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P. STEELE.

GATE.

No. 383,920. Patented June 5, 1888.

Fig. 1.

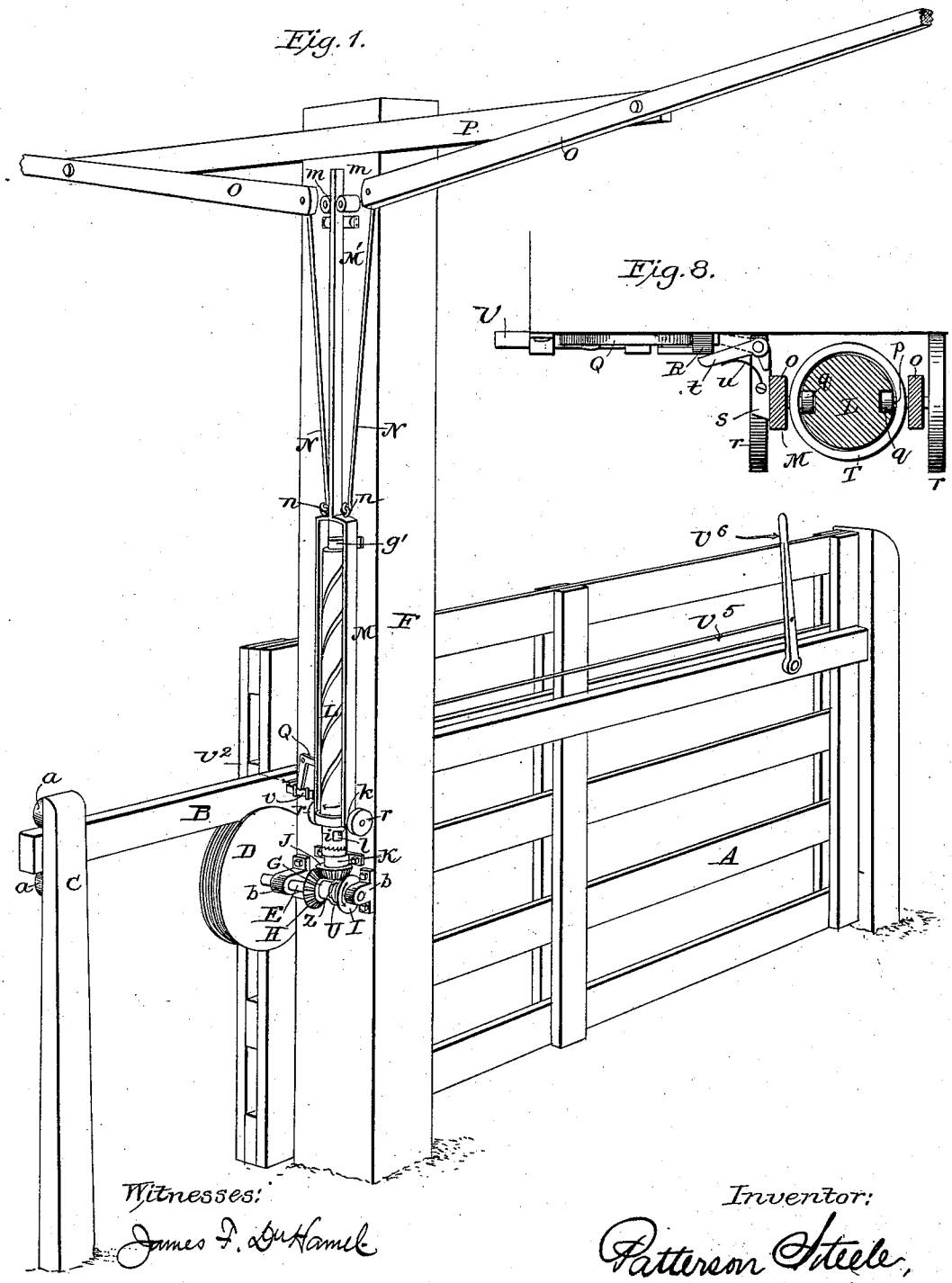

Fig. 8.

