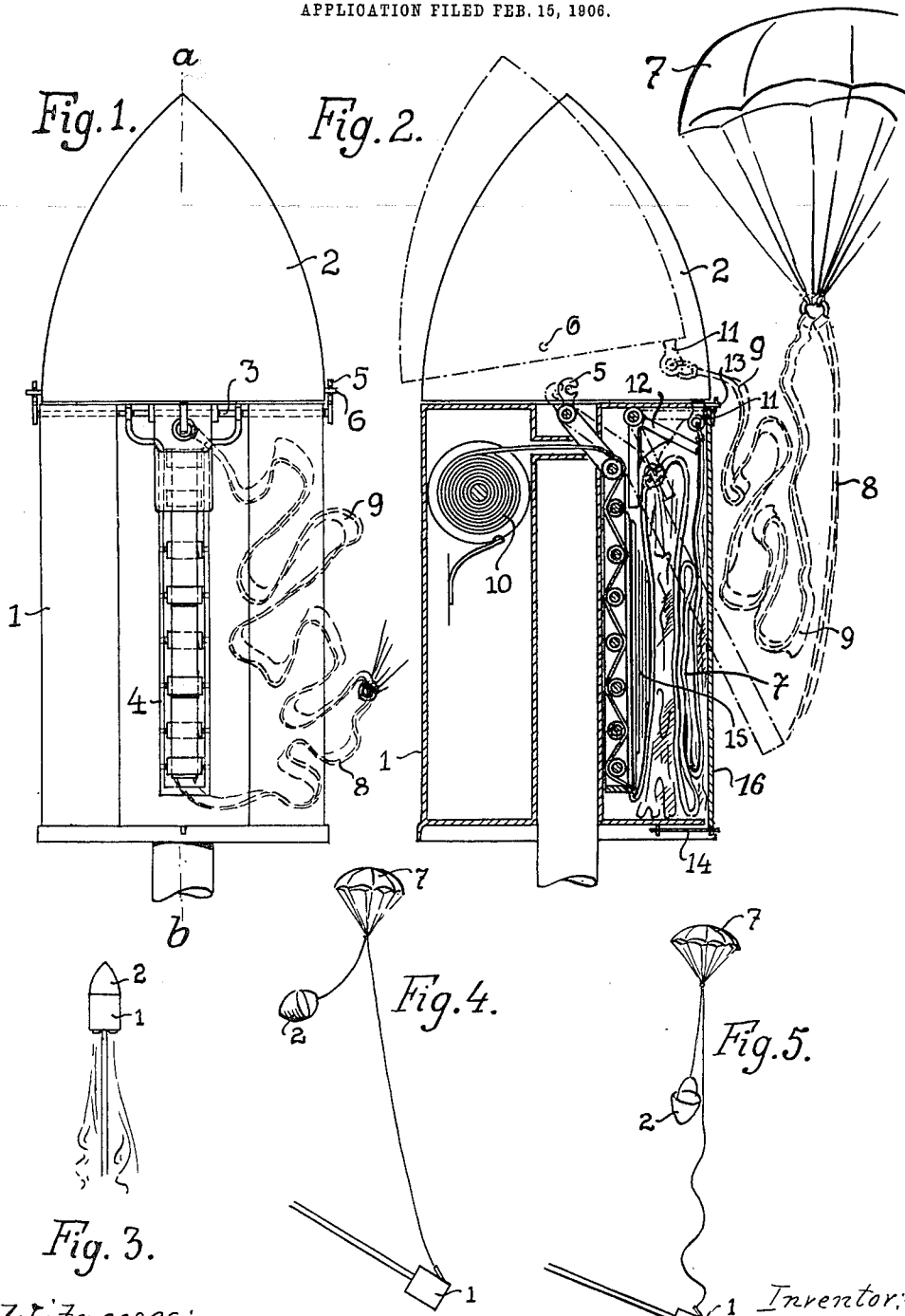


A. MAUL.
ROCKET APPARATUS.
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Witnesses:-

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UNITED STATES PATENT OFFICE.

ALFRED MAUL, OF DRESDEN, GERMANY.

ROCKET APPARATUS.

No. 847,198.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED MAUL, a subject of the German Emperor, and residing at Dresden, Germany, have invented certain new and useful Improvements in Rocket Apparatus, of which the following is a specification.

The present invention relates to a device for safely landing scientific instruments that have been shot in the air by means of a rocket apparatus—such as, for instance, described in my United States Letters Patent No. 757,825. In this prior patent I have described the construction of the projectile in combination with a photographic apparatus for taking bird's-eye views of the ground; but it is obvious that in place of the camera any other scientific instruments—for instance, for measuring wind-pressures, humidity-degrees, or the like purposes—may be arranged in the rocket apparatus. The upward propulsion of the apparatus may be effected by means of rocket charges directly secured to the projectile or by means of a suitable gun.

