(No Model.)

W. H. HALL.

TOY LOCOMOTIVE ENGINE.

No. 281,360. Patented July 17, 1883.

Fig. 1.

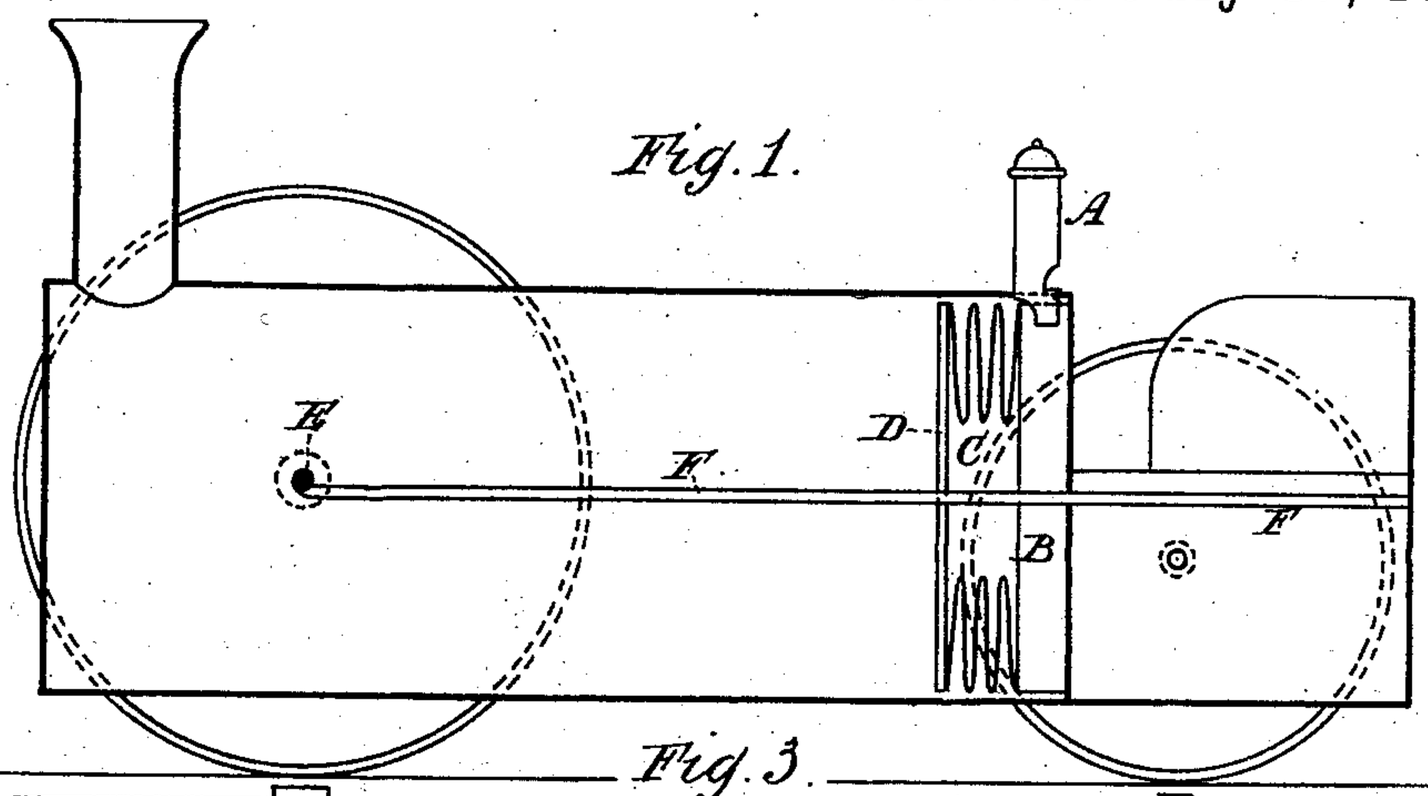


Fig. 3.

