shoulder or cam 64.

A link-bar 65 is pivotally mounted at one end upon a pin carried by the dog 59, and is provided with a longitudinal slot 66, which is engaged by a pin projecting from the dog 55, and a spring 67 carried by the dog 55, as shown, bears at its free end against the dog 59, so as to hold the same at a distance from the dog 55, which distance is equaled by the length of the slot 66. A similar spring 68, secured in the casing, bears at its free end against the arm 55 of the other dog, and holds the same normally in the position shown in the drawings.

69 designates a lever which is mounted upon the shaft 45 so as to operate or swing in a vertical plane, and also to have a slight lateral movement or swing. Said lever is provided with a slot 70, extending concentrically to the axis of the shaft 45, which embraces loosely the grooved portion 34 of the sleeve or rearwardly-projecting hub-portion 33 of

the disk 31, and is adapted to limit the rise and fall of said lever. At its front end, said lever is provided with a laterally projecting handle 71, which is above the tooth of the dog 59, and is interposed between said dog and the periphery of the disk 31. Said lever is also provided with an inclined portion 72, which is adapted to be operated upon by the cams 63 and 64 of said dog, as will be hereinafter more particularly explained. This casing is secured to the inner side of the safe in such position and manner that the arm 56 of the first-mentioned dog is at right-angles to the bolt 73 of the safe, which will be provided with a notch 74 to receive the end of said dog, and will have its end beveled or rounded as shown at 75, for a purpose which will hereinafter appear.

Mounted rigidly upon the lower end of the shaft 52, is a clevis 76, which is universally jointed to a clevis 77, provided with a longitudinal passage wherein the upper end of the shaft 25 fits slidingly and non-rotatably. This connection is provided so that the shaft 25 may accommodate itself to the springing motion of the car, and also maintain its operative relation to the shaft 52. The universal joint connection is provided to accommodate any lateral movement of the car or any longitudinal vibration thereof above and independent of the truck mechanism.

It will be apparent that the longitudinal vibration of the car will cause the shaft 25 to operate pivotally within the bearing of the arm 23 of the sleeve 21. Supposing the safe to be near the right-hand side of the car, as viewed from the rear toward the front end, and the train has to make a run of say ten miles before access to the safe is necessary, the knob 43 is grasped and the disk 42, provided with a double scale of miles inscribed thereon, is rotated until the numeral 10, near the margin of said disk, registers with the indicating arrow. (See Fig. 3.) Before this can be done, however, the tooth of the dog 59 must be disengaged from the notch 31^a, in the periphery of said disk, and this is accomplished by grasping the end of the handle 71 of the lever 69, and raising the same. This upward movement of the lever, due to the position of its pivotal point and the cam 61, causes the dog 59 to swing outwardly to the position shown in dotted lines, Fig. 4, and said handle-portion of the lever moves approximately in the direction indicated by the slot 78 in the door 29. This pivotal operation of the dog 59, through the medium of the spring 67, causes the arm 56 of the other dog to swing outward to the position shown in dotted lines, Fig. 5, so that the beveled end of the same lies in the path of the bolt 73. When the disk is adjusted, as hereinbefore explained, the notch 31^a of the disk 31 is moved a corresponding distance away from the tooth 60 of the dog 59, which tooth is now pressed into frictional engagement with the periphery of said disk by the spring 67. The handle portion 71 of the le-

ver is now moved downward, and coming into contact with the downwardly and forwardly extending cam 63, is thrown forward at the same time, and this forward movement of the lever causes it to bear against the front wall of the groove 34 of the hub-portion 33, and force said disk forwardly until it engages frictionally the cog-wheel 37, by means of the teeth 35 and 39, respectively. The lever is locked in this position to prevent the disengagement of said disk and cog-wheel, by entering the notch 62 at the lower end of said cam 63. The safe is now closed, and the bolt 80 shot or moved forward in any suitable manner, and moving forward, its beveled end 75 engages the correspondingly beveled surface 57, and causes the arm 56 to retract until the notch 74 comes opposite the end of said arm. 85 Immediately this takes place the spring 67 again forces said arm outward and it engages the notch 74 of said bolt, and makes it absolutely impossible to withdraw said bolt until said arm is disengaged therefrom. The safe 90 may be provided with the usual lock or not, as desired.