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Arthur Ashley.

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Patterson Steele,

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

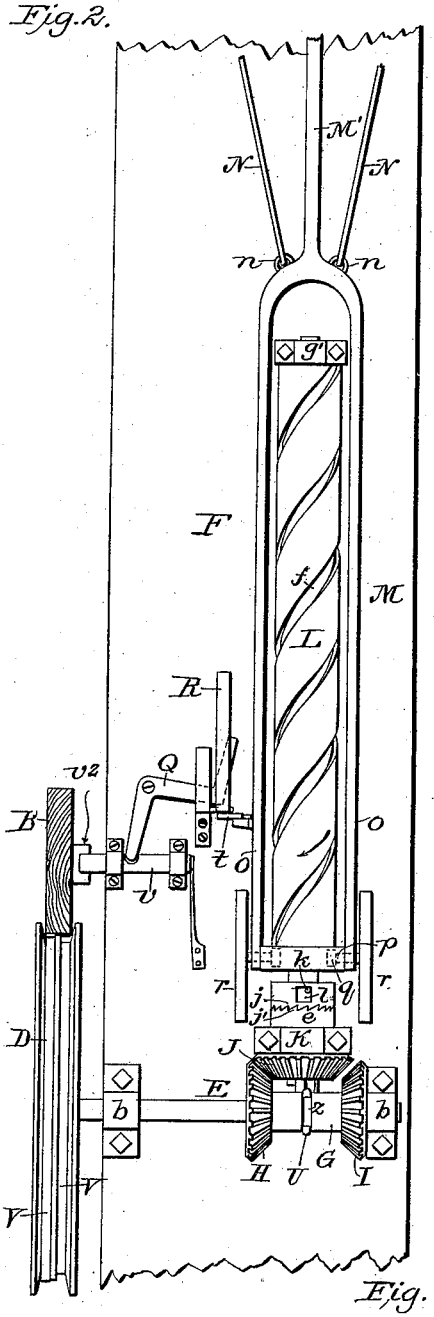


Fig. 3.

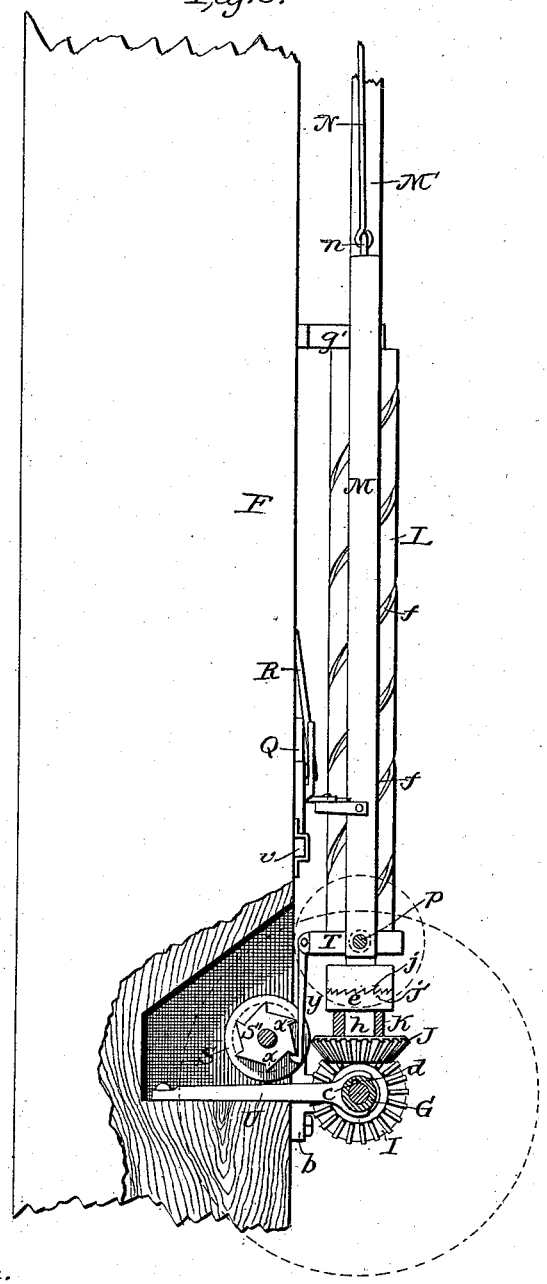
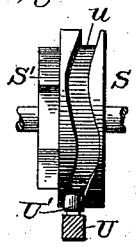


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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GATE.