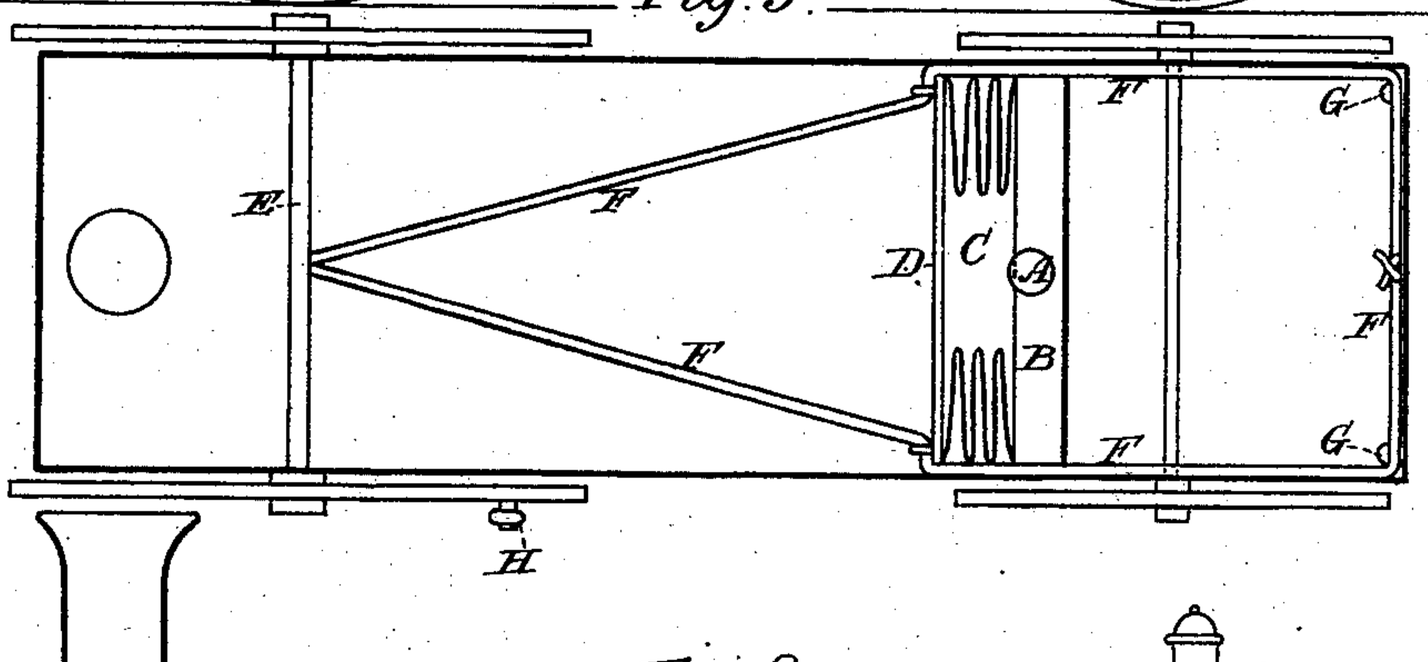


Fig. 2.

