F. K. LANDGRAF & W. L. TURNER.

TESTING MACHINE.

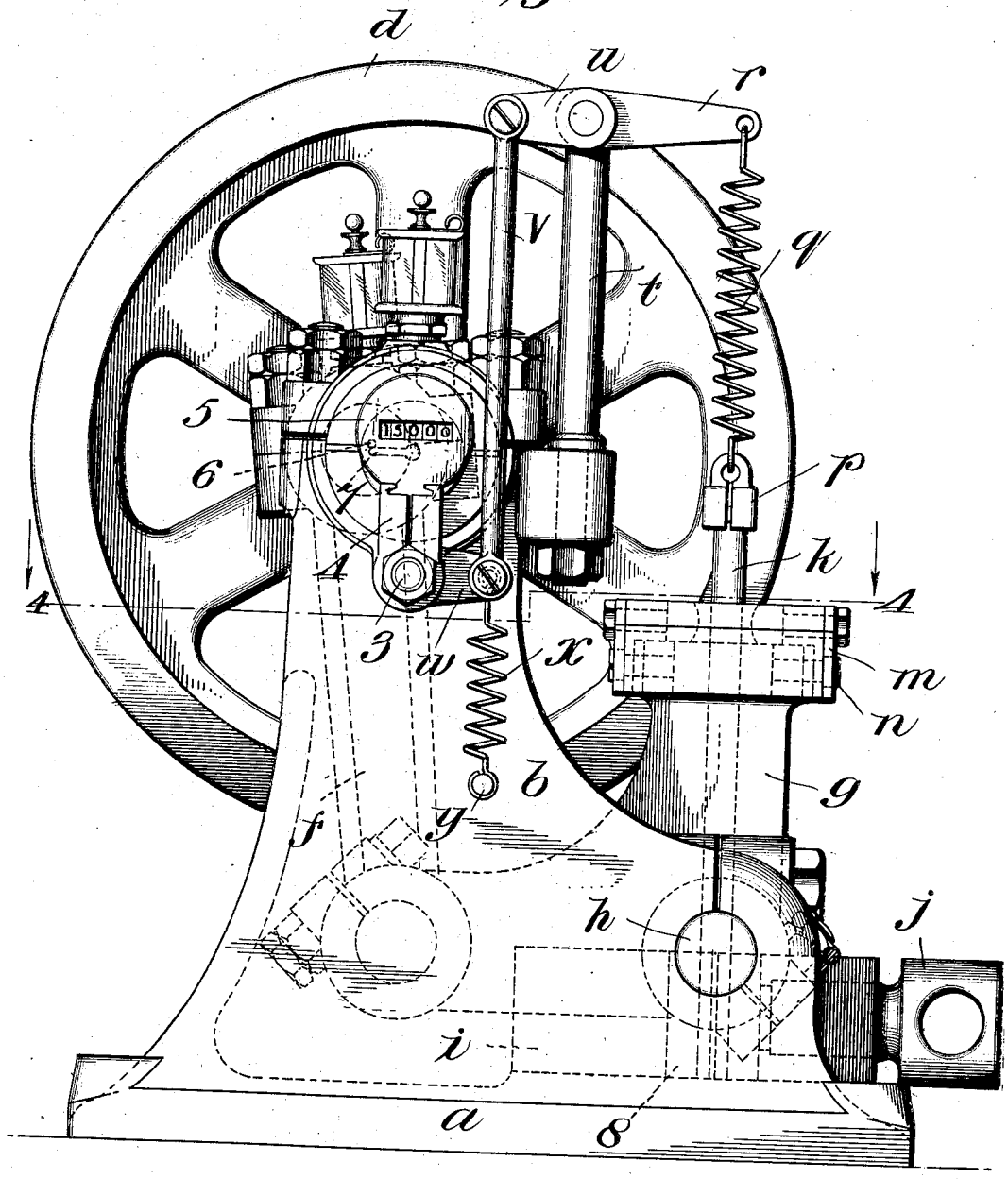
APPLICATION FILED APR. 8, 1908.

902,497.