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Fig. 5.

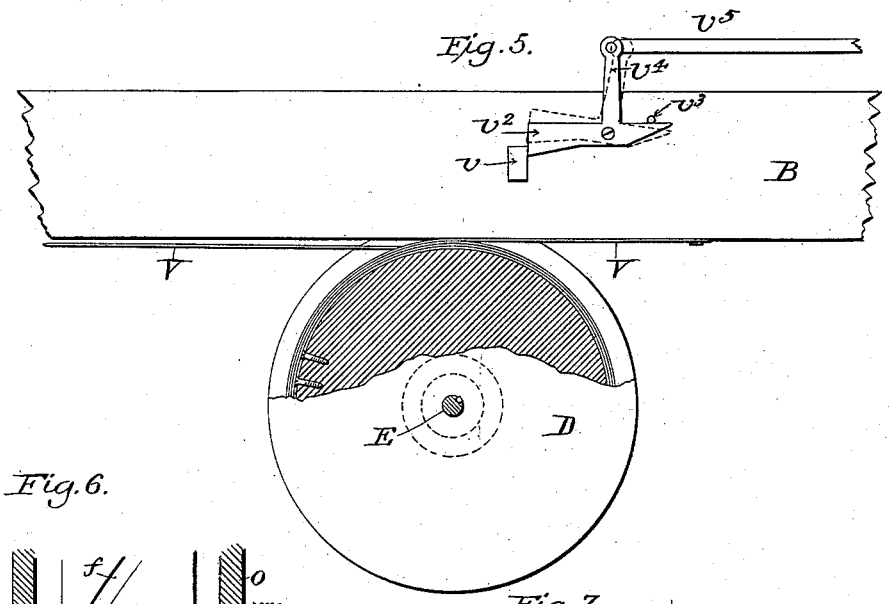


Fig. 6.

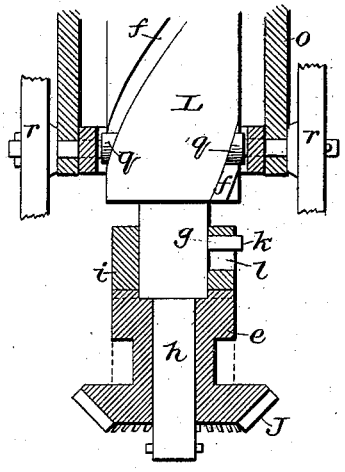
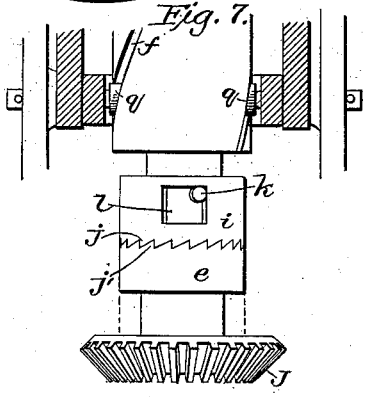


Fig. 7.



Witnesses:
James F. DeHamel
Arthur Ashley.

Inventor:
Patterson Steele,
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UNITED STATES PATENT OFFICE.

PATTERSON STEELE, OF FAYETTE COUNTY, KENTUCKY.

GATE.

SPECIFICATION forming part of Letters Patent No. 383,920, dated June 5, 1888.

Application filed November 25, 1887. Serial No. 256,127. (No model.)

