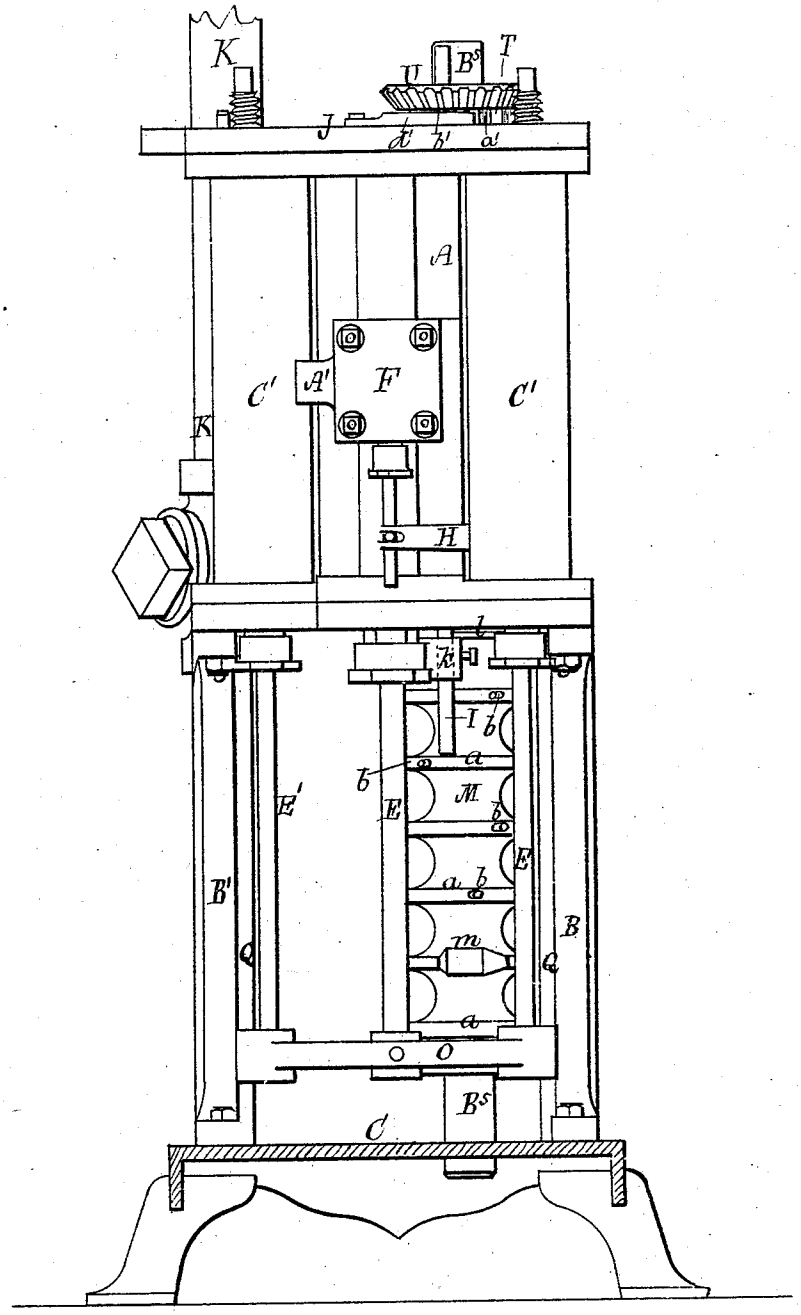
(No Model.) 3 Sheets—Sheet 1.

M. D. PORTER.

NAUTICAL SIGNAL.

No. 285,841. Patented Oct. 2, 1883.

Fig. 1.



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(No Model.)