Patented Oct. 27, 1908.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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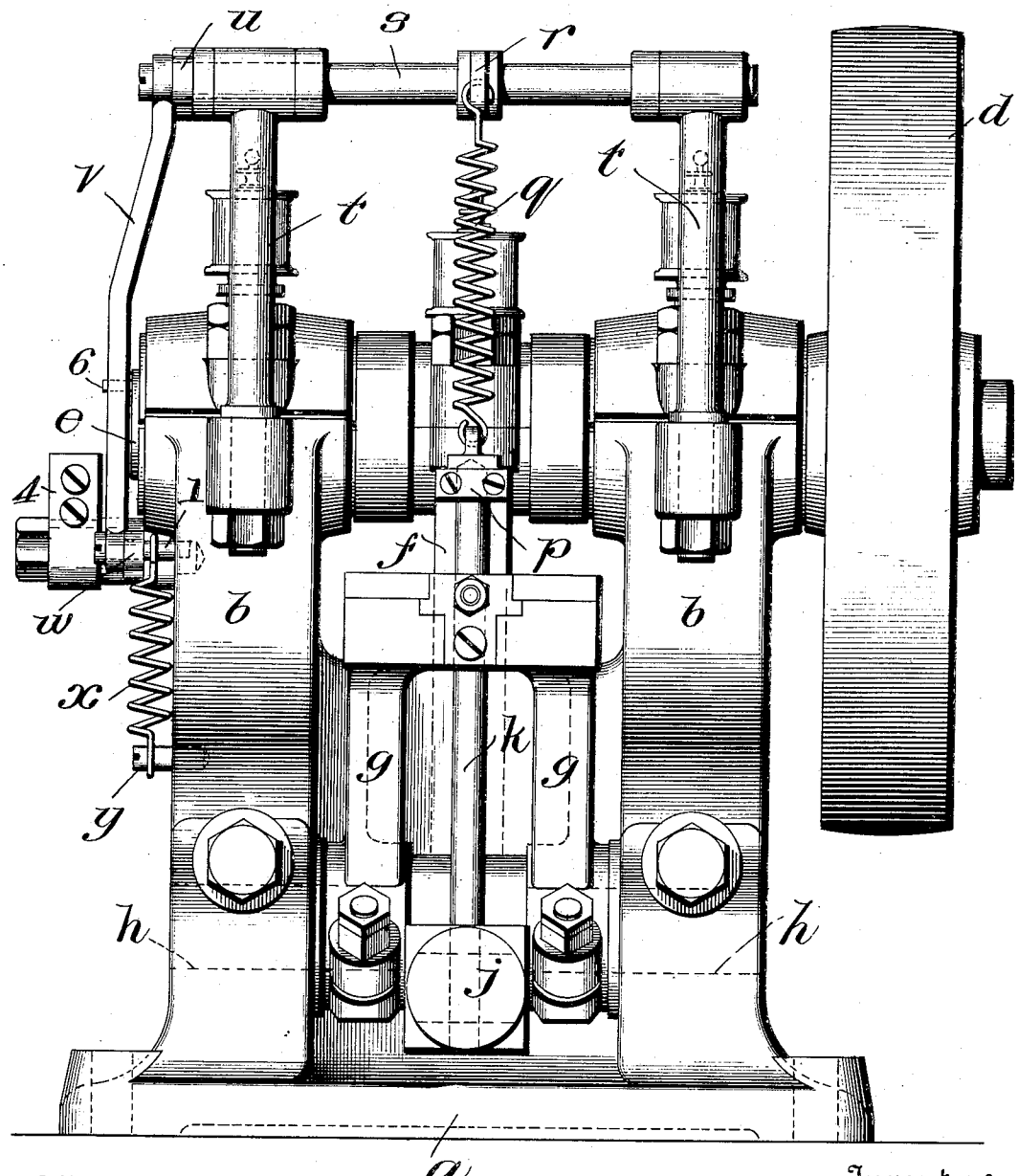
