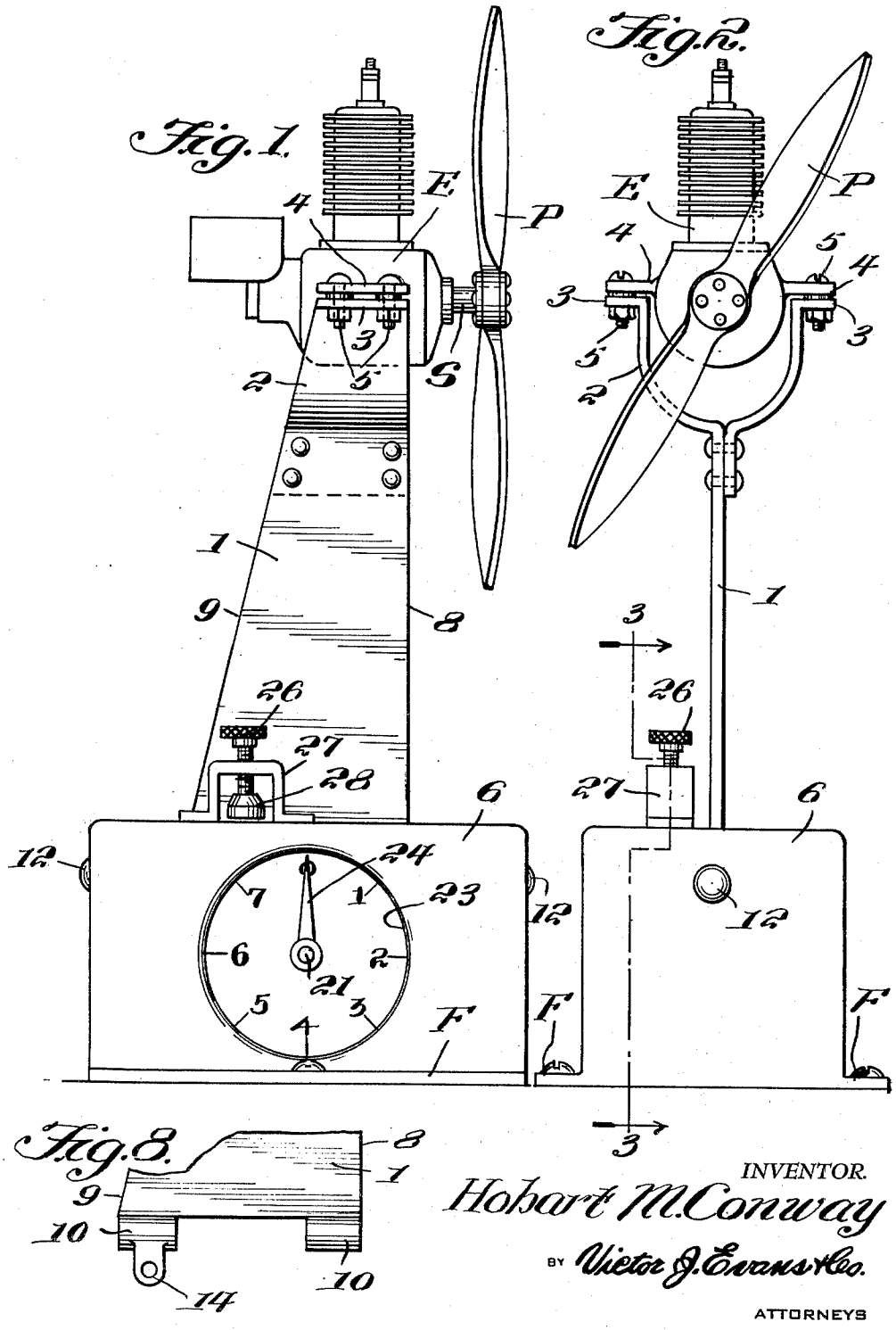
Aug. 1, 1950 H. M. CONWAY, JR 2,516,855

THRUST METER

Filed May 2, 1947 2 Sheets-Sheet 1



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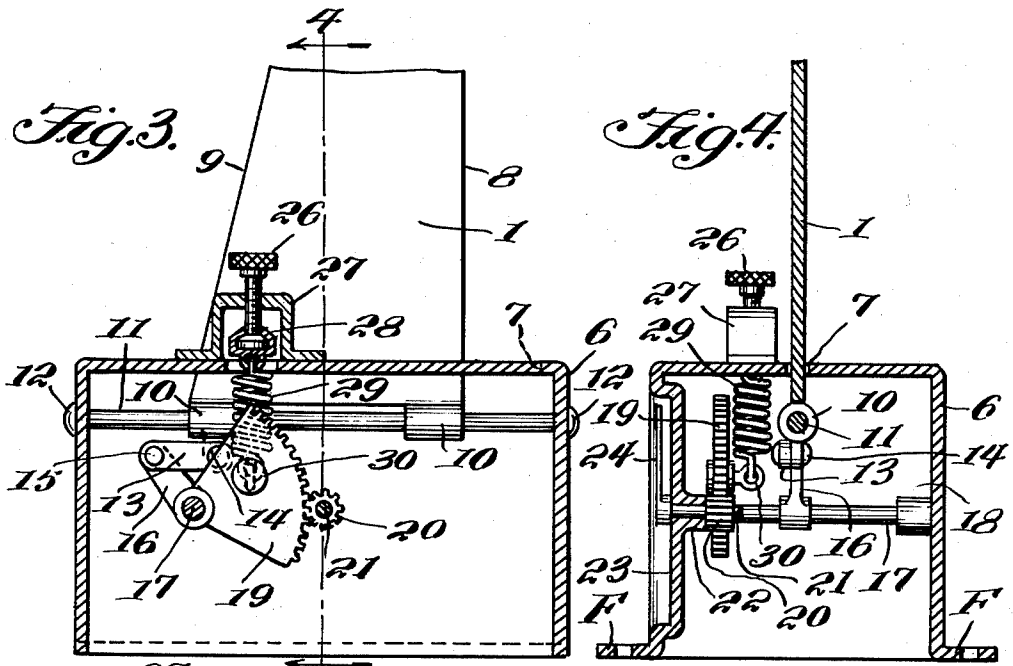
BY Victor J. Evans & Co.