To all whom it may concern:

Be it known that I, PATTERSON STEELE, residing in the county of Fayette and State of Kentucky, have invented certain new and useful Improvements in Gates, of which the following is a specification.

My invention relates to that class of gates designed to be actuated manually by persons on horseback, in vehicles, or afoot on approaching and after passing through the gateway, and more particularly to such as are moved longitudinally by means of levers at the side of the road and some distance from the gate.

The present invention is designed as an improvement upon the gate for which Letters Patent were granted to me bearing date the 22d day of March, 1887, and numbered 359,746.

The annexed drawings illustrate my invention, Figure 1 being a perspective view of a gate constructed in accordance therewith; Fig. 2, a perspective view of the principal parts of the actuating mechanism; Fig. 3, a side elevation of the same; Fig. 4, an edge view of the cam-wheel by which the reversing-pinions are shifted; Fig. 5, a view illustrating the manner of connecting the gate with its operating mechanism; Figs. 6 and 7, detail views of the clutch by which a return movement of the hand-levers is permitted to take place without rotating the shaft or giving motion to the actuating mechanism; and Fig. 8, a detail view of the latch mechanism.

Referring again to the drawings, A indicates the gate proper, provided with a runner-bar, B, which, as in my former patent, runs upon or between suitable supporting and guiding rollers, *a*, applied to a post, C, and upon the main impelling wheel or drum D. Other supporting and guiding rollers may obviously be provided, if desired, though not deemed necessary.

The wheel or drum D is keyed or secured upon a shaft, E, which is journaled in hangers or bearings *b*, bolted or otherwise made fast to a main post or upright, F, as shown in Figs. 1, 2, and 3. Shaft E is furnished with a spline or feather, *c*, and is encircled by a sleeve, G, Fig. 3, having a groove, *d*, to receive the spline, whereby the sleeve is enabled to move freely lengthwise upon the shaft, but by which provision the two are compelled always to rotate in unison.

The sleeve G carries two bevel-pinions, H and I, at such distance apart as to permit a third pinion, J, to stand between them and in mesh with either without extending quite to the other; and as these pinions H and I are fixed upon the sleeve G they can at no time be both in mesh with pinion J.

As shown in Figs. 6 and 7, pinion J is formed with a circumferentially-grooved neck or hub, *e*, which receives the encircling collar or section of a box or bearing, K, bolted to post F, as shown in Figs. 1, 2, and 3, the pinion being thus held against vertical movement, but left free to rotate.

L indicates an upright drum or cylinder provided with two helical grooves, *f*, running from end to end, or nearly so. The upper end of this cylinder is journaled or supported in a bracket, *g'*, bolted to post F, and the lower end is reduced in diameter, as shown in Fig. 6, forming two sections, *g* and *h*, of different diameters, the section *g* being encircled by a clutch sleeve or collar, *i*, and resting at its end upon the upper end of hub *e* of pinion J, while the lower section, *h*, passes centrally through the pinion, as shown. The lower section or journal, *h*, of cylinder L is free to turn within and independently of pinion J, except at such times as it is locked thereto by the clutch sleeve or collar *i*, which is provided with ratchet-teeth *j*, to engage with corresponding teeth, *j'*, of the hub *e* of pinion J, as shown in Figs. 1, 2, 3, 6, and 7. Clutch-collar *i* is not rigidly secured upon neck *g* of cylinder L, but is loose thereon, so as to permit limited movement of either independently of the other. Connection is, however, made between them by means of a pin or stud, *k*, projecting from neck *g* into or through a rectangular opening, *l*, in the clutch-collar *i*, as best shown in Figs. 6 and 7. This opening is of a width and height considerably greater than the diameter of the pin *k;* hence cylinder L and its neck *g* and pin *k* may be moved or turned a limited distance before the pin will come into contact with the side walls of the opening, and the collar *i* may rise and fall, so that in turning it backward its teeth may ride back over those of the pinion *j*, thereby leaving the pinion at rest.

