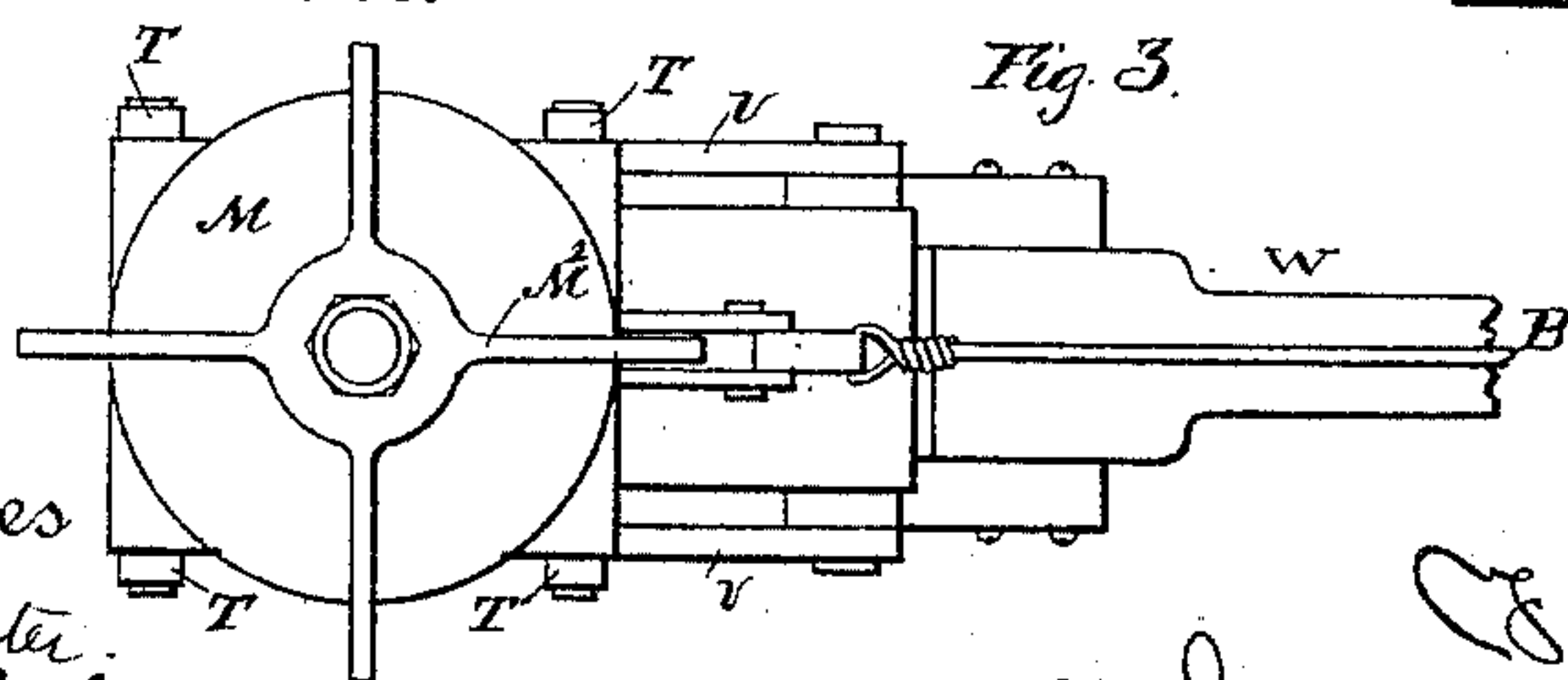
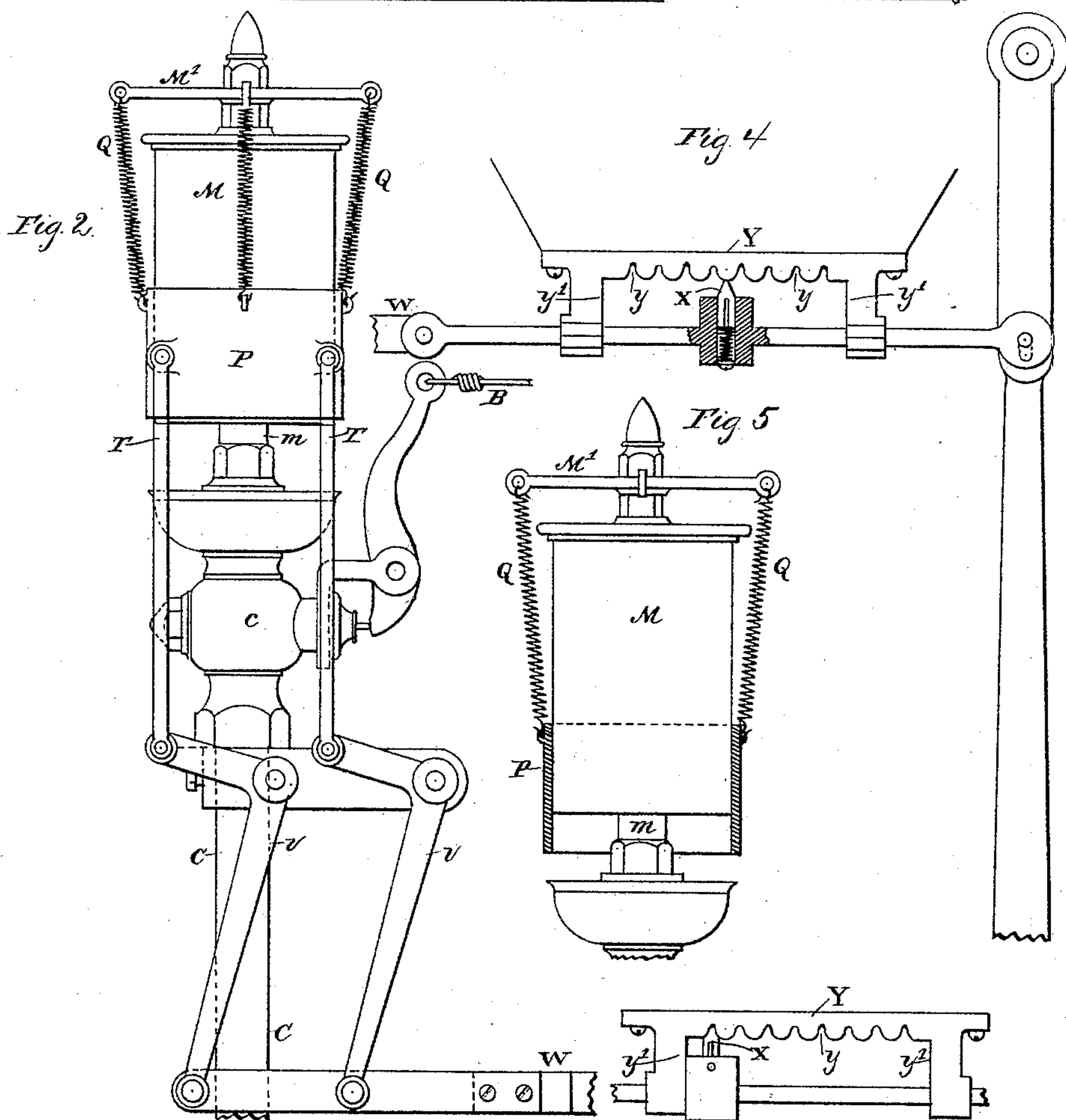