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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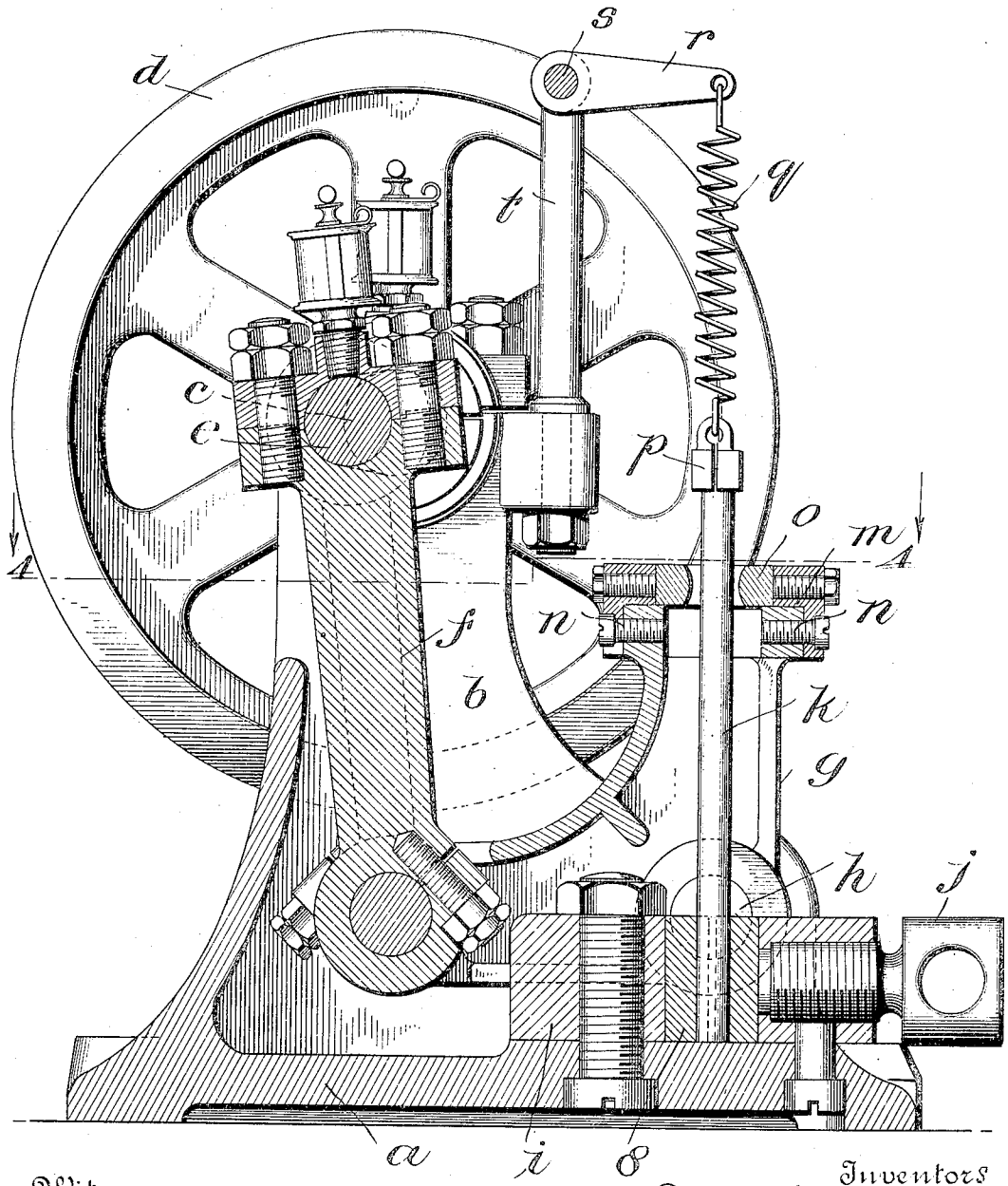
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4 SHEETS—SHEET 3.