M indicates a yoke, which straddles the cylinder L, and the two arms of which reach from above the cylinder to or nearly to its lower end,

as shown in Figs. 1, 2, and 3. This yoke is formed with a vertical guide-bar or extension, M′, which passes between two guide-rollers, *m m*, as shown in Fig. 1, and it is provided with eyes *n*, to receive the hooked ends of connecting rods or links N, which extend thence to the inner ends of levers O O, pivoted to the arms of a cross-beam, P, extending from the post or standard F to each side of the fence, as in Fig. 1. The lower ends of the arms *o* of the yoke M are furnished with studs *p*, which extend both inward and outward from said arms, their inner ends serving to support anti-friction rollers *q*, which traverse the helical grooves *f* of cylinder L and give rotary motion to the cylinder as the yoke M is raised or lowered. The outer ends of these studs carry rollers *r*, which bear upon and traverse the face of post F, and thereby prevent the yoke M from turning with the cylinder or twisting, as it might otherwise do.

Projecting from the side of yoke M nearest the gate is a bracket, *s*, upon which is pivoted a trip or finger, *t*, the free end of which is normally pressed toward the face of post F by a spring, *u*, as best shown in Fig. 8. As the yoke is carried upward by drawing down the outer end of either lever O, this finger engages beneath a double elbow-lever, Q, pivoted to post F, throwing its horizontal arm upward and causing its depending arm to retract the latch or locking bolt *v*, by which the gate is held shut, and the upwardly-extending arm of the lever Q causes the finger *t* to maintain its bearing against said lever long enough to permit the gate to move and carry the latch-bar or dog out of line with the bolt, so that when the bolt is again released it may not spring behind or against the latch-bar or dog or hinder the free movement of the gate.

In order to prevent the finger *t* from encountering the upper end of lever Q during the descent of the yoke M, a pivoted guard, R, is secured to the face of post F, its upper end leaning inward against the post over the lever Q, and its lower end set away from the post, as indicated in Figs. 2, 3, and 8. As the yoke descends, the finger *t* rides down over the outer face of guard R, and is thereby carried clear of lever Q; but the instant it passes off the lower end of said guard the finger is thrown inward again by its spring *u*, in position to engage the lever Q on the next upward movement of the yoke.

To permit the unlocking of the gate by hand and independently of the actuating mechanism above described, I provide the running-bar B with a pivoted gravitating latch bar, v^2, Fig. 5, which in its normal position stands in front of and forms an abutment against or behind which the latch-bolt *v* may engage, as shown in Fig. 1.

The latch-bar or dog v^2 is limited in its movements by a suitable stop-pin, v^3, and is formed with an upright arm, v^4, which is connected by a rod, v^5, to a hand-lever, v^6, by which it may be operated from the front end of the gate. By raising the dog or latch-bar out of line with the locking-bolt *v* the gate may be released and made free to slide back.

Referring now to Fig. 3, it will be seen that a wheel, S, is mounted upon a horizontal shaft or axle in a recess made in the face of post F, the wheel occupying a position directly in rear of the cylinder L. The periphery or face of this wheel is grooved, as shown in Fig. 4, the groove *w* running obliquely first to the right and then to the left. In the drawings three such oblique portions are indicated on the side or face toward the observer, and these duplicated on the opposite side would give six oblique sections, three to the right and three to the left.

The number may be increased or diminished; but whatever number be adopted there will be formed upon the side of the cam-wheel S a ratchet-wheel, S′, with precisely the same number of ratchet-teeth, coinciding in angular or circumferential position with the oblique sections of the groove *w*.

The lower ends of the arms of the yoke M are connected by a hoop or ring, T, from which is suspended a pawl or dog, *y*, which, as the yoke descends, rides freely over one of the teeth *x* of the ratchet-wheel S′, but which, as the yoke ascends, engages with the square face of such tooth and imparts to the wheel S′ S a partial rotation, bearing the same relation to a complete rotation that one tooth bears to the whole number of teeth in the ratchet-wheel. As the cam-wheel is thus partially rotated, it gives lateral motion to a shipping lever or fork, U, one end of which is pivoted in post F, and the other end of which is seated in a circumferential groove, *z*, in the collar G, encircling shaft E, and carrying the pinions H and I, a stud, U′, extending from the lever into the groove *w* of the cam-wheel S. This stud will preferably be furnished with an anti-friction roller, though this is not essential.