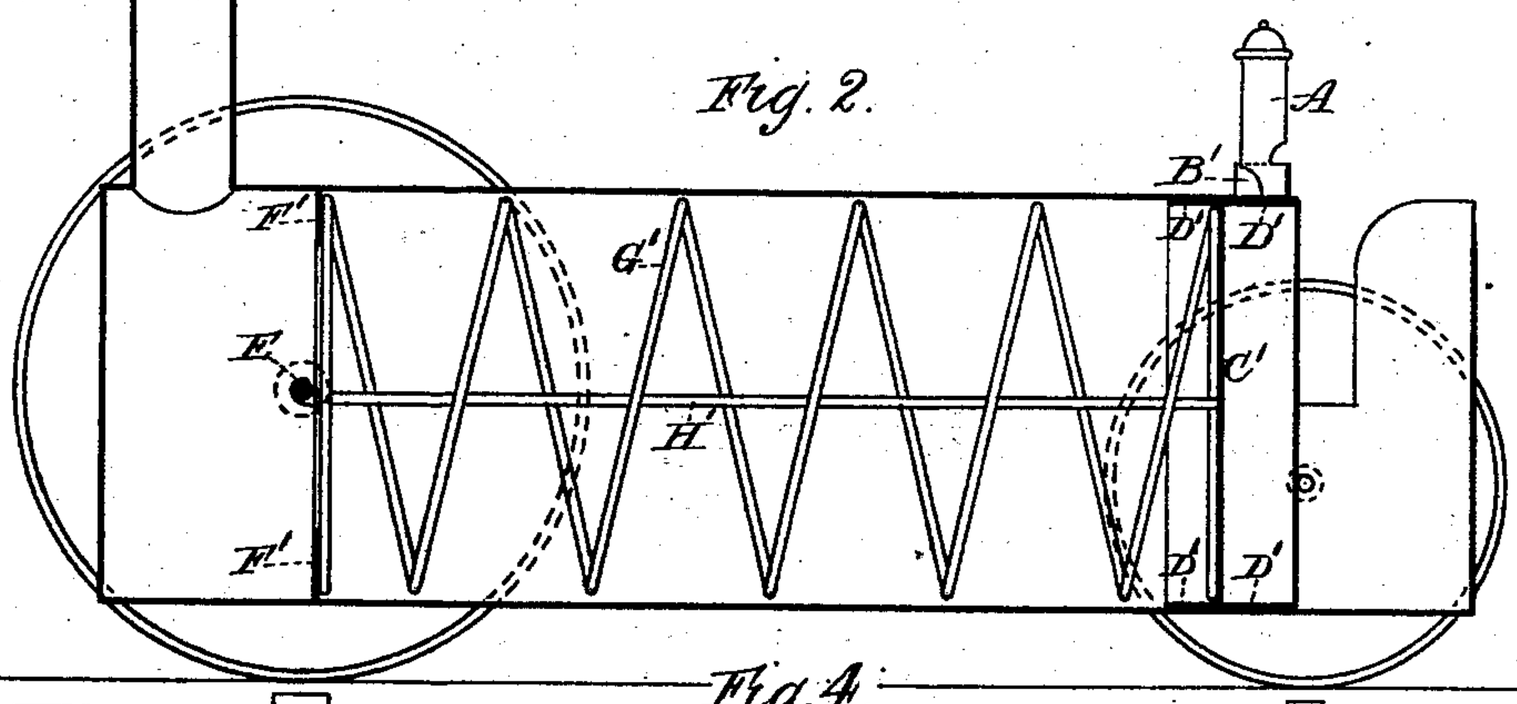
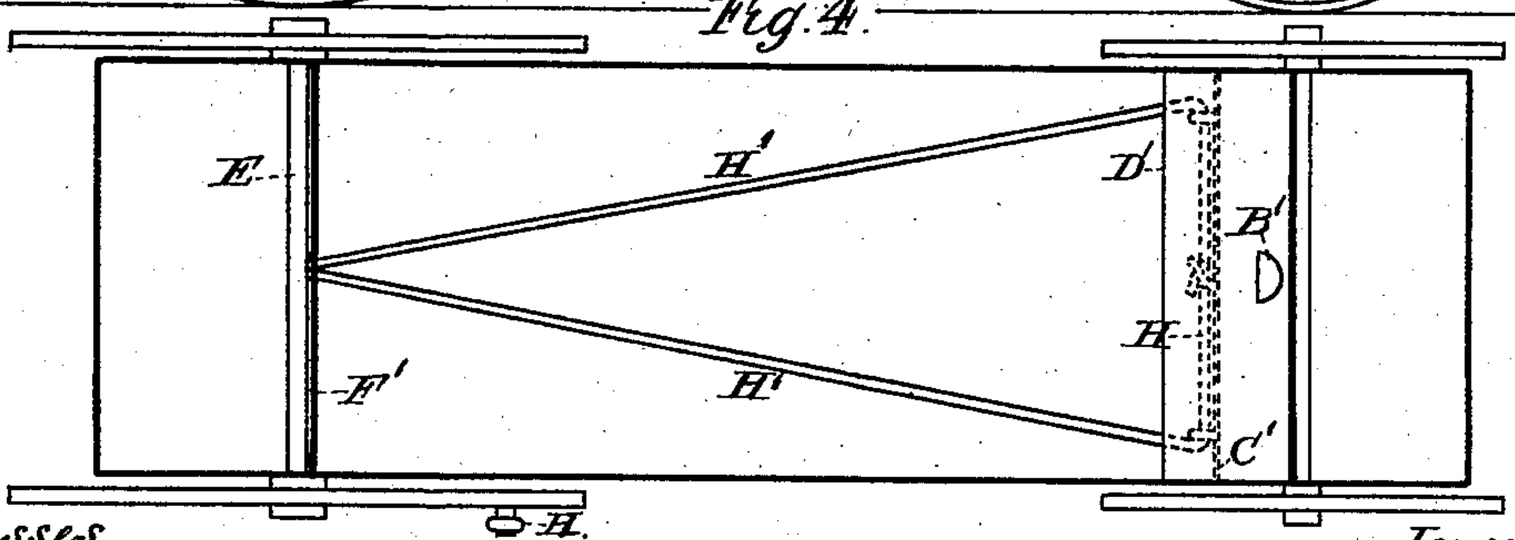