Fig. 3.



Witnesses
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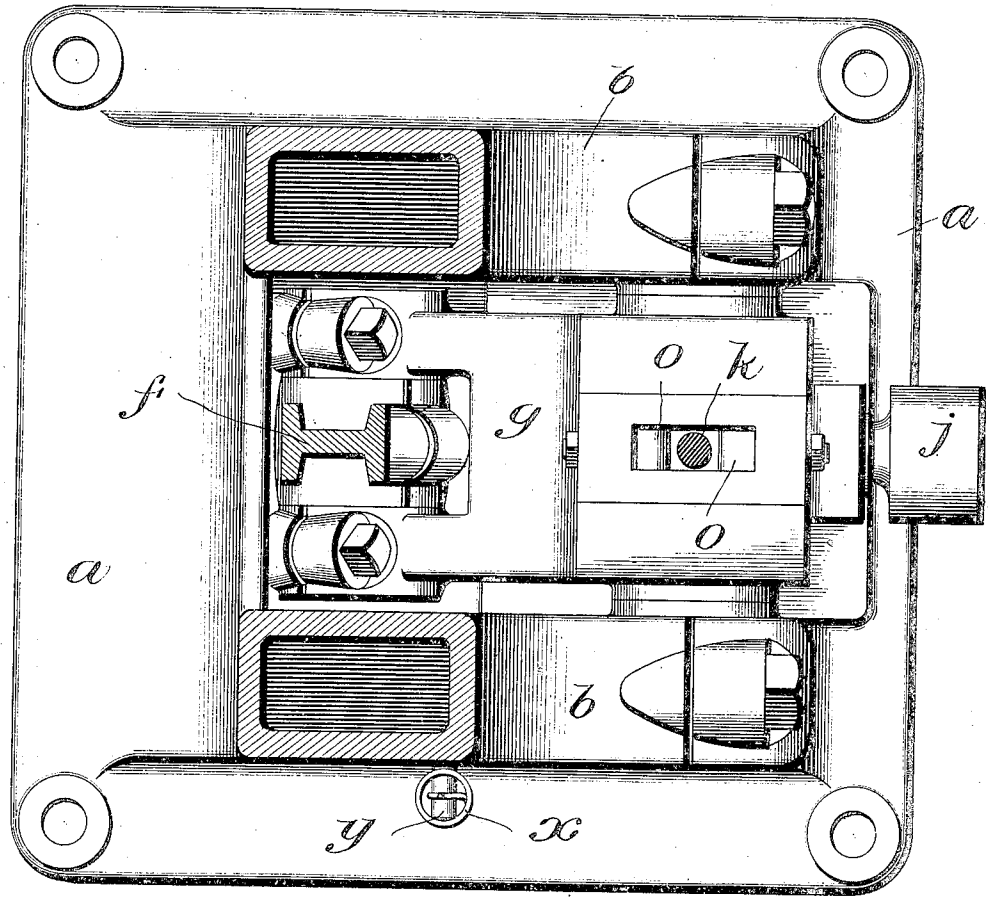
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4 SHEETS—SHEET 4.

Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

FRED K. LANDGRAF, OF BRIDGEVILLE, AND WILLIAM LAWRENCE TURNER, OF PITTSBURG, PENNSYLVANIA.

TESTING-MACHINE.

No. 902,497. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed April 8, 1908. Serial No. 425,894.

To all whom it may concern:

Be it known that we, FRED K. LANDGRAF, a citizen of the United States, residing at Bridgeville, and WILLIAM L. TURNER, a British subject, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Testing-Machines; and we 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.

Our invention relates to improvements in testing machines and the object thereof is to provide a simple machine which will subject the material being tested to a combination of impact and steady motions and which will register the number of impacts made before the article tested breaks.

A further object is to register the number of impacts required to break a given article.

With these objects in view our invention consists in the constructions and combinations of parts as hereinafter described and claimed.

In the accompanying drawings Figure 1 is an end view of our improved machine. Fig. 2 is a side view thereof. Fig. 3 is a central vertical section thereof, and Fig. 4 is a cross section on the line 4—4 of Figs. 1 and 3.

a represents the base of the machine which is formed of a solid casting having upwardly extending arms or brackets *b* in which the driving shaft *c* provided with a fly wheel *d* is mounted in suitable bearings, suitable oiling devices being provided. The shaft *c* is provided with a crank portion *e* to which is attached a heavy link or connecting rod *f*. The lower end of this connecting rod is pivotally connected to a hollow bell crank rocker *g* which is pivoted on stub shafts *h* held in suitable bearings in the base *a*.