When the various parts of the mechanism bear the relation to each other just described, the forward movement of the train will cause, through the rotation of the axle 21, the rotation of the shaft 52, through the medium of the worm 10, the worm-wheel 19, the teeth 20, the pinion 26, and the shaft 25. The rotation of the worm-thread 51 upon said shaft 52, causes, through the medium of the worm-wheel 50, the pinion 48, upon the same shaft, the cog-wheel 47 engaging said pinion, the pinion 46, and the cog-wheel 37, the rotation of the disk 31 in the direction indicated by the arrow (see Fig. 4), until the notch 31^a comes opposite the tooth of the dog 59. The mechanism is so proportioned that the cog-wheel 37 moves the distance of one tooth with each mile traveled by the express-car, so it will be understood that by the time the car has traveled the requisite ten miles the spring 67 will again force the dog pivotally forward, and the tooth 60 thereof will engage the notch 31^a. Immediately this takes place the pressure of the spring 67 is removed from the other dog, and the weaker spring 68 forces the same pivotally inward and causes the disengagement of the arm 56 with the notch of the bolt 73. In case the spring 68 became weakened from any cause, and was alone unable to retract the arm 56 from engagement with the bolt, it will be apparent owing to the slotted link-plate 65 connecting the dogs, that the spring 67, bearing against and forcing inward the dog 59, will cause said slotted link-plate to exert an inward pressure or pull upon the other dog, so that the inward movement of the same, owing to the action of this auxiliary spring, is made positive and reliable. The inward movement of said dog 59 at the same time causes the free end of the lever to swing to the rear by reason of the cam 64 bearing against the inclined

portion 72 of said lever, as shown most clearly in Fig. 7, where the lever occupies its forward position, and in Fig. 5, where it occupies its rearward position, or the position it occupies after being acted upon by the cam 64. This rearward movement of the lever at the same time, by engaging the rear wall of the groove 34 of the hub 33, causes the disk to slide rearwardly and out of engagement with the cog-wheel 37, so that at the instant the tooth of the dog engages the notch of the disk, the same is released from rotating with the cog-wheel, and becomes stationary. To arrange the mechanism in position for resecuring the bolt 73, the lever 69 is again grasped at the handle-portion 71, and moved upward, and engaging the cam 61 of the dog 59, moves said dog outwardly again to the position shown in dotted lines. Immediately the tooth of the dog is disengaged from the notch 31^a, the disk is rotated a distance corresponding to any number of miles required. The handle is then moved downward, and engaging the cam 63 of said dog, is forced forwardly thereby until it finally rests in the recess 62 at the lower end of said cam, and the forward movement of said lever causes the disk 31 to re-engage the cog-wheel 37, as before.

If the safe be located upon the left-hand side of the car as viewed from rear to front (or the car is being run backward, which amounts to the same thing), the numbered disk is rotated in the opposite direction until the numeral of the inner set representing the number of miles to be traveled before the safe is unlocked, registers with the indicating arrow. This is necessary because the disk will be rotated in the opposite direction to that indicated, to bring the notch into engagement with the tooth of the dog. It is obvious, therefore, that the location of the safe and the direction the car is to travel will be the guide which determines the direction the disk is to be rotated, when the distance-lock mechanism is to be set for a run of any predetermined distance.

In Fig. 1, instead of showing the shaft 25 universally jointed to the shaft 52, I mount non-rotatably and slidingly upon the upper end of said shaft 25, the cog-pinion 78, and mount rigidly upon the lower end of the shaft 52 the cog-pinion 79. These cog-pinions preferably occupy the space between the real and false bottoms of the car, so as to be protected from dust and other foreign particles. A shaft 80 is journaled at its opposite ends in the standards 81 and 82, and mounted rigidly upon said shaft at one end, is the cog-pinion 83, which meshes with the cog-pinion 78, and mounted upon the shaft near its opposite end is the cog-pinion 84, which meshes with the cog-pinion 79. It will be apparent from this construction that any longitudinal vibratory movement of the car will cause the slight pivotal motion of the shaft 25, as hereinbefore explained, and that said pivotal opera-

tion will not affect the operative relation between the cog-pinions 78 and 83.