It now remains only to describe the connection of the gate with wheel D to complete the description of the entire mechanism. This will be readily understood upon referring to Fig. 5, in which B indicates the runner-bar of the gate, and D the wheel through which the motion of shaft E is given to the gate.

V V indicate two thin flat bands, preferably of mild steel, but which may be of other metal, or of suitable alloy plated or coated to prevent corrosion, or left in its natural state. These bands each have one end made fast to the under side of the runner-bar B and the other end made fast to the wheel D, which is preferably formed with a separate groove for each band, but with a bearing-face for the bar between them. The bands are wound in reverse directions upon the wheel, and consequently as one winds on the other winds off; hence by rotating the wheel in one direction one band will be wound to move the gate and the other will be unwound to permit such move-

ment, and preparatory to being itself wound upon the wheel to produce the return movement of the gate.

By the use of the flat metal bands I am enabled to wind them in successive layers upon themselves without appreciably increasing the diameter of the coil, and hence there is no appreciable variation in the rate at which the bands are taken up. There is consequently no necessity for making a compensating pulley, after the manner of a fusee, as would be necessary were thicker bands used, and thus wound in successive coils.

The construction being thus fully set forth, the operation of the gate may be stated as follows, assuming the parts to be in the position shown in Figs. 1 and 2, which they assume when at rest: The clutch-collar *i* being in engagement with pinion J, and one of the levers O being drawn down at its outer end to elevate the yoke M, the rollers *q*, rising in the grooves *f* of cylinder I, give rotary motion to said cylinder in the direction indicated in Figs. 1 and 2. This rotation would be transmitted to pinion J, but for the fact that at the commencement of such rotation the stud or pin *k* occupies a position at the right-hand side of the opening *l*, and that during the initial part of such rotation the pin is moving across the opening to its left-hand wall, with which it must make contact before it can act upon the collar *i*. It will thus be seen that during the first part of the rise of yoke M collar *i* (and consequently pinion J) remains at rest, and no motion is imparted to shaft E or wheel D. The position of finger T is such, however, that it engages lever Q and withdraws the latch *v* at the very outset of the rise of yoke M, so that by the time the pin *k* comes into operative contact with the forward wall of opening *l* the latch is withdrawn and the gate is made ready for movement. During this same brief period and by the same initial rise of yoke M the pawl or dog *y* engages a tooth of ratchet-wheel S′ and turns cam-wheel S far enough to shift lever U so as to throw collar G lengthwise of shaft E, carrying pinion H out of and pinion I into mesh with pinion J. The further elevation of yoke M, and consequent further rotation of cylinder L, gives motion, through pinions J and I, sleeve G, and shaft E, to wheel D, which, through band V, withdraws the gate. The lever O is then released and the yoke falls to its original position, and the person or vehicle passes through the gateway. In descending, the yoke M, through its rollers *q*, rotates the cylinder L backward; but this rotation is not imparted to the pinion J, because the bevel faces of teeth *j* cause the clutch-collar *i* to rise and its teeth to ride back over those of the pinion J, leaving the parts in the position shown in Figs. 1 and 2, except that pinions I and J are then in mesh. The passenger, having passed the gate, now pulls down upon the second lever O, and the operation above described is repeated in all particulars, except that a section of groove *w* of cam-wheel S, inclined in the reverse direction from the previously-acting section, comes into play, and hence the initial portion of the rise of yoke M causes the sleeve G to be shifted in a reverse direction from the previous movement, consequently causing pinion H to go into mesh with pinion J and pinion I to go out of engagement therewith. As the pinion J rotates only in the one direction, it will be seen that when pinion H is brought into mesh with it shaft E and wheel D will be rotated in a reverse direction from that given to them through the meshing of pinions J and I, and hence the gate will be moved forward. Thus it will be apparent that each alternate ascent of the yoke causes shaft E and wheel D to turn in one direction, and each intermediate ascent causes them to turn in the reverse direction, so that on approaching the gate and operating the lever at that side the gate will be opened, and on leaving it and operating the other lever the gate will be closed, and this regardless of which side is approached.