3 Sheets—Sheet 2.

M. D. PORTER.

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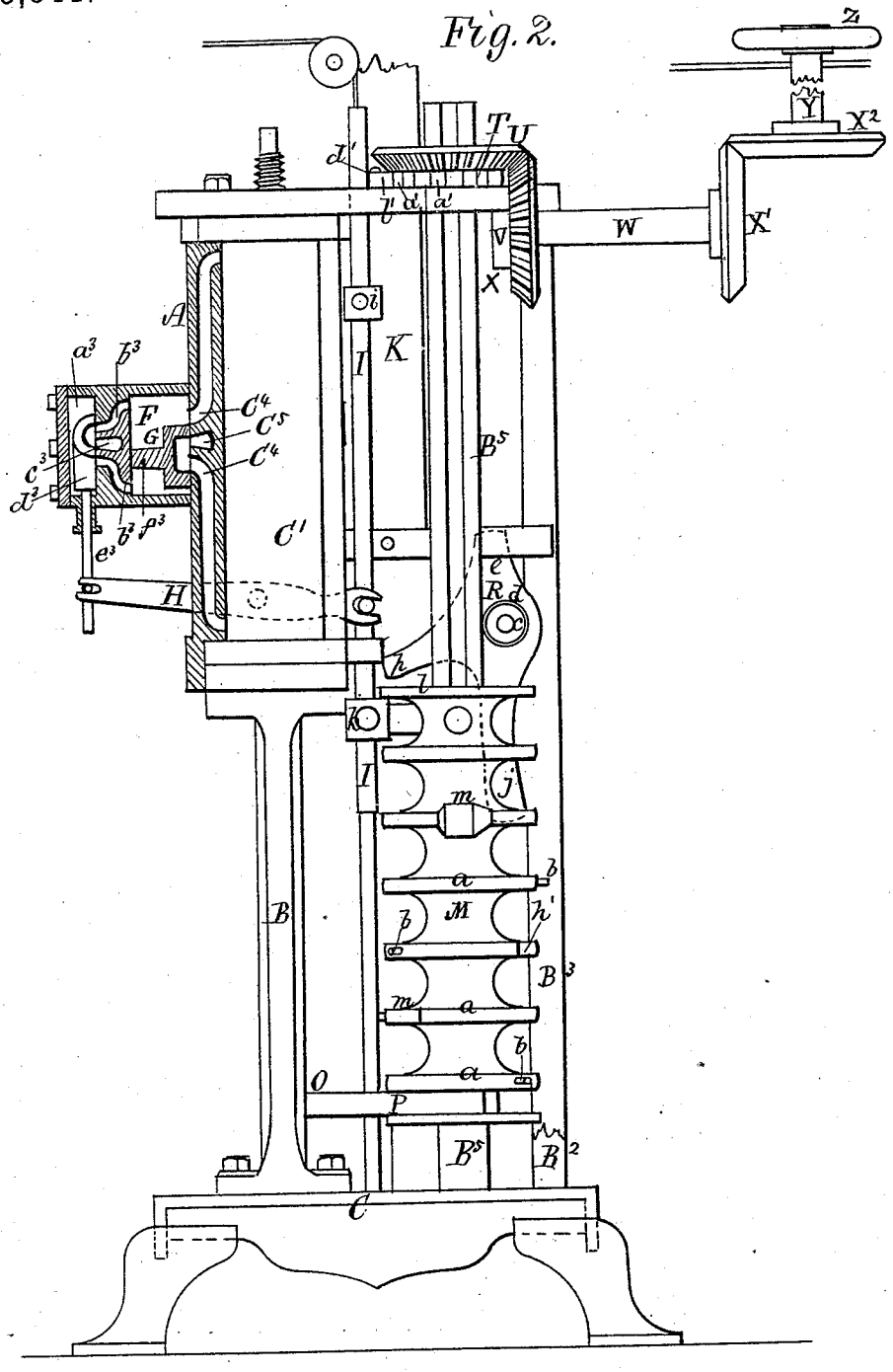
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

M. D. PORTER.

NAUTICAL SIGNAL.

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Fig. 4.

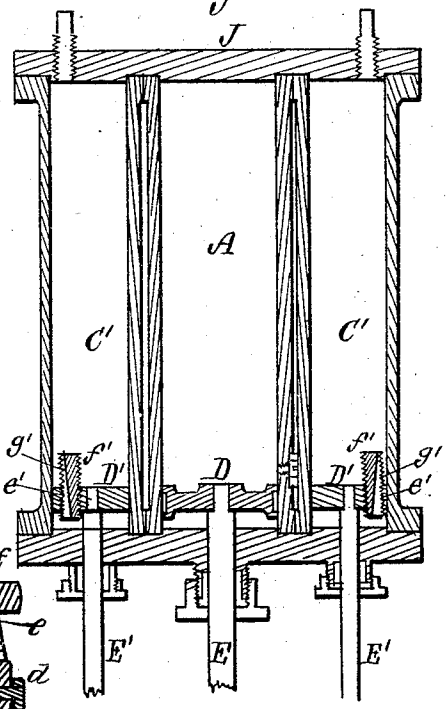


Fig. 6.

