(No Model.) 4 Sheets—Sheet 1.

C. F. MYERS.

FLYING MACHINE.

No. 262,687. Patented Aug. 15, 1882.

Fig. 1.

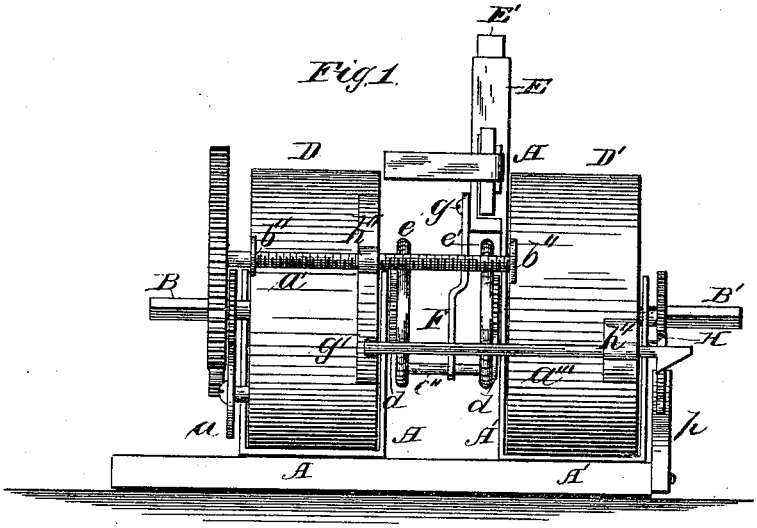
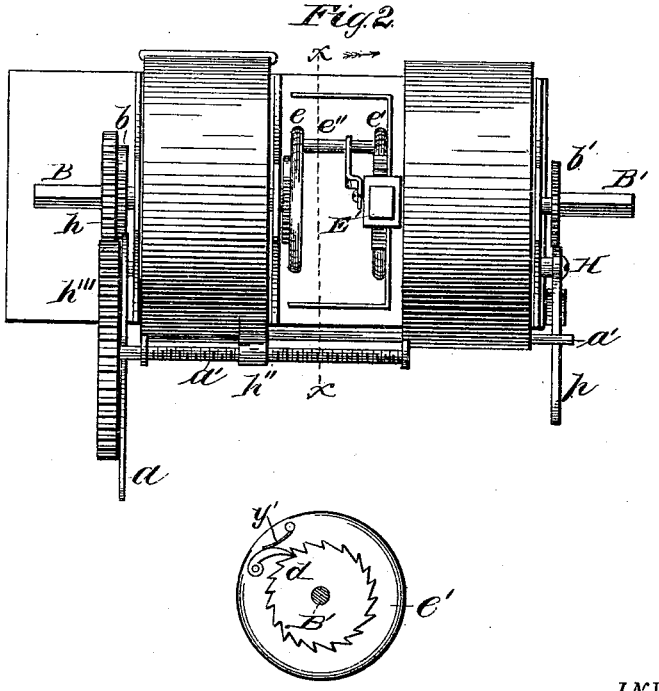


Fig. 2.



WITNESSES

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Jas. H. Baxter

INVENTOR

Chas. F. Myers

(No Model.)

4 Sheets—Sheet 2.

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Fig. 3.

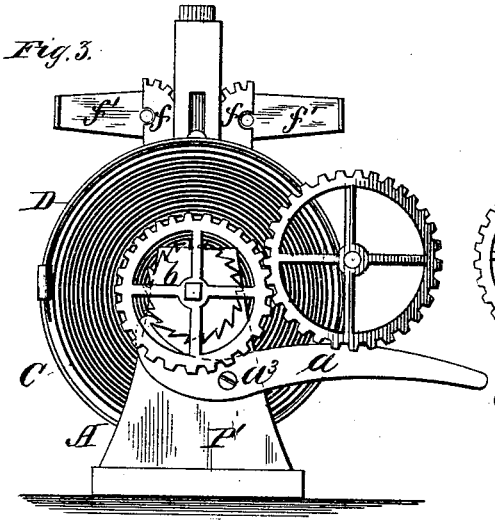


Fig. 4.