Having thus described my invention, what I claim is—

1. In combination with a longitudinally-movable gate and a wheel or drum for propelling the gate, a helically-grooved drum or cylinder geared to the propelling wheel or drum, and a yoke movable lengthwise of the grooved drum or cylinder and provided with lugs or projections to enter the grooves thereof, whereby a longitudinal movement of the yoke is caused to impart rotary motion to the grooved cylinder and to the propelling-wheel.

2. In combination with a gate and a propelling wheel or drum therefor, a post, a helically-grooved cylinder geared to the propelling-wheel extending parallel with the face of said post and journaled in bearings, and a yoke provided with rollers to bear and travel upon the face of the post, and with projections to enter the grooves of the cylinder, whereby the yoke is prevented from turning or twisting laterally, but is caused to impart rotation to the cylinder when moved relatively thereto.

3. The combination, substantially as set forth, of a longitudinally-movable gate, a propelling wheel or drum therefor, a sleeve encircling said shaft free to move longitudinally thereon, but incapable of rotating independently of the shaft, two gears carried by said sleeve, a second shaft or cylinder at right angles to the first and provided with helical grooves, a gear-wheel carried by said second shaft or cylinder, a yoke provided with lugs or projections to enter the grooves of the shaft and impart rotation to the latter, and a shifting-lever connected with the sleeve and actuated through the movements of the yoke to move the sleeve and bring one or another of its gears into mesh with that of the grooved shaft or cylinder.

4. In combination with a longitudinally-movable gate, a propelling wheel or drum therefor, a shaft carrying said drum, a sleeve encircling said shaft and movable endwise

thereon, two gears carried by said sleeve, a helically-grooved cylinder at right angles to the propelling-wheel shaft, a gear carried thereby, a yoke movable lengthwise of the grooved cylinder and having projections extending into the grooves thereof, a shifting-lever in engagement with the sliding sleeve, a cam-wheel serving to move the shifting-lever alternately in reverse directions and provided with ratchet-teeth, and a dog or pawl carried by the yoke and serving to engage said teeth and to turn the cam-wheel when the yoke is moved.

5. The combination, substantially as set forth, of a longitudinally-movable gate, a propelling-wheel and shaft therefor, a sleeve encircling said shaft and provided with two gears, a helically-grooved cylinder, a gear to mesh alternately with those of the sleeve connected with the cylinder, substantially as shown and described, whereby it is caused to turn with the cylinder in one direction only, a shifting-lever in engagement with the sleeve, a cam-wheel serving to actuate the shifting-lever and provided with ratchet-teeth, a yoke movable lengthwise of the grooved cylinder and provided with lugs or projections to enter the grooves thereof, and a dog or pawl carried by said yoke and adapted to engage with the ratchet-teeth of the cam-wheel and to rotate said wheel.

6. In combination with a gate, a propelling-wheel and its shaft, a sleeve carried by said shaft and movable longitudinally thereon, gear-wheels carried by said sleeve, a helically-grooved cylinder, a gear-wheel loosely mounted upon said cylinder and provided with a toothed hub, a toothed collar loosely encircling the cylinder directly above said toothed hub and adapted to move a limited distance independently of the cylinder, a shifting-lever connected with the sliding sleeve, a cam-wheel serving to move the shifting-lever and provided with ratchet-teeth, a yoke movable lengthwise of the cylinder and having projections to enter the grooves thereof, and a dog carried by said yoke and adapted to engage with the teeth of the cam-wheel, all substantially as set forth, whereby each movement of the yoke is caused to shift the sleeve and its gear-wheels and to rotate the shaft, the rotation being alternately in opposite directions.