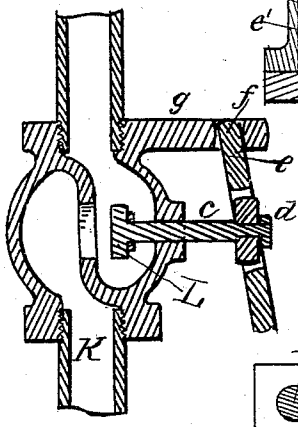


Fig. 5.

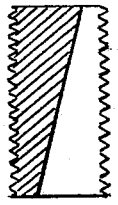
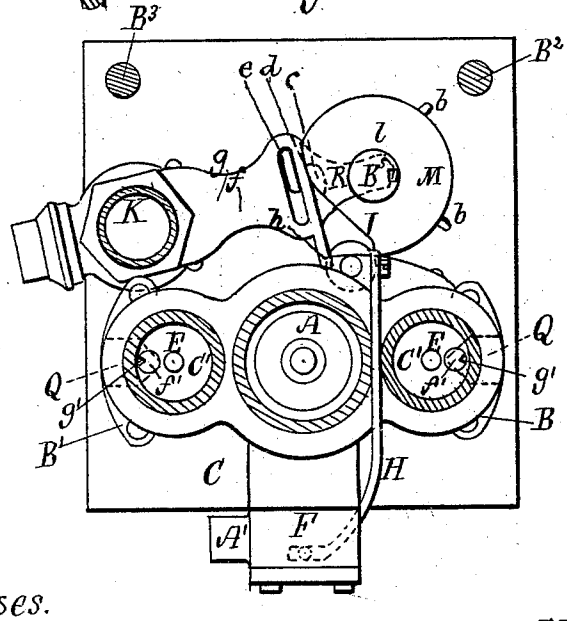


Fig. 3.



Witnesses.
Thos. J. Bailey
S. C. Means

Inventor.
Major D. Porter.
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UNITED STATES PATENT OFFICE.

MAJOR DANE PORTER, OF BOSTON, MASSACHUSETTS.

NAUTICAL SIGNAL.

SPECIFICATION forming part of Letters Patent No. 285,841, dated October 2, 1883.

Application filed June 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, MAJOR DANE PORTER, a citizen of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Marine Danger-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to a device or machine for producing signals by currents of steam, air, or other fluid driven through a whistle, fog-siren, or other object capable of emitting audible sounds; and it consists in certain details of mechanical construction, as hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a front view, in Fig. 2 a side elevation, with the steam-cylinder in section, and in Fig. 3 a horizontal section, of a machine containing my improvements. Fig. 4 is a section of the cylinder of the fluid-governor to be described. Fig. 5 is a view of the piston-plug, and Fig. 6 is a section of the steam-supply valve.

In the above-named drawings, A represents a vertical steam-cylinder, supported at bottom upon the top of vertical columns B B′ B^2 B^3, erected upon a suitable bed-plate or foundation, C, this cylinder A having supply-ports C^4 C^4, exhaust-port C^5, piston D and piston-rod E, valve-chamber F, valve G, and valve-rod, after the manner of steam-engines in general, the steam-supply pipe of the valve-chamber being shown at A′.

To operate the valve G, I employ a horizontal oscillating pallet or lever, H, pivoted at about its center to one side of the cylinder A, the front end of this lever being pivoted in any suitable manner to the valve-rod, the opposite or rear end of said lever being pivoted to a vertical bar, I, supported by and playing in guides in the frame of the machine, said frame consisting, in the present instance, of the base-plate and columns before named and a top head-plate, J, surmounting such columns.

K in the drawings represents a steam-supply pipe, which connects directly with a steam-whistle, fog-siren, or other signal device capable of being operated by a current or blast of steam, air, or other elastic fluid, the said pipe being provided with a valve, L, by which the admission of fluid to the signal device is governed. The office of the steam-cylinder is mainly to operate the actuator which controls the valve L, while such valve lets on steam at the beginning of the complete sounding of the signal-code and shuts off such steam when such sounding is finished, preparatory to a second sounding.