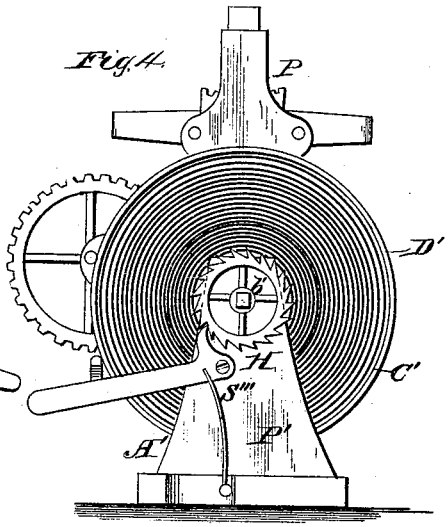
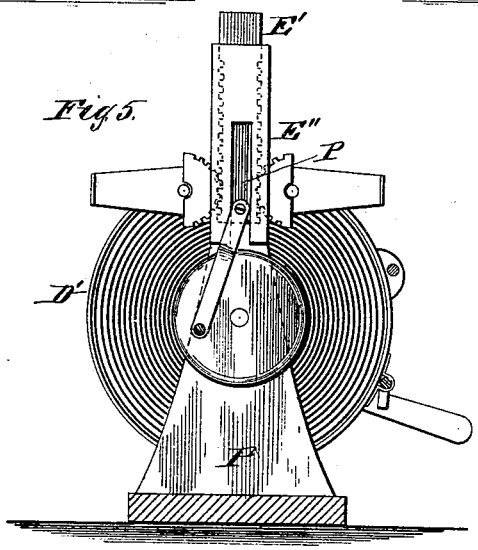


Fig. 5.



WITNESSES

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(No Model.) 4 Sheets—Sheet 3.

C. F. MYERS.

FLYING MACHINE.

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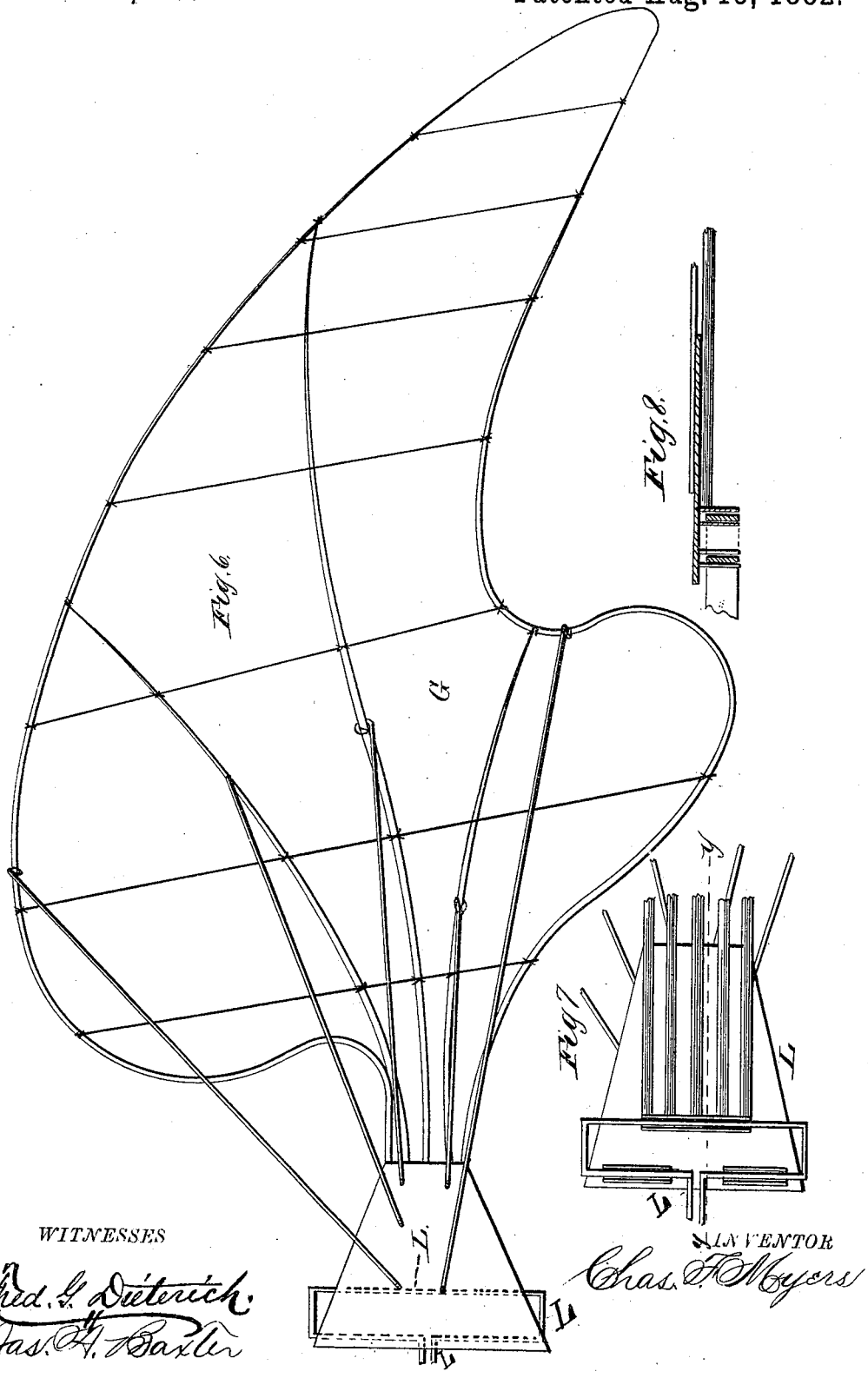