While I have shown two forms of intermediate mechanism for transmitting motion from the rotating axle of the car to the worm-shaft 52, it is to be distinctly understood that I do not confine myself to any particular mechanism for transmitting motion from the axle to the shaft 52, or to the cog-wheel 37, as various other arrangements of gearing may be employed which will accomplish the purpose equally well without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a locking bolt mounted upon a wheeled vehicle, of a distance-lock mechanism, consisting of a notched disk, a dog yieldingly engaging said disk, a second dog, and a lever provided with an arm whereby it may be pivotally operated to cause the first-mentioned dog to be disengaged from the notch of said disk, and means whereby the operation of said first-mentioned dog causes the last-mentioned dog to operate and engage a notch in said bolt, substantially as set forth.

2. The combination with a locking bolt mounted upon a wheeled vehicle, and a rotating axle of said vehicle, of a distance-lock mechanism, consisting of a disk having a notch in its periphery, a dog held yieldingly into engagement with the periphery of said disk, a second dog held yieldingly into engagement with a notch of said bolt, a lever adjacent to said disk and to said dog, and mechanism which transmits motion from the said rotating axle to the said disk until the notch thereof registers with and is engaged by the yieldingly advanced dog, and means whereby said dog, as it enters said notch, moves said lever, which causes said disk to cease rotating, substantially as set forth.

3. The combination with a distance-lock mechanism, comprising a notched disk, a dog yieldingly engaging the notch of said disk, a second dog, and means to move the first-mentioned dog out of the notch to permit the disk to be rotated a predetermined distance, and means whereby said dog, when disengaged from said notch, will cause the other dog to be yieldingly advanced, of a notched bolt, which is adapted to be engaged by said yieldingly advanced dog, substantially as set forth.

4. The combination with a distance-lock mechanism, comprising a notched disk, a dog yieldingly engaging the notch of said disk, a second dog, having a beveled end, and means to move the first-mentioned dog out of the notch to permit the disk to be rotated a predetermined distance, and means whereby said dog, when disengaged from said notch, will cause the other dog to be yieldingly advanced, of a notched bolt, having its forward end beveled so that when advanced the yieldingly

advanced dog will be forced back until the notch in said bolt comes opposite or registers with the end of the same, substantially as set forth.

5 5. The combination with a notched bolt, of a distance-lock mechanism, comprising a continuously rotating wheel, a notched disk adjacent thereto, opposing clutch-members carried by said rotating wheel and said disk, a
10 yieldingly advanced dog having its tooth engaging the periphery of said disk and provided with a cam, a second dog operatively connected to the first-mentioned dog and engaging the notch of said bolt, and a lever,
15 which when operated in the proper direction comes in contact with the cam of said first-mentioned dog and throws the clutch-members of said disk and said rotating wheel into engagement, substantially as set forth.

20 6. The combination with a notched bolt, of a distance-lock mechanism, comprising a continuously rotating wheel, a notched disk adjacent thereto, opposing clutch-members carried by said rotating wheel and said disk, a
25 yieldingly advanced dog having its tooth engaging the periphery of said disk and provided with a cam, and with a recess communicating with said cam, a second dog operatively connected to the first-mentioned dog
30 and engaging the notch of said bolt, a lever, which when operated in the proper direction comes in contact with the cam of the first-mentioned dog and throws the clutch-members of said disk and said rotating wheel into
35 engagement, and entering the said recess communicating with said cam, is held from accidental movement, so that the disk and rotating wheel are securely locked together, substantially as set forth.