The particular object of this invention is to provide means for preventing the delicate instruments from being damaged by coming in too violent contact with the ground in the rapid descent of the projectile.

The new device essentially consists of a cap into which the instruments are placed, separably attached to the cylindrical projectile-casing, which upon the projectile reaching the highest point of its flight is automatically released from the casing proper and hangs suspended from a then freed parachute. The latter after the heavy casing has struck the ground will slowly descend with the cap and land the instruments without shock and danger of damage.

In order to make the invention more readily understood, I will now describe it with reference to the accompanying sheet of drawings, of which—

Figure 1 represents a side elevation of the apparatus with the closing-plate removed from the parachute-chamber. Fig. 2 is a section on line *a b* of Fig. 1. Fig. 3 shows a diagrammatic view of the apparatus driven skyward by means of a rocket explosion. Fig. 4 shows the apparatus during the descent, and Fig. 5 after the cylindrical casing has struck the ground.

The cylindrical casing 1 is provided with a cap 2, holding the scientific instruments, and journals a shaft 3, carrying a lever-arm 4

and at either free end a locking-hook 5. These latter cooperate with pins 6 on the cap 2, locking the parts 1 and 2 together. In the cylinder 1 there is provided a compartment for storing the parachute 7 and the ropes or straps 8 and 9, which connect the parachute to the parts 1 and 2. The lever-arm 4, rigidly secured to the shaft 3, is constructed in the shape of a ladder and serves as guide and brake for the longer strap 8, which connects parachute and casing and is wound upon the braked drum 10, as clearly shown in Fig. 2. The cap 2 is provided with a lug 11, which ordinarily extends through the cover of the cylinder and to which is attached the strap 9, the other end of which is secured to the parachute.

A bell-crank lever 12, the one arm of which lies against and is operated by the lever 4, while the other lies just below the lug 11, is pivotally secured in the casing 1. Access to the parachute-compartment is had by means of a cover-plate 16, which is held in position above by a fixed eye 13 and below by a time-fuse-controlled celluloid or the like strip 14. The parachute is pressed against the cover-plate 16 by an elastic bolster 15, as shown in Fig. 2.

The ignition of the powder charge of the rocket is effected in any suitable manner, and there are provided time-fuses or clock-work in the cylinder, and in the cap if necessary, for successively disengaging the various operating parts; but as the construction and operation of these parts are known in the art, being described, for instance, in my United States Letters Patent No. 757,825, and form no important part of this invention it is unnecessary to describe them here in detail.

The operation of the apparatus is the following: The fuses are so timed that upon the projectile, which has been shot into the air in any well-known manner, commencing its descent the fuse 14 is burned through, releasing the cover-plate and freeing thereby the parachute, which now expands. The apparatus descends and draws the strap 8 taut, with the result of swinging out the brake-ladder 4. This causes, first, the hooks to free the pins 6 and, secondly, rocks the bell-crank lever 12, which thereby pushes the lug 11 out of the casing, disengaging in this manner the cap 2 from the casing 1. The strap 8 by reason of the weight of the attached cylinder 1 reels off the braked drum 10 during the quick

descent. Upon the cylinder striking the ground the pull on the parachute through strap 8 is suddenly eased, and the cap containing the instruments, suspended from the parachute, will now slowly descend and land without shock.

What I claim is—

1. In a rocket apparatus, the combination with a casing having a compartment, of a cover-plate for said compartment, a hollow cap, means for temporarily securing said cap to said casing, and time-controlled means for releasing said cap, substantially as set forth.

2. In a rocket apparatus, the combination with a casing having a compartment, of a cover-plate for said compartment, a parachute in said compartment, a hollow cap adapted to receive scientific instruments, means for temporarily securing said cap to said casing, time-controlled means for releasing said cap, straps connecting said parachute, said casing and said cap, and actuating said cap-releasing means, substantially as set forth.

3. In a rocket apparatus, the combination with a casing having a compartment, of a cover-plate therefor, time-controlled means for releasing said cover-plate, a hollow cap adapted to contain scientific instruments, means for temporarily securing said cap to said casing, comprising a shaft, locking-hooks at either end thereof and a lug extending into said casing, a parachute in said compartment, straps connecting said parachute, said casing and said cap, means for ejecting said parachute, and means for releasing said cap, comprising a ladder-lever controlling said locking-hooks, a braked drum, and a bell-crank lever cooperating with said lug, the parts being constructed, arranged, and cooperating substantially as set forth.

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

ALFRED MAUL.

Witnesses:

FRANZ N. LEHNERS,
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