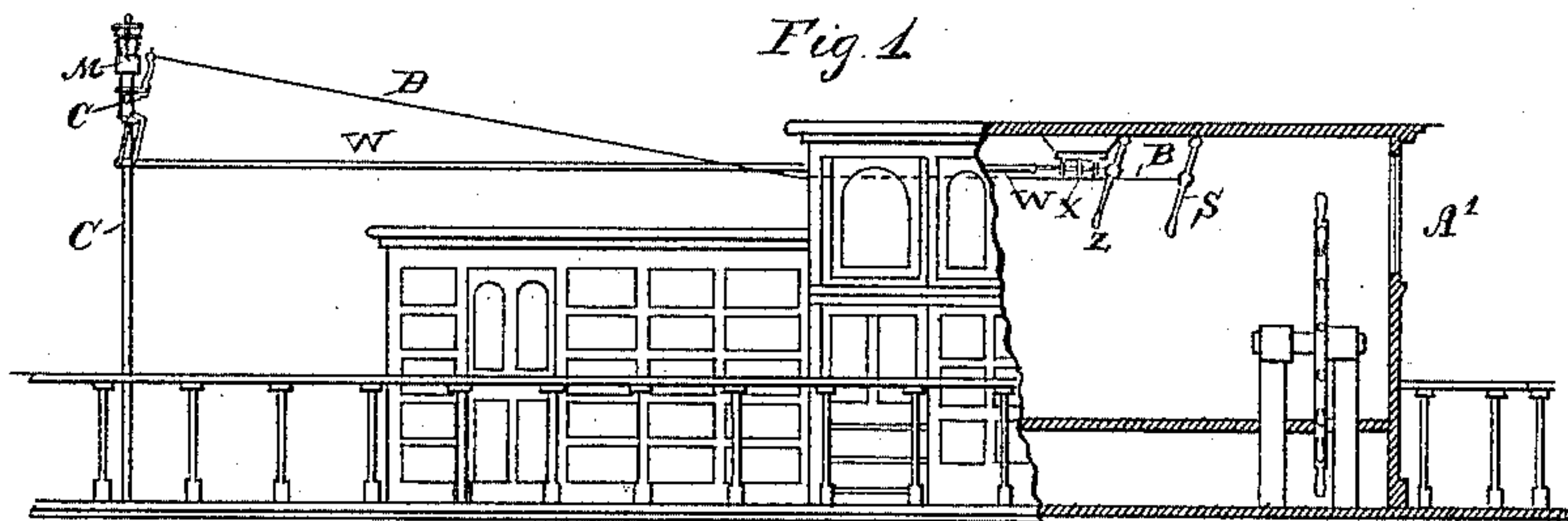