To actuate the lever H as occasion may demand, I employ a vertical corrugated cylinder, M, formed with annular ledges *a a*, &c., of equal diameter, and equidistant from each other, this corrugated cylinder being supported by and capable of sliding upon a vertical shaft, B^5, journaled in the plates C J, and being raised and lowered upon such shaft by a cross-head, O, which has a horizontal arm, P, that straddles the lower end of said cylinder, which is peripherally grooved to receive said arm. The cross-head O is supported by and slides vertically upon parallel upright ways or slides Q Q, formed upon opposite sides of the columns B B′, before named, and is secured to and carried by the lower outer end of the piston-rod E. At the close of each complete sounding of the code, whatever the length of such sounding may be, the cylinder must return to its starting or initial point of action, and to effect this I secure to the periphery of more or less of the ledges of the cylinder lateral spurs *b b*, &c., these spurs being distributed in manner as is requisite to carry out any given order of notes of the signal.

To actuate the valve L of the whistle-supply, I employ a three-armed lever or pallet, R, which is capable of compound motion—that is, a rocking motion on its pivot and a bodily swinging motion from its upper end as a pivot. To enable this to be done I pivot the lever or pallet R at its corner to the outer end of the stem *c* of the valve L by a gimbal-joint, as shown at *d*, and I insert the upper end of the upper vertical arm, *e*, of said lever in a horizontal lateral slot, *f*, formed in a bracket, *g*, secured to the upper part of the case of the

valve L. The free end of the horizontal arm *h* of the lever R operates with a stud, *i*, secured to the upper part of the vertical bar I, before named, while the lower end of the lower vertical arm, *j*, of said lever operates with the ledges of the actuator or cylinder M as the latter descends in the act of sounding the various individual notes of the code. After the completion of the sounding of the entire code, an interval of time of comparatively considerable length should elapse before the beginning of another sounding, and in my present machine I take advantage of this lapse of time in which to return the actuator M to its initial—that is, its highest—point, and during this time the pallet H must be idle—that is, out of engagement with the cylinder or actuator M. This is accomplished by a spur, *k*, on the bar I, which spur, as the actuator reaches the lowest point in its descent, after sounding the last note of the code, is struck by the flange *l* on the top of the actuator, the result being that the upper arm, *e*, of the pallet R is lowered and its lower arm, *j*, thrown out of engagement with the ledges of the actuator M. At the same time that the actuator-cylinder M completes its descent and thrusts the lever or pallet R to one side, as stated, the action of the bar I strikes against and lowers the rear end of the oscillating lever H and raises the front of such lever, thereby lifting the valve-rod I and shifting the valve G and changing the direction of the stroke of the cross-head O.

To prevent rotary motion of the actuator M upon its supporting-shaft B^4, and yet permit it to slide vertically upon such shaft, I employ a spline-and-groove connection between the two, as shown in the drawings. The ledges of the actuator M are to be mutilated—that is, cut away—in places, according to the order in which the notes of the signal are to be sounded—that is to say, according to the number of such notes and the length of the pause between them—some of these mutilations being shown at *m m*, &c.

A suitable dial-plate containing the code which is to govern the machine is secured to a suitable standard, and to adjust the actuator M in accordance with this code-dial, I secure to the top of the shaft B^5 a plate or head, T, and to the top of this head T, I secure a horizontal beveled gear, U, which is engaged by a second beveled gear, V, secured to one end of a horizontal shaft, W, the inner end of such shaft being journaled in a hanger, X, depending from the head-plate J, before named, while the outer end of such shaft W carries a beveled gear, X′, which engages a beveled gear, X^2, secured to the lower end of a vertical shaft, Y, the upper end of this latter shaft carrying a hand-wheel, Z, by which the position of the shaft B^4 and actuator M are determined or adjusted axially.

If my machine is adapted to navigable vessels to give danger-signals, the actuator M and the mechanism connected with it will be located in the engine-room of such vessel, while the band-wheel and the dial-plate before mentioned are situated upon the deck or bridge of the vessel.

It is necessary or very desirable that after the sounding of the code has begun no interruption of such sounding shall or can take place until the code of sounds is completed; and to effect this result I form in the periphery of the head before named a series of notches, *a′ a′*, &c. While operating with these notches I employ a dog or latch, *b′*, pivoted at one end to the top of the head-plate J, before named, the nose *c′* of this latch taking into the notches of the head, and being impelled toward such head and into engagement with said notches by a spring, *d′*. The dog or latch *b′* locks the head T and actuator M in position by means of the notches *a′ a′*, &c., in the head; hence the number of these notches must coincide with the number of points upon the compass-card, which, as before stated, are in this instance eleven—viz., N, NE, E, SE, S, SW, W, NW, "hove to," "reversed engine," "prolonged blast."