Fig. 4.



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TOY LOCOMOTIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 281,360, dated July 17, 1883.

Application filed February 12, 1883. (No model.) Patented in England November 3, 1882, No. 5,253; in France January 26, 1883, No. 153,335, and in Germany January 31, 1883.

To all whom it may concern:

Be it known that I, WILLIAM HAMILTON HALL, a subject of the Queen of Great Britain, and residing at London, England, have invented an Improved Toy Locomotive-Engine, of which the following is a specification.

This invention relates to the construction of a toy locomotive-engine in which the motive power for driving the toy is also employed to automatically sound a whistle by the compression or suction of air through the whistle.

The engine may be worked by one or more spring or springs, which may be of india-rubber elastic, spiral steel or other metal, or such as is or are used for ordinary clock-work, which said spring or springs may be attached to or connected with the axle of a pair of the wheels of the engine, which may be of larger diameter than the other wheels of the said engine, and which said first-mentioned wheels are hereinafter called the "driving-wheels."

The main structure of the engine may be of tin or other suitable material or materials, and may be of any convenient size as a whole; but the proportions thereof should be according to the following: The engine should have a lengthy body, with short tender behind, fixed and forming part of the structure of the engine; and the body of the said engine should be sufficiently roomy inside to allow of a sufficiency of air being collected therein and utilized by compression, by the means hereinafter mentioned, for the purpose of sounding a whistle fixed outside the said engine. The cross-section of the said body of engine may be either round or the upper part round and lower part square, as most suitable and convenient to the means adopted for working the said engine and compressing the said air. The driving-wheels should be placed as far forward as practicable, and the whistle at the after end of the engine, if the air is to be compressed by means of a single compression operated in one direction only, with a pair of smaller wheels behind; and if the air is to be compressed by means of a compression operating from both ends of the engine simultaneously, the driving-wheel and whistle should be placed in the center of the length of the body of the engine, with a pair of smaller wheels behind and in front.