WITNESSES

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(No Model.) 4 Sheets—Sheet 4.

C. F. MYERS.

FLYING MACHINE.

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Fig. 9.

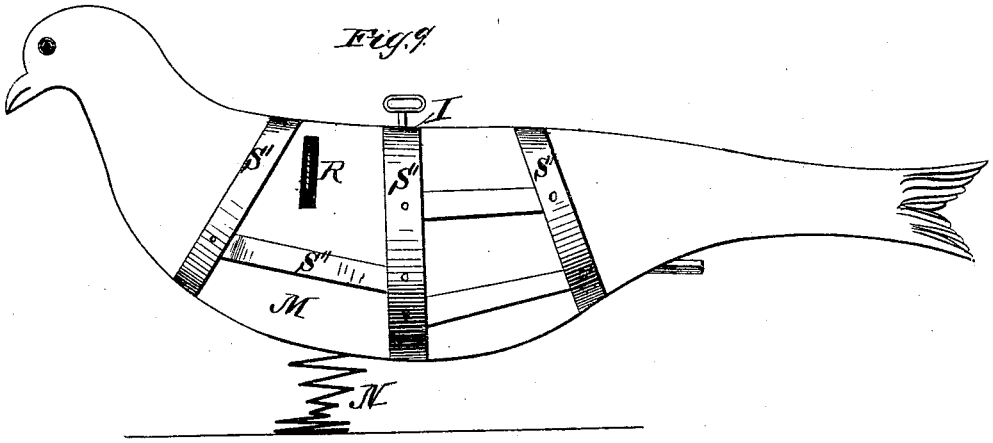


Fig. 10.

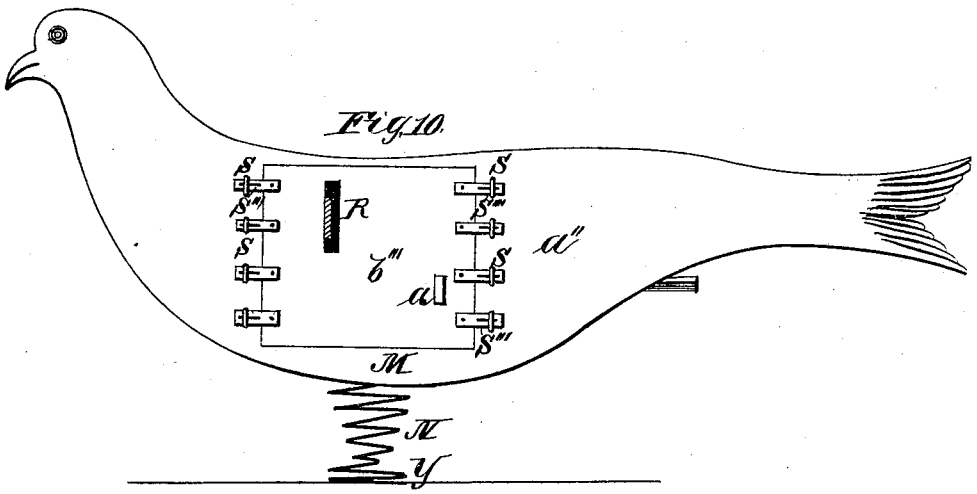
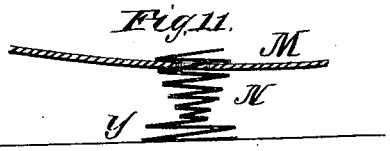


Fig. 11.