7. In combination with a sliding gate, a propelling shaft and wheel, a helically-grooved cylinder, a yoke for rotating said cylinder, and gearing connecting the cylinder and the propelling-shaft, a latch adapted to engage with the gate, and a trip or arm projecting from the yoke and serving to engage with and withdraw the latch as the yoke is lifted.

8. In combination with a sliding gate, a vertically-movable yoke or bar, and intermediate gearing, substantially such as shown and described, for transmitting motion from the yoke or bar to the gate, a latch adapted to engage with the gate when the latter is closed, a trip carried by the yoke or bar and adapted to engage with the latch and to withdraw the same as the yoke or bar is lifted, and a guard extending over the latch, and serving to deflect the trip and to prevent its engagement with the latch as the yoke descends.

9. The combination, substantially as set forth, of sliding gate A, propelling-wheel D, shaft E, carried in bearings secured to a post, F, sliding sleeve G, provided with gears H I, shifting-lever U, toothed cam-wheel S S′, helically-grooved cylinder L, gear J, loosely encircling said cylinder and provided with teeth j', clutch-hub i, provided with teeth j and opening l, pin k, projecting from the grooved cylinder into said opening, a yoke, M, having projections extending into the grooves of the cylinder, and a dog, y, carried by said yoke and serving to rotate the cam-wheel.

10. In combination with a sliding gate, A, and propelling-shaft therefor, E, a cylinder or shaft, L, a yoke or bar, and hand-levers for imparting rotary motion to the cylinder L, and reversible gearing interposed between the propelling shaft E and the cylinder L, whereby the latter may be rotated in either direction by the former without changing the direction of rotation of the cylinder L.

11. In combination with a gate, a propelling-shaft, E, suitably connected therewith, a grooved cylinder, L, a yoke, M, having projections to enter the grooves of said cylinder, a toothed collar, i, loosely encircling said cylinder and provided with a hole or recess, a pin extending from the cylinder into said hole or recess, pinion J, loosely encircling cylinder L and provided with teeth to engage with those of collar i, and reversing-gear connecting shaft E and pinion J.

12. In combination with the propelling-shaft of a sliding gate such as described, a shaft or cylinder at right angles thereto, means, substantially such as described and shown, for rotating said cylinder, and reversing-gear forming a connection between the shaft and cylinder, whereby the shaft may be rotated alternately in opposite directions by a continuous rotation of the cylinder in one direction.

13. In combination with shaft E, sleeve G, encircling shaft E, gears H I, carried by said shaft, cylinder L, pinion J, and clutch-collar i, carried by said cylinder, shifting-lever U, cam and ratchet wheel S S′, yoke M, and dog y, carried by said yoke and serving to rotate wheel S S′.

14. In combination with gate A and latch v, yoke or bar M, provided with yielding trip t, lever Q, extending from latch v into the path of trip t, and yielding guard R, extending over the rear end of lever Q, all substantially as shown and described.

15. In combination with a sliding gate, a propelling-shaft therefor, a helically-grooved cylinder connected by gearing with said shaft, a yoke having projections to enter the grooves of the cylinder, and a tail or extension, and rollers on opposite sides of said tail or extension to guide the same, substantially as set forth.

16. The combination, substantially as set forth, of a gate, A, a propelling-wheel and shaft therefor, a helically-grooved cylinder, gearing connecting the shaft and the cylinder, a yoke having projections to enter the grooves of the cylinder, rollers carried by said yoke and arranged to travel upon a fixed bearing-surface, and levers connected with and serving to move the yoke.

17. In combination with gate A, pivoted latch-bar or dog v^2, and an operating-lever connected therewith, a locking-bolt connected with the actuating mechanism of the gate and adapted to pass into the path of the bar or dog v.

In witness whereof I hereunto set my hand in the presence of two witnesses.

PATTERSON STEELE.

Witnesses:
J. D. HUNT,
W. W. MCILVAIN.