The body of the engine should contain either a bellows fitting loosely therein, and so that when distended the greater portion or nearly the whole of the interior space of the engine is occupied thereby, or else a movable part (in the case of a single compression, as aforesaid) or two movable parts (in the case of a simultaneous compression, as aforesaid) fitting loosely in the said body of the engine, but sufficiently closely to prevent, as far as practicable, any escape of air, the said bellows or movable part or parts working backward and forward along the interior length of the engine. The whistle is inserted in the top of the body of the engine in such a position, either at the after end thereof or in the center of the length of the body of the engine, as to receive through it the compressed air. The end or ends of the said bellows and the said movable part or parts for compressing the said air, as aforesaid, (hereinafter called the "air-compressing" part or parts,) may have a vent-hole covered over on the inside by a piece of cloth or other suitable material falling loosely over it, so as to admit the air, but to prevent the same escaping when compressed. The said air-compressing part or parts may have round its or their edge or edges a packing consisting of a piece of cloth, felt, or other suitable material, to prevent any undue escape of air between such edge or edges and the surface of interior of engine. Air may be admitted freely into such part or parts of the body of the engine as are not sought to be air-tight, so as to allow of the free working of the means aforesaid for working the said engine and compressing the said air.

If the engine is worked by one or more india-rubber elastic spring or springs, the spring (in the case of one) may be attached to the back of the tender, and, leading through a small hole (large enough only to permit the spring to work freely backward and forward) in the after end of the engine, is then attached to the center of the working end of the bellows. The other end of the bellows being fixed to the after end of the engine, or to the center of an air-compressing part, (as the case may be,) and leading through the same, is then attached to the axle of the driving-wheels, (hereinafter called the "main axle,") the said work-

ing end of the bellows or air-compressing part being pressed close up to the after end of the engine when the spring is attached, as aforesaid. When the driving-wheels are turned round backward, the spring is wound round the main axle and the bellows or air-compressing part extended, and when the wheels are let go they are turned by the spring in a forward direction and the bellows or air-compressing part contracted, the whistle being sounded by the air being forced through it.

If two india-rubber elastic springs are used, the engine is worked upon the same principle as aforesaid; but the springs are attached to the back of the tender, one on each side, and, leading through holes in the after end of the engine, are then attached to the working end of the bellows, outside the same, one on each side, and lead thence to the main axle, being attached at the center of axle, so as to obtain greater space for winding round the axle. Two springs, as aforesaid, are not suitable to an air-compressing part; but such air-compressing part may have one spring attached to it from the back of the tender, as aforesaid, and then two springs, or two springs attached thereto outside the same, one on each side, and leading to the axle.

If a spiral steel or other metal spring is used, it may be fitted into the body of the engine between the working end of the bellows or air-compressing part and the main axle, and a string or strings used to connect such working end or air-compressing part with the said axle when the said string or strings is or are wound round said axle, the said spring being contracted and causing driving-wheels to revolve and the bellows or the air-compressing part to be contracted by its pressure when let go.

An ordinary clock-work spring or springs may be used by fitting the same transversely into the body of the engine at either or both ends, connected with an axle running lengthwise through the center of the engine, the motion of the said longitudinal axle being transmitted to the main axle by means of cog-wheels or double strings attached to each axle, and the said bellows or air-compressing part being extended and contracted by means of a screw-thread on the said longitudinal axle working in a corresponding thread in the center of the head or working end of the bellows or air-compressing part; and the said longitudinal axle may have a crank-handle fixed to one end thereof, outside the after end of the engine, for winding up. If the said engine is wound up by turning the driving-wheels or one of such driving-wheels, (one of the said wheels may be made to fit loosely on the axle, so as not to turn when the axle is wound up,) a small handle may be fitted or jointed between the spokes of the wheel to be turned, so that it can be used on the outside of the wheel for the purpose of winding the engine, and when turned inward can be used as a stop against the bottom or some other convenient part of the body of the engine, to prevent the engine running off until it is desired to start it. The said engine may be wound up by means of a vertical axle passing through or partially through the body of the engine, and having a crank-handle outside the said engine, such vertical axle being connected with the main axle by means of cog-wheels or a string.