(No Model.)

F. E. FORSTER.  
MARINE SIGNAL.

No. 440,741.

Patented Nov. 18, 1890.



Witnesses  
Chas. F. Butler  
Charles R. Searle

Inventor  
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By his Attorney  
Thomas Drew Peterson



# UNITED STATES PATENT OFFICE.

FERDINAND E. FORSTER, OF NEW YORK, N. Y.

## MARINE SIGNAL.

SPECIFICATION forming part of Letters Patent No. 440,741, dated November 18, 1890.

Application filed August 7, 1889. Serial No. 320,069. (No model.)

*To all whom it may concern:*

Be it known that I, FERDINAND E. FORSTER, of the city and county of New York, in the State of New York, have invented a certain  
5 new and useful Improvement Relating to Marine Signals, of which the following is a specification.

I have devised simple means for varying the note of a steam-whistle at will within wide  
10 limits, and also means for conveniently operating such steam-whistle on ship-board to produce widely-differing notes with absolute certainty and with little labor or care. The pressure of the steam may vary within wide limits.  
15 Each whistle is able to give two or more widely-differing notes, and to vary the order and the length of those notes, as required. I can make the tones conform to an exact musical standard; but this is not absolutely necessary.  
20

I propose to use the invention in connection with a code which shall be agreed upon and in which certain successions of different sounds shall indicate the direction in which  
25 the steamer which gives the signal is running, or, in case she is changing her course, the direction which she proposes to take. Certain different successions of sounds will be understood to indicate each a certain direction of travel, the sounds in each group differing from each other, while the average pitch may vary within wide limits, even to the extent that the lowest note given by one steamer shall be higher than the highest on another.  
30 I prefer to make the range in the tones as nearly as may be what is known as the "octave," and I provide for effecting a moderately-rapid transition of the sound from one extreme to the other of this range. It is important that the code be simple and that it shall not require for the giving or receiving of signals any degree of musical culture, while it shall clearly set forth the direction in which a vessel is going to move.  
40

45 The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a side elevation, partly in section, of a portion of a vessel. The remaining figures are on a larger scale. Fig. 2 is a side elevation, and Fig. 3 is a plan view. Fig. 4

is a side elevation, partly in vertical section, showing a portion of the apparatus. Fig. 5 is a side elevation, partly in vertical section, showing another portion of the apparatus.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the upper deck of a steamer; A', the pilot-house, and C a pipe delivering steam from the boiler, controlled by a valve c, which may be operated at will from the wheel-house by the ordinary connection B, so as to cause the whistle to sound at any time and to continue the sound for any period desired.

I have discovered that the tone of a steam-whistle can be varied within wide limits by a simple change in the position of the lip or lower edge of the bell, against which the current of steam impinges.

M is the bell, mounted on a central rod m. It stands in the usual relation to the pipe C, which delivers the steam to act on it. On the exterior of the bell M is mounted the ring P, which is capable of being shifted upward and downward. When this ring is depressed, its lower edge extends below the lower edge of the bell M, and serves as the resonant lip or edge, against which the steam impinges and by which the loud tone desired is produced. Contrary to what might be expected, the lowering of the ring and the practical elongating of the bell raises the tone. The raising of the ring, thereby practically shortening the bell lowers or flattens the sound.

Q Q Q Q are helical springs connecting the ring P with a horizontal cross-frame M', mounted above the bell M. These springs exert a contractile force, tending to hold the ring P strongly up to its highest position.