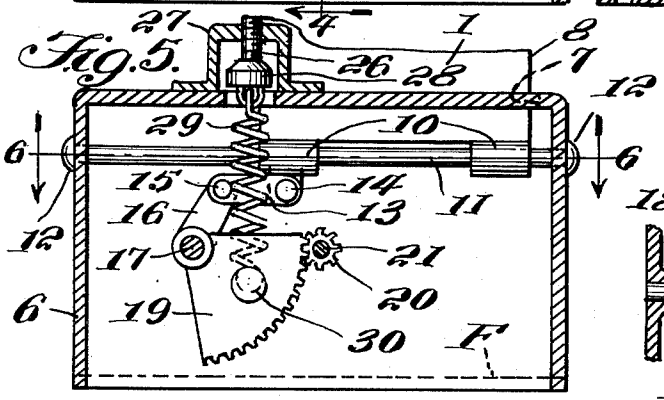
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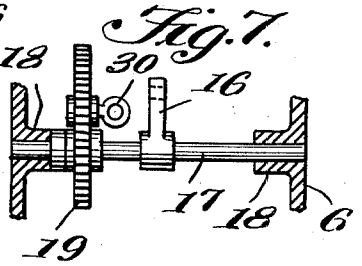
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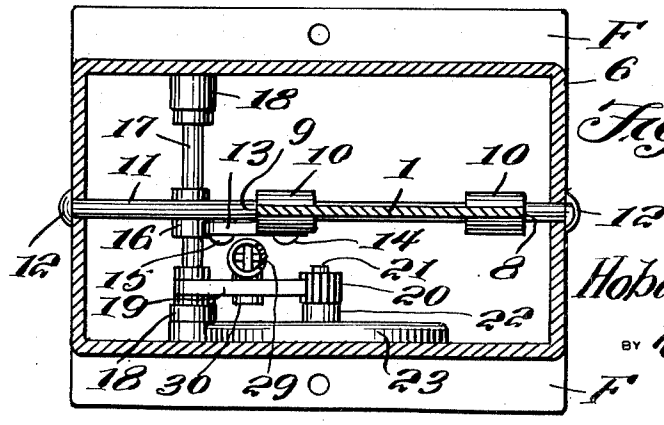
THRUST METER