The principle hereinbefore described of working the said engine and compression of air therein by means of a single compression operating in one direction only, (in which case the driving-wheels are placed as far forward as practicable,) with the use of a spring or springs, whether india-rubber elastic, spiral steel or other metal, or ordinary clock-work, is applicable to the working of the said engine and compression of air therein by means of a compression operating from both ends of the engine simultaneously, (in which case the driving-wheels are placed in the center of the length of the body of the engine,) the principal difference of construction being that with the latter method the bellows have two working ends instead of one, or there are two air-compressing parts instead of one, (as the case may be,) the said bellows or air-compressing parts, when contracted, being in the center of the length of the body of the engine, and having the main axle and whistle in the middle of or between them, and when extended reaching to or nearly to each end of the engine; and with such method of simultaneous compression, if india-rubber elastic is used for motive purposes, there should be two or more springs attached to each end of the interior of the engine and to each working end of bellows or each air-compressing part, and crossing one another; and if spiral steel or other metal is used there must be two springs, one at each end of the interior of the engine, and there may be one or more ordinary clock-work spring or springs, if such is or are used, connected with a longitudinal axle, as before mentioned; and whichever kind of springs or spring are or is used, the power thereof may be transmitted to the turning of the main axle and working the said bellows or air-compressing parts by means of a longitudinal axle, as aforesaid, having a screw-thread working in opposite directions on each moiety thereof, with corresponding threads in center of each head or working end of the bellows or air-compressing parts, the motion of the said longitudinal axle being transmitted to the main axle by means of cog-wheels or double strings attached to each axle, the said longitudinal axle being revolved, after being wound up, for the purpose of driving the engine, either by the india-rubber elastic springs (where same are used) leading through eyes or pulleys at each corner of the interior of the engine, and thence being wound round longitudinal axle at each end, or by the natural pressure of screw-threads, or, (where ordinary clock-work spring or springs is or are used,) by the direct force of the spring or springs; or a plain longitudinal axle without screw-threads may be used with

connecting springs, or strings or other suitable means may be adopted for applying the said principle to the working of the said engine and compression of air therein by means of a compression operating from both ends of the engine simultaneously.

In the construction of the said engine, cog-wheels and pinion-wheels or pulleys or eyes with strings working therein (which may be fitted in any suitable known way) may be used, where practicable, for lengthening the run of the engine in proportion to the working scope of the spring or springs.

In order that the engine may be wound up without the driving-wheels or either of them turning round, the main axle may be fitted through a tube, the said tube having bearings on each side of the engine, and the spring or springs and winding-gear being connected with the tube instead of with the axle itself, and the said tube having fitted at one end thereof a check-wheel with a small metal spring fixed on driving-wheel working with such check-wheel; or the said driving-wheels may both be fitted loosely on the axle, the said axle having fitted at one end thereof a check-wheel, with a small metal spring on the driving-wheel working therewith, so that when the said tube or the said axle (as the case may be) is turned round one way the said driving-wheels, or either of them, do not revolve; but when turned round the opposite way by the motive power the check-wheel acts on or is chocked with the small spring on driving-wheel and forces it round.

The check-wheel may be fixed on the driving-wheel instead of the axle, in the form of a small band or collar with teeth inside, and a small spring on the axle working therewith, inside the same. The said engine may be wound up by means of a crank-handle fixed to the end of the main axle outside the driving-wheel.

If any crank-handle is used for winding up the said engine, there should be a piece of wire or other material jointed to the body of the engine in the path of the handle when being turned, so as to prevent the engine running off until it is desired to start it, and the same folding down clear of the handle when not required as a stop.

The axle of the after wheels may have its bearings at each end of a frame or case, the said frame or case being pivoted at its center to tender or engine, (according to the exact position of the wheels,) so that the said engine may be made to run in a circular direction or straight, as desired, by adjusting the said after wheels, the said pivot being made to fit sufficiently tightly, so as not to be shifted from position by the running of the engine when once adjusted. If bellows are used for compressing the said air, as aforesaid, the same may have rigid rings of wire or other suitable material fitted inside or outside the same at convenient distances apart, to assist the effectiveness and regular working of the said bellows; and the said bellows may have india-rubber elastic bands also around them at distances in between the said rigid rings, to further assist the effectiveness and regular working of the said bellows; and the power of the said elastic bands may be utilized for motive purposes, either alone or in conjunction with another or other spring or springs.