WITNESSES

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Jas. A. Baxter

INVENTOR

Chas. F. Myers

UNITED STATES PATENT OFFICE.

CHARLES F. MYERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

FLYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 262,687, dated August 15, 1882.

Application filed October 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. MYERS, a citizen of the United States of America, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Flying-Machines; 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.

My invention relates to an improvement in flying-machines designed chiefly for conveying dispatches and explosives for military and naval purposes, but also as a toy for the amusement of children; and it consists in the frames A and A′, trigger *a*, and automatic trigger *a′*, directed by guide-brackets *b″* and *h⁴*, ratchets *b* and *b′*, arbors B and B′, springs C and C′, spring-barrels D and D′, pawls and ratchets *d* and *d*, guide E, rack E′, wheels *e* and *e′*, connected by crank or connecting bar *e″*, arm F, segmental pinions *f* and *f*, rigidly secured to wing-arms *f′* and *f′*, and wings G, and in locating the machinery of the device other than the wings in the interior of a light case shaped in the form of a bird, boat, aerial car, or other suitable incasement; and in constructing the frames holding the operating mechanism, the wheels, and all the parts of the device excepting the springs in skeleton form, and in providing a hollow rack and arbors, in order to attain the minimum as to weight of mechanism other than the springs, in connection with the maximum as to weight, length, and strength of the springs, and efficiency for the intended purpose; and it also consists in the skeleton frame I, which is designed to afford a sufficient purchase for the hand of the operator in winding the spring or springs, and in constructing the operating machinery other than the springs of any light metallic or hardened plastic material or of suitable wood, whereby the weight of the device may be lessened without impairing its requisite strength and power; and in the construction and arrangement of suitable mechanism, whereby two or more springs are caused to operate successively, one spring at the moment when its force is expended operating to release another one, thereby continuing the motion of the wings; and in constructing the wings of thin semi-cylindrical or tubular steel, tapering in diameter, width, or size from the arms of the wings, where most strength is required, to the points thereof most remote therefrom, in order to cause the wings to react or to spring back and upward when they are flapped downward by the action of the springs, thus in a measure lifting the device; and in the manner of constructing the arms of the wings as a means of adjusting the wings with relation to the center of gravity of the device, and rendering them strongest at the point where exposed to the greatest strain; and in constructing the tail, when the frame inclosing the machinery is not constructed of plastic material, of cloth, paper, or other light material stretched upon and fastened to a suitable wire frame; and in the peculiar construction and arrangement of the parts, as hereinafter more fully specified.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is an end or front view. Fig. 4 is an end or rear view. Fig. 5 is a sectional view on line *x x*, Fig. 2. Fig. 6 is a plan view of a wing. Fig. 7 is an inverted plan view, showing the method of connecting and adjusting the wing to the arm. Fig. 8 is a sectional view on line *y y*, Fig. 7. Fig. 9 is a side view showing skeleton frame. Fig. 10 is a side view showing the incasement in sections. Fig. 11 is a detached sectional view, showing manner of attaching spring-legs to body.

M represents the shell or casing inclosing the machinery. It may be formed of papier-maché, colored pulp, or other suitable light plastic material, and it is constructed in two sections, *a″* and *b‴*. The frames A and A′ are placed in the interior of the shell M, and the arms *f′ f′* of the wings G project through slots R R, provided in the shell M. The metallic bands S″ are slipped over the outer shell of the bird, joined together, and secured in manner similar to that of uniting together the sections *a″* and *b‴*, forming the bird-incasement. The thumb-screws S are projected through the slots S″ and then turned half

round to prevent their withdrawal; but for this purpose straps made of leather or other suitable pliable material may be employed, provided with button-holes and securely fastened to the smaller section, and in fastening slipped over suitable buttons rigidly attached to the larger section of the shell.