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Patented Aug. 1, 1950 2,516,855

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THRUST METER

Hobart M. Conway, Jr., Atlanta, Ga.

Application May 2, 1947, Serial No. 745,572

2 Claims. (Cl. 73—140)

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The present invention relates to the general class of measuring and testing appliances, of the pull measuring type, and more specifically to an improved thrust meter which while well adapted for various uses, is especially designed for testing, measuring and indicating the thrust or pull of small power plants, as for instance the engine or motor and propeller or jet propulsion engines employed in the propulsion of model airplanes, in order to ascertain and determine the performance of laboratory work as compared with actual practice that may lead to adjustments and differences in values.

The primary object of the invention is the provision of a portable, compact, and efficient appliance of precision which is composed of a minimum number of parts that with facility may be manufactured at low cost of production, and assembled with convenience to provide an appliance upon which the testing power plant may be detachably mounted for operation and observation.

The invention consists essentially in certain novel features of construction and combinations and arrangements of parts for attaining these results as will hereinafter be described and more specifically set forth in the appended claims.

In the accompanying drawings I have illustrated a complete example of a physical embodiment of my invention wherein the parts are combined and arranged according to one mode I have devised for the practical application of the principles of the invention. It will however, be understood that changes and alterations are contemplated and may be made in these exemplifying drawings and mechanical structures, within the scope of my claims, without departing from the principles of the invention.

Figure 1 is a view in front elevation of a testing and metering appliance in which my invention is embodied, showing a small gasoline engine or motor and its propeller detachably mounted thereon.

Figure 2 is a view in elevation of the structures in Fig. 1 disclosing the motor and propeller in front elevation.

Figure 3 is a vertical sectional view at line 3—3 through the hollow base, stand, or housing of the appliance and disclosing the actuating and operating mechanism for the thrust meter.

Figure 4 is a transverse vertical sectional view at line 4—4 of Fig. 3.

Figure 5 is a view similar to Fig. 3 showing the actuating and operating mechanism at the magnitude of a thrust movement.

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Figure 6 is a horizontal detail sectional view at line 6—6 of Fig. 5.

Figure 7 is a detail fragmentary view showing the rocker shaft or torque shaft and accessories; and

Figure 8 is a detail fragmentary view at the lower end of the thrust arm or standard of the appliance on which the power plant is mounted for testing.

In this preferred form of the invention, in order that the general arrangement and utility of parts may readily be understood I have illustrated in the assembly drawings a conventional small-power-plant that may be a gasoline engine or motor E having the usual shaft S and a propeller P, as employed on model airplanes. For testing, the power plant is detachably mounted upon the upper end of a thrust arm or standard 1 in the nature of an upright flat plate or blade that terminates at its upper end in a U-shaped cradle or yoke 2 having lateral attaching flanges 3, and the flanges 4 of the engine housing are rigidly attached, as by bolts 5, to the yoke flanges for holding the engine to be tested for thrust.

The movable thrust arm is supported in and projects above a hollow rectangular base 6, which is provided with attaching flanges F in order that the portable appliance may be bolted to a bench, table, or other support, and the flat top of the hollow base is slotted, as at 7 parallel with the plane of the engine shaft, to permit movement of the thrust arm in accord with power developed by the operating motor or engine carried by the arm or standard 1.