The principle of working the said engine by means of a spring or springs, as aforesaid, and automatically sounding a whistle by compression of air in the body of the engine may be adapted to the working of the said engine in same manner and automatically sounding a whistle by expanding or extending a bellows or a movable part or parts fitted into the body of the engine, as aforesaid, and drawing air through an inverted whistle into the body of the engine, the respective positions of the main axle and the spring or springs and whistle in relation to one another being altered to meet the circumstances of the case.

The said engine may also be worked without a spring or springs, or in conjunction therewith, by making the body of the engine air-tight, or so far air-tight as is practicable, admitting the air only through an inverted whistle, and contracting the said bellows or movable part or parts by winding a string or strings attached to head of the bellows or movable part or parts round main axle or axles in connection therewith, and creating thereby a partial vacuum in body of the engine, the pressure of the atmosphere (the said atmosphere first passing through and sounding the whistle) expanding or extending the said bellows or movable part or parts and affording the motive power, and the said bellows or movable part or parts in this case should have no vent-hole.

A dual whistle-sounding may be obtained by making the body of the engine as air-tight as practicable, and by means of bellows or a movable part or parts, as aforesaid, worked by a spring or springs, as aforesaid, forcing the air out through a whistle outside one part of the body of the said engine, and at the same time drawing the air in through a whistle fixed inside the other part of the body of the said engine, the said two parts of the body of the engine being kept air-tight in relation one to the other; and the body of the said engine being made sufficiently air-tight, the said air may be forced out and drawn in, respectively, for the purpose of sounding any whistle or whistles, as aforesaid, either by contracting bellows by means of a spring or springs, as aforesaid, or by expanding the same by means of any such spring or springs.

The accompanying drawings serve to illustrate two simple methods of carrying out my invention.

Figure 1 is an elevation, partly in section, to show the interior mechanism; Fig. 3, a plan showing the interior mechanism of an appara-

tus illustrating my invention. Figs. 2 and 4 are corresponding views, showing formal variations in the construction.

In Figs. 1 and 3, A in Fig. 1 is the whistle, and in Fig. 3 the aperture in the top of the engine to receive same. B in both figures is a metal rim fixed inside the after end of the engine, to receive around it the soft material of the bellows C. D is the working end of the bellows. E is the main axle, and F represents the india-rubber elastic springs fastened to the main axle and to the working end of the bellows, and passing through holes in the back of the engine, each side of said metal rim, and thence around hooks G, (shown in Fig. 3,) and tied together at the back of the tender. H in Fig. 3 is a small handle for winding up the engine by turning the wheel upon which it is fixed.

In Figs. 2 and 4, A and B′ in Fig. 2 are respectively the whistle and a metal case at the top of the engine to receive said whistle. B′ in Fig. 4 is the aperture in the top of the engine for said whistle. C′ in both figures is a disk having a broad rim, D′, around it to receive a packing, so as to make D′ fit close into the body of the engine. E is the main axle. F′ is a metal rim fixed partially around the interior of the body of the engine, at top and bottom for one end of spiral steel spring G′ (shown in Fig. 2) to rest against, the other end resting against the said disk. H′ represents strings fastened to the main axle and then to said disk, as shown in Figs. 4 and 1. In Fig. 4 is a handle, H, for winding, as in first illustration. The said steel spring is not shown in Fig. 4.

I claim—

The improved automatic whistling toy engine described, consisting of the body of the engine, having within it a bellows or disk operated by means of springs, and by a string or elastic wound upon the main axle, combined with the whistle, all as shown and set forth.

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Witnesses:

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