40 7. The combination with a notched bolt, of a distance-lock mechanism, comprising a continuously rotating wheel, a notched disk adjacent thereto, opposing clutch-members carried by said rotating wheel and said disk, a
45 yieldingly advanced dog having its tooth engaging the periphery of said disk and provided with a pair of cams, a second dog operatively connected to the first-mentioned dog and engaging the notch of said bolt, a lever
50 which when operated in the proper direction comes in contact with one of the cams of said first-mentioned dog and throws the clutch-members of said disk and said rotating wheel into engagement, so that said disk will be rotated
55 until the notch comes opposite the tooth of said dog, which immediately enters the same, and this movement of the dog causes the second cam to engage said lever and cause the same to throw the disk out of engagement
60 with said rotating wheel, and a spring which simultaneously causes the disengagement of the first-mentioned dog with the notch of said bolt, substantially as set forth.

8. The combination with a notched bolt, of a distance-lock mechanism, comprising a continuously rotating wheel, a notched disk adjacent thereto, opposing clutch-members carried

by said rotating wheel and said disk, a yieldingly advanced dog having its tooth engaging the periphery of said disk and provided with a pair of cams, a second dog operatively connected to the first-mentioned dog and engaging the notch of said bolt, a lever which when operated in the proper direction comes in contact with one of the cams of said first-mentioned dog and throws the clutch-members of said disk and said rotating wheel into engagement, so that said disk will be rotated until the notch comes opposite the tooth of said dog, which immediately enters the same, and this movement of the dog causes the second cam to engage said lever and cause the same to throw the disk out of engagement with said rotating wheel, and a slotted link connecting said dogs, so that when the first-mentioned dog swings into engagement with the notch of said disk the last-mentioned dog will be withdrawn from engagement with the notch of said bolt, substantially as set forth.

9. A distance-lock mechanism, comprising a shaft, a notched disk mounted loosely thereon and provided with a forwardly extending hub-portion, and a rearwardly extending hub-portion, which is annularly grooved, and provided also with a clutch-member, a rotating wheel mounted loosely upon the forwardly extending hub-portion and provided with a clutch-member which engages the clutch-member of the said notched disk, a disk mounted non-rotatably upon the forwardly extending hub-portion and provided with numerals upon its face which indicate varying distances, and a knob or handle, also mounted upon said hub-portion and carried by said disk, of a lever, engaging the annular groove of the rearwardly extending hub-portion of the disk and provided with a handle portion, and a yieldingly advanced dog which engages the notch in said disk and is provided with a cam, which is engaged by the handle-portion of said lever, when operated, so that said dog is moved out of engagement with the notch of said disk, that the knob or handle may be operated to turn the notched disk and the numbered disk a predetermined distance or until one of the numerals upon said numbered disk registers with an indicating mark, substantially as set forth.

10. The combination with a notched bolt, a safe carried by a wheeled vehicle, and the rotating axle of the same, of a distance-lock mechanism, comprising a yieldingly advanced dog engaging the notch of said bolt, a yieldingly advanced dog operatively connected to said first-mentioned dog, a notched disk arranged in the same plane and in frictional engagement with the last-mentioned yieldingly advanced dog, a wheel which is engaged or clutched by said notched disk, a shaft provided with a worm-thread which is operatively connected to said wheel, a worm upon the rotating axle of the vehicle, a worm-wheel engaging the same and provided with cog-teeth upon its face, a casing inclosing said

worm and said worm-wheel, a sleeve mounted upon the shaft of the worm-wheel, a bearing-box mounted loosely in said sleeve, a shaft mounted at its lower end in said bearing-box and provided with a pinion engaging the cog-teeth of said worm-wheel, a hinged cover for said casing, which is provided with a slot through which said shaft projects, and suitable mechanism connecting the said shaft of the pinion with the shaft having the worm-threads which are operatively connected to the wheel clutched by the notched disk, substantially as set forth.

11. The combination with a notched bolt, of a distance-lock mechanism, comprising a continuously rotating wheel, a notched disk adjacent thereto, opposing clutch-members carried by said rotating wheel and said disk, a

spring holding them yieldingly apart, a yieldingly advanced dog having its tooth engaging the periphery of said disk and provided with a cam, a second dog operatively connected to the first-mentioned dog and engaging the notch of said bolt, and a lever, which when operated in the proper direction comes in contact with the cam of said first-mentioned dog and throws the clutch-members of said disk and said rotating wheel into engagement, substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JAMES T. MARLIN.

Witnesses:

G. Y. THORPE,
M. R. REMLEY.