To throw the latch *b′* out of engagement with the notched periphery of the head T, or rather to unlock such latch and permit the head to be rotated and slip over the latch when the complete sounding of the code has ceased, thereby permitting the position of the actuator to be changed to vary the order of the notes of the whistle, I compel the rod I, before named, to perform another function, which is this: As the actuator is descending and actuating the lever or pallet R to open and close the valve L and sound the various notes of said whistle, the said rod I is at its highest point, and its upper end remains behind the latch *b′* and compels the latter to engage the teeth of the head T and prevent turning of the latter. As the actuator reaches its lowest point and the sounding of the code has been completed, the rod I is lowered by the flange *l* of the actuator striking against the spur *k* of said rod, thereby freeing the head or wheel T and permitting it to slip over the dog *b′* and be set to the desired point.

I desire to add to my machine a governor to regulate the length of time between the various notes of the code, in order that the intervals of time demanded by such code may be carried out. I accomplish this in the present instance by employing twin cylinders C′ C′, disposed upon opposite sides of the steam-cylinder A, before named, and parallel therewith, and in each of these cylinders I place a piston, D′, the rod E′ of which connects with one end of the cross-head O, before named. The cylinders C′ C′ are filled with oil or other fluid of considerable density, and an opening, *e′*, is made through each piston, through which the oil must flow as the piston traverses, the cylinders. The opening *e′* may be combined with a cock to increase or diminish its size, and thereby accelerate or retard the speed of the piston.

I prefer, however, as a simple way of effecting the desired result, to screw through each piston a plug, f', and cut in one side of this plug a longitudinal tapering channel, g', through which the oil must pass. By screwing the plug f' in one direction, the size of the opening through the piston is enlarged, the resistance to the oil in the cylinder lessened, and the speed with which the two pistons, and consequently the actuator M, move are accelerated, and vice versa.

The operation of my machine as above constructed is as follows: Supposing the code to which it is adapted to require that the SE point of the compass, for instance, shall be denoted by the following blasts of the whistle—that is, two blasts in succession, with an interval, say, of two seconds; then an interval of time of six seconds; and, finally, one blast followed by a long pause of fifteen seconds, which indicate that one complete sounding of the code has taken place; and these sounds and intervals to be repeated so long as the actuator M is not changed in position axially upon its shaft—and supposing, also, that the actuator is at its highest or initial point of action, in this case the point of the ledges of the actuator which are in line with the lower arm, j, of the pallet or lever R are intact except one, which has a mutilation or notch, h', to permit this flange or ledge to pass over without actuating said lever-arm. Therefore as the actuator descends the first two ledges operate successively upon the lever or pallet R, and this pallet in turn operates the valve L to produce the two blasts of the whistle with the required interval of two seconds. The notch or mutilation h' now passes by the pallet R without actuating the latter or sounding the signal, and the actuator travels till its next succeeding flange strikes the pallet and sounds the last note required, with a lapse of time of six seconds. The flange l of the actuator M now abuts against the spur k on the rod or bar I, and the latter is lowered, thereby tilting the oscillating lever or latch H, and in so doing raising the valve-rod G' and steam-valve G and changing the direction of the stroke of the cross-head O and of the actuator. At the same time the descent of the rod or bar I lowers the horizontal arm h of the pallet R and throws the lower arm, j, of such pallet out of the path of movement of the ledges of the actuator. The cylinder or actuator M now rises without effect upon the pallet R or sounding the whistle until it returns to its initial point, from which we started, the period of time occupied by the ascent of the actuator determining the extent of the pause between the completion of one sounding of the signal and a repetition of such sounding. As the actuator reaches its highest or initial point, as explained, the flange l of such actuator abuts against the stud i upon the rod or bar I and lifts such rod, thereby tilting the lever H in a direction opposite to that last explained, and shifting the engine-valve G and reversing the direction of the cross-head O and the longitudinal stroke of the actuator M, at the same time lifting the arm h of the pallet R and throwing the lower arm of such pallet into engagement with the ledges of the actuator. During the interval of time occupied by the traverse of the actuator in its ascent the position of such actuator axially upon its shaft may be changed to permit of a change in the order of the notes of the signal, when the course of a vessel, for instance, is changed, as the head T is unlocked and free to rotate.