The shell M is provided with the elastic or spring legs N, the upper convolution of the spring being inserted in the interior of the lower part of the bird or casing, the convolutions being decreased in size, as shown, as they approach the feet, the lower part of the springs being formed into horizontal bows, loops, or feet *y*, as shown; but rubber or other elastic substance may be substituted for the wire springs and the same be attached to the bird-casing by ordinary mechanical means, with results equally beneficial; but when employed for many purposes the feet and legs may be dispensed with, especially such military or naval purposes as conveying explosives. The feet are chiefly designed to protect the device from the shock occasioned by its impinging the earth on its descent.

The frame which furnishes the bearings of the machinery may be made of thin sheet metal, hard wood, papier-maché, or other light and strong material, the central parts being removed, as shown and stated, to form a skeleton frame capable of affording sufficient solidity and strength for the purpose. A portion of the frame or frames, as shown at P, projects vertically upward to form the inner side of the rack-guide, and a portion thereof forms the vertical standards P′ and the horizontal base.

The trigger *a*, which is pivoted by pin a^3 to the frame A, acts as a pawl in meshing in the ratchet *b*. When it is desirable to start the flying-machine the trigger *a* is released by pressure thereon where it projects outside of the outer incasement, M. The ratchets *b* and *b′* are rigidly attached to the arbors, and hence revolve when the arbors are respectively rotated; but the wheels *e* and *e′*, carrying the arm *e″* on the arbor, revolve loosely. Hence the pawls and ratchets *d d*, actuated by the springs *y′ y′*, are pivoted to the inner face of the wheels *e* and *e′*, by which construction the spiral springs may be wound upon the arbor without actuating the wings.

The double rack E′ is toothed on either side, as shown, and meshes in the segmental pinions *f* and *f*, and it is actuated by the arm F. This arm is pivoted to the rack by the pin *g*, its opposite end having an orifice provided therein, through which loosely projects the wheel-connecting bar *e″*. The rack E′ is guided by the guide E, wherein it oscillates vertically, the guide being adapted as to size and shape for reception of the rack. The guide E is also provided with the vertical slot E″ for reception and guidance of the pin *g*, which is rigidly secured to the rack and connects therewith the arm F. Through an orifice provided in the arm F projects the wheel-connecting or crank bar *e″*. This bar fits loosely in the orifice, and to lessen friction its ends are loosely secured at their bearings in the wheels *e* and *e′*.

The arms *f′* and *f″* are pivoted and have their bearings in the frame of the operating mechanism, and have rigidly secured thereto the segmental pinions *f* and *f*, which mesh in the teeth of the rack E′, as aforesaid. These arms, where they project through the outer shell of the bird, are provided with the elbows L and L, in order that the wings attached thereto may be the more readily adjusted to the proper center of gravity of the device when suspended in the atmosphere. The adjustment of the velocity of the action of the wings to conform to the strength of the spring may be attained by varying the semi-diameter of the segments *f* and *f*, or by locating the wheel-connecting bar *e″* nearer to or farther from the axes of the wheels, and ordinarily the use of additional cog-wheels be thus avoided. The arbors which have their bearings in the frames A and A′ project outside the outer shell or casing of the device, beneath the tail of the bird on one side and the throat on the other side thereof, and the spiral springs C and C′ are wound up thereon by a key, spring C being wound up first, and the key is then withdrawn, and the trigger *a*, which meshes in the ratchet, holds the spring C secure until released by pressure thereon. These spiral springs, which rotate the arbors B and B′ and indirectly actuate the arms and elbows L of the wings of the device, are rigidly secured to the arbors at one of their respective ends and to the barrels D and D′ at their opposite ends.

The frame and wheels and all component parts of the device, save the springs, are formed in skeleton shape by removing all parts thereof between their exterior lines which may be dispensed with without impairing the efficiency or requisite strength of the device for its intended purpose, whereby a great saving is effected in the weight to be carried, and the power and efficiency of the device are thus greatly augmented.