The front edge 8 of the standard or upright thrust arm is disposed in a plane perpendicular to the engine shaft while the rear edge 9 diverges toward the lower end of the arm to provide a wide base that is equipped with a pair of spaced bearing sleeves 10, 10, that are slidably mounted upon a guide bar 11 located in a horizontal plane parallel with the engine shaft.

The guide bar is located within the upper portion of the hollow base and rigidly supported in opposed walls of the base by headed ends 12, 12, exterior of the base. By this arrangement of the engine shaft and parallel aligning bar 11, together with the perpendicular arm, the propeller of the testing engine when in operation develops and imparts to the thrust arm a movement longitudinally of the guide bar, which movement is instrumental in activating and operating the thrust meter and its indicator.

The thrust and consequent sliding movement of the torque arm or standard on its guide bar,

are transmitted to the meter and indicating mechanism in terms of energy or force.

For this purpose, the torque arm or standard 1, or preferably one of its bearing sleeves 10, within the hollow base 6 is equipped with a connecting link 13 pivoted thereto at 14 and the link is also pivoted at 15 to a rock arm 16 rigidly mounted upon a torque shaft 17 disposed in a plane perpendicular to the plane of the guide bar, and located beneath the bar where it is journaled in bearings 18 in opposite vertical walls of the hollow base 6.

A quadrant shaped, segmental, or arcuate gear 19 is rigidly mounted upon the rock shaft 17 to turn therewith, and this gear constantly meshes with a reduced pinion 20 rigidly mounted on and rotatable with an indicator shaft 21 parallel with and located in the same horizontal plane with the rock shaft or torque shaft.

The indicator shaft is journaled in a bearing 22 integral with an inset or recessed front wall 23 of the hollow base, which forms a circular dial for the pointer or needle 24 located exterior of the base and mounted on the projecting end of the indicator shaft, for co-operation with the annular scale on the dial that displays in units of energy the torque or thrust developed by the engine and its propeller.

For initially setting the metering mechanism at zero on the dial, a set screw 26 is mounted in a hollow bracket 27 mounted on top of the base 6, and provided with a non-rotatable coupling head 28 that projects through a hole in the top wall of the hollow base. A helical spring 29 is connected at its upper end to the coupling head 28, and its lower end is anchored at 30 to the segmental gear 19 at a point between the rock shaft and the indicator shaft and below the planes of these shafts, in order that the screw may be turned to swing the gear and rotate the pinion for setting the meter. The spring offers resilient resistance to the forward turn of the rock shaft, and also automatically retracts the mechanism to zero position at the cessation of applied thrust.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an apparatus for measuring and indicating the thrust of a power plant, the combination comprising a hollow base having a horizontal guide bar, a movable standard slidable on the bar, means for maintaining said standard in upright position, means for operatively mounting a power plant upon the standard whereby thrust is transmitted from the power plant to the standard, a transversely arranged rock shaft in said base, a rock arm on said rock shaft, a link pivotally connecting said rock arm and standard, a segmental gear fixed to said rock shaft, an indicator shaft and an indicator thereon, a pinion on the indicator shaft coacting with said gear, and spring means for resisting the thrust developed by the power plant.

2. In an apparatus for measuring and indicating the thrust of a power plant, the combination comprising a hollow base having a horizontal guide bar, a movable standard slidable on the bar, means for maintaining said standard in upright position, means for operatively mounting a power plant upon the standard whereby thrust is transmitted from the power plant to the standard, a rock shaft in said base, a rock arm on said rock shaft, means pivotally connecting said rock arm and standard, a segmental gear fixed to said rock shaft, an indicator shaft and an indicator thereon, a pinion on the indicator shaft coacting with said gear, and resilient means for resisting the thrust developed by the power plant.

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The following references are of record in the file of this patent:

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