I do not restrict myself to the precise details of mechanism as herein explained, as these may be departed from to a considerable extent without involving patentable novelty.

Owing to the absence of a balance-wheel and to the want of momentum to reverse the valve of the steam-cylinder, such valve is liable to stop at the point of reversing. To prevent this I employ a second valve-chest, a^3, containing live-steam ports b^3 b^3 and exhaust c^3, connecting with the main valve-chamber F, valve d^3, valve-rod e^3, and I pivot the outer end of the lever H to this rod e^3. The valve G, under this arrangement, extends laterally across its chamber F, as shown at f^3, and the valve d^3, in conjunction with the ports b^3 b^3 and c^3, operates to drive the valve G in manner as will be readily understood; hence it is impossible for such valve G to stop at any point. To produce the single prolonged note, which denotes that the vessel is leaving port, the ledges a of the actuator are omitted in a vertical line at the point requisite to carry out such prolonged note—that is, the full diameter of the actuator is preserved on such line.

In order that the attendant may know when the proper time arrives at which he can change the position of the actuator axially, if necessary—that is, at the end of a complete sounding of the code—I connect to the top of the shipper rod or bar I a wire or cord which connects with a gong or other alarm. As the rod I reaches the lowest point in its descent after such complete sounding of the signal, and falls away from and releases the dog b', the gong is sounded.

I claim—

1. In combination with a steam-whistle and a pipe supplying steam thereto, a valve arranged in said pipe to control the passage of steam through the same, a pallet swiveled to the stem of said valve and pivoted so as to have compound motion, a vertically-sliding corrugated cylinder, M, which engages with said pallet, a vertically-sliding bar, I, which engages with said pallet and is moved up and down by said cylinder M, a lever, H, which engages with said rod at one end, and at the other with the rod of the slide-valve of the first-named cylinder, and the necessary actuating and intervening devices, substantially as set forth.

2. In combination with the steam-whistle

and its supply-pipe and valve, a pallet swiveled to the stem of said valve and pivoted so as to have compound motion, a vertically-sliding corrugated cylinder, M, a cross-head, O, and arm P, whereby said corrugated cylinder receives its vertical motion, a sliding rod or bar, I, which engages with said pallet and is actuated by said corrugated cylinder, the lever H, which is actuated by said rod or bar I, a slide-valve operated by said lever H, a cylinder which is provided with said slide-valve, a piston operating in said cylinder, and a piston-rod attached to said piston and said cross-head, substantially as set forth.

3. In combination with the steam-whistle and its supply-pipe and valve, a pallet swiveled to the stem of said valve and pivoted so as to have compound motion, a vertically-sliding corrugated cylinder, M, provided with a flange, *l*, at its top, a cross-head, O, and arm P, whereby said corrugated cylinder receives its vertical motion, a sliding rod or bar, I, which is provided with spurs *i* and *k*, adapted to be struck by said flange *l*, and said spur *i* being also adapted to engage an arm of said pallet, a lever, H, actuated by rod or bar I, a slide-valve operated by said lever H, a cylinder which is provided with said slide-valve, a piston operating in said cylinder, and a piston-rod attached to said piston and cross-head, substantially as set forth.

4. A vertically-sliding cylinder, M, having flanges *a*, which are provided with spurs *b*, and notches *h'*, in combination with the vertically-sliding rod I, lever H, connected to said rod, a slide-valve operated by said lever, a steam-cylinder, piston, piston-rod, cross-head, and arm P, whereby cylinder M is operated, the pallet R, having compound motion, and adapted to be engaged by cylinder M and rod I, and suitable intervening devices, substantially as set forth.

5. A vertically-sliding cylinder, M, having flanges *a*, which are provided with spurs *b* and notches *h'*, and devices for turning said cylinder on its axis to change the locations of said spurs and notches, in combination with the vertically-sliding-rod I, lever H, connected to said rod, a slide-valve operated by said lever, a steam-cylinder, piston, piston-rod, cross-head, and arm P, whereby cylinder M is operated, the pallet R, having compound motion, and adapted to be engaged by cylinder M and rod I, and suitable intervening devices, substantially as set forth.

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

MAJOR DANE PORTER.

Witnesses:
S. O. MEARY,
ALBERT HAYDEN.