T T are slender rods of hard wood or other suitable material leading downward from three or more points in the ring P and connecting to corresponding bell-crank levers U, mounted on fixed centers below. The lower arm of each of these levers U is attached to a forked end of an operating-bar W, which connects to the lever Z in the pilot-house. When this lever Z is released, the tension of the springs Q lifts the ring P, and through the connections U and W carries the lever Z to one end of its traverse. When, on the contrary, the helmsman grasps the lever Z and



moves it forcibly to the other extremity of its traverse, it acts through the rod W, bell-crank levers U, and rods T on the ring P, and depresses the latter.

5 It remains to describe the provisions for insuring that the motion from one extreme position to the other is effected with moderation and always to a certain definitely-prescribed extent.

10 The rod W carries a spring-dog X, having a double-beveled upper end, which, as the lever Z is shifted, engages successively in the several notches *y* in a bar Y fixed above. The series of notches preferably correspond to the  
15 musical gamut, with larger notches at what are known in music as the "third" and "fifth." Especially is there a deep notch at each end of the scale. There may be, in addition, a positive stop *y'* to arrest the dog X and prevent  
20 the operating of the devices by any excess of force beyond the proper limit for the extreme range of tone desired.

When the lever Z is operated in one direction, the springs Q are allowed to lift the ring  
25 P to its fullest extent, and the corresponding sound is emitted if the steam is allowed to flow. When the operator shifts the lever Z, and thereby exerts a tension through the rod W, levers U and rods T depressing the ring  
30 P, it moves to its lowest position, but not instantaneously. The action of the spring-dogs X in the several notches *y* insures that the movement shall occupy an appreciable time, and ordinarily that there shall be a series of  
35 brief stoppages on the several intermediate notes. The motion of the lever Z will ordinarily be made with vigor, so as to shift it by rapid succeeding steps from one end to the other of its traverse. The operator will ordi-  
40 narily cause this lever to remain at one extremity of its movement during all the period between one set of sounds or one signal and the next.

The code may be varied. It is not a neces-  
45 sity of my invention that any particular signal be used to indicate any particular direction of travel. Suppose, for example, any note sounded once briefly always means that the course is northerly, and two notes in quick  
50 succession indicate that the course is southerly. A slide from the lowest note to the highest indicates that the course is easterly, and two such slides quickly following each other that it is westerly. The helmsman can op-  
55 erate the lever Z, which determines the pitch, with one hand, and the lever S, which lets on or shuts off the steam-valve *c*, by the other hand. Suppose he is running northeast, he indicates that fact at intervals by whistling  
60 a short note with a uniform tone, immediately followed by a sound which slides from the lowest pitch to the highest. If he hears a signal ahead which induces him to temporarily change his course to east, he indicates  
65 that fact immediately, even before he has

made the change, by whistling the proper succession of sounds—that is, setting the ring P by one hand in the position to give the lowest note, then with the other hand open-  
ing the valve *c* to allow the whistle to sound, 70 and then, while the sound is being emitted, moving the lever Z so as to traverse the spring-dog X over the whole series of notches *y* and cause it to rest at the other end of its motion. The vessel approaching may or may  
75 not have before received notice through the signals of the original course of one vessel; but now she is told by my signal of our proposed change, and can change her course ac-  
80 cordingly, and if provided with my invention she may signal back to us what change, if any, she has made or proposes to make in her course.

The spring-dog X, with its double-beveled end engaging successively in the beveled  
85 notches *y*, allows the lever Z to be moved; but the engagement of the dog in the several notches insures that the motion shall be delayed a little at each notch, so as to give a  
90 step-by-step effect.

Another and entirely independent use of my invention is to execute musical airs. This will require skill, but only to a small amount. It is accomplished by simply mov-  
95 ing the lever Z successively to the several positions required and give the steam for the period required.

The code above proposed is a simple one. It may be varied indefinitely. My invention serves with any code to effect the transition,  
100 always with certainty and with moderation, from the lowest to the highest sound and back again, with the certainty that however unskillful the operator may be the change in the tone will be produced properly. 105

I claim as my invention—

1. The combination, with the steam-pipe C, the bell mounted thereon, and the ring embracing the bell and suspended by springs  
110 from the frame above the bell, of the valve *c* in the pipe C and valve-controlling mechanism, substantially as specified.

2. The combination, with the steam-pipe C, the bell M, mounted thereon, and the ring embracing the bell and suspended by yield-  
115 ing connections from the cross-frame M' on the bell, of the ring controlling and adjusting mechanism consisting of the rods, the operating-bar W, bar Y, having notches *y*, stop *y'*, the spring-dog X, engaging said  
120 notches, and the lever Z, all arranged and operating substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York, New York State, this 31st day of July, 1889, in the presence of two  
125 subscribing witnesses.

FERDINAND E. FORSTER.

Witnesses:

H. E. WELLS,

GEORGE W. LYNCH.