L L represent the arms of the wings, which are bent after passing out of the slots R R at right angles and then projected forward a short distance and then again bent at right angles and projected rearward a short distance beyond their starting-point, thus forming a quadrilateral frame, in order that properly-shaped artificial or natural wings may be the more readily secured thereto, and that thus secured they may occupy the proper angular position in relation to the body of the bird or be readily adjusted thereto. The frames of these wings may be made of tubular, semi-tubular, or other steel wire, or of small strips of steel tapering from the arms thereof, where greatest strength is required, to their outer extremities, where least strength is requisite. These frames are made of light elastic steel in order to bend in striking the atmosphere, since their upward recoil is de-

signed to aid in lifting and sustaining the device in the atmosphere; but the wings may be made wholly of steel wire of uniform diameter and strength, and strengthened by uniting thereto and twisting thereon auxiliary pieces, as shown in Fig. 6.

The automatic and subsidiary trigger a' is the mechanism employed for releasing a second spring, intended, like the first spring, to furnish motive power for actuating the same pair of wings, the second spring being released just at the moment when the first spring has expended its force upon the wings. This automatic trigger a' comprises in part horizontal bar a', whose bearings are provided in the guide-brackets b'' and b'', where it rotates loosely. It has rigidly secured thereto the cog-wheel h''', which meshes in the cog-wheel h and has encircling the same the nut h''. The horizontal bar a' is threaded as a male screw, and thus adapted to the female screw provided in the nut h''. The nut h'' has the curved arm g' projecting therefrom and rigidly secured thereto, and from this arm projects the horizontal trigger-bar a''', having the half-barbed or inclined head H rigidly secured thereto. The trigger-bar a' is guided in its horizontal motion by the guide h^4, which latter is rigidly fastened to the spring-barrel D'. The half-barbed head rests near its terminal point on the pawl p when the spring is wound up, and when, by action of the rotating cog-wheels h and h''' upon nut h'', it is caused to travel horizontally forward the half-barbed head gradually lowers the pawl p until it is removed from the teeth of the ratchet, and when the pawl p is thus released the ratchet b' rotates toward pawl p until the force of the second spring D' is expended. The wider part of the barbed head or inclined plane is not permitted to slide past the pawl p, and therefore when the primal spring C is rewound the spring S''', Fig. 4, causes the pawl p to again occupy its original position by lifting it against the point of the barbed head. It will be observed that in winding up the second spring C' the ratchet is turned from the tooth of the pawl. By this connection of the trigger with relation to the motive power, when desirable, a series of springs may be employed, and in such manner that when one has spent its force another may act *seriatim*.

What I claim is—

1. The combination of trigger a, pinion b, secured on arbor B, cog-wheel h, and automatic trigger a', substantially as shown, and for the purpose described.

2. The combination of ratchet b', secured on arbor B', pawl p, actuated by spring S''', and automatic trigger a', substantially as shown, and for the purpose described.

3. The combination of trigger a, automatic trigger a', having bearings b'' and h^4, and pawl p, substantially as shown, and for the purpose described.

4. A flying-machine actuated by springs released *seriatim* by means of triggers, substantially as shown and described.

5. The combination of cog-wheels h and h''', trigger-bar a' and a''', nut h'', and guides b'' and h^4, substantially as shown, and for the purpose described.

6. The combination of pawl p, ratchet b', springs C' and S''', and barbed head of automatic trigger a', substantially as shown, and for the purpose specified.

7. The combination of the wheels e and e', crank or connecting bar e'', arm F, and rack E', substantially as shown, and for the purpose described.

8. A flying-machine constructed and arranged by means of pawls and ratchets to admit winding the springs on separate arbors, the springs being caused, by triggers, to act *seriatim* on one and the same pair of wings, substantially as shown and described.

9. The combination of the barrels D and D', guides b'' and h^4, and automatic trigger a', substantially as shown, and for the purpose described.

10. The combination of sections a'' and b'', secured by thumb-screws S, substantially as shown, and for the purpose described.

11. The combination of shell M, legs N, and feet Y, substantially as shown, and for the purpose described.

12. The combination of skeleton frame I and shell M, substantially as shown, and for the purpose described.

13. The combination of the arms L and wings G, substantially as shown, and for the purpose described.

14. In a flying-machine, the wings G, constructed to taper from the arms thereof, where greatest strength is required, to the extremities thereof, where least strength is needed, and of elastic material, to produce elastic reaction of the wings, substantially as shown and specified.

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

CHAS. F. MYERS.

Witnesses:
GEO. R. HERRICK,
JAS. A. BAXTER.