i represents a vise securely fastened to the base *a* which vise is provided with an adjustable screw *j* to firmly hold the test pieces, one of which is shown at *k*. This test piece projects upward through the hollow rocker *g* and the upper opening of said rocker is provided with an adjustable die holder *m* adjusted by means of screws *n*. The adjustment of the die holder is made in a line perpendicular to the test piece and in line with the direction of deflections of the test piece and is for the purpose of so setting the die holder that it is equally distant from both sides of the neutral axis of the test piece, so that if the die should not hold the test piece exactly vertical, the die holder could be so set as to make the deflections exactly the same on both sides of the neutral axis of the test piece when the machine is in operation. The die holder *m* is provided with a perforated die such as *o*, and different dies provided with different size openings may be used for the purpose of increasing or decreasing the amount of deflections given to the test piece. The vise *i* is provided with removable and changeable jaws such as 8, for the purpose of firmly grasping test pieces of different shapes.

Means are provided for counting the number of deflections which the test piece will stand before it breaks, and these means are as follows:—*p* represents a clamp which is fastened to the free end of the test piece and to which clamp is fastened a spring *q*, the upper end of which is attached to a lever *r* which is fastened to the shaft *s* running horizontally along the top of the machine and held in suitable bearings on the pedestals *t* which are secured to the frame and project upwardly. To the shaft *s* is fastened another lever *u* and to the free end of said lever is attached a link *v*, the lower end of which is pivotally attached to a lever *w* for swinging the counting mechanism. *x* represents a spring which is attached to the lever *w* and a pin *y* on the frame of the machine which spring normally holds the lever *w* in its lowest possible position. The amount of movement of the lever *w* is governed by the pin 1 attached to said lever, which works in a slot 2 in the frame of the machine, as shown in dotted lines in Fig. 2. The lever *w* is pivoted on a stud 3 and to the lever is attached an upwardly extending arm 4, which arm carries the counting mechanism 5 of any desired type. On the end of the shaft *c* is a pin 6 which is adapted to strike an arm 7 which operates the counting mechanism when the parts are in the position shown in Fig. 1.

The operation is as follows:—The parts being in the position shown in Fig. 3, and the test piece *k* being inserted in the machine, as shown in said Fig. 3, the machine is started in operation and the test piece is subjected to first an impact and then a steady deflection in one direction and then to an impact and deflection in the other direction, the operation being repeated until the test piece

breaks. The machine at the same time records the number of deflections to which the test piece is subjected before it breaks, by the means already described, acting upon the counting mechanism. When the test piece breaks, the counting operation ceases because the spring *q* no longer exerts a pulling action on the lever *w* and the spring *x* at once pulls the lever *w* to its lowest position, carrying with it the arm 4 which carries the counter. This swings the entire counter so that the operating arm 7 thereof will not be struck by the pin 5 on the shaft *c* and thus the rotation of said shaft will have no effect upon the counter until the parts are again restored in the position shown in Fig. 3 for action upon a new test piece.

We claim:—

1. In a test machine the combination of means for holding a test piece, a hollow rocker through which said test piece projects and means for operating said rocker to alternately deflect one end of said test piece in one direction and then in the other, substantially as described.

2. The combination of a supporting frame, means secured thereto for holding a test piece, a hollow rocker, a perforated adjustable die holder provided with a perforated adjustable die carried on the end of said rocker and through which said test piece is adapted to project, and means for operating said rocker, substantially as described.

3. In a test machine the combination of a supporting frame, a vise having adjustable jaws for holding a test piece, a hollow rocker arm through which said test piece is adapted to project and means for swinging said rocker arm so that said test piece will be subjected to impact and pressure alternately in opposite directions, substantially as described.

4. In a test machine the combination of a supporting frame, a vise for holding the test piece, a hollow rocker arm, through which said test piece projects, means for moving said test piece, a counter carried by said machine and connections whereby the deflections of said test piece will operate the counter until said test piece breaks, substantially as described.

5. In a test machine the combination of means for holding a test piece, a hollow rocker through which said test piece projects, means for operating said rocker to deflect said test piece alternately in opposite directions, a counter adapted to be operated by the movement of the rocker operating means when the test piece is unbroken, connections between the test piece and the counter supporting means for normally holding said counter in position to be operated, and a spring for moving said counter out of operative relation with the operating shaft as soon as the test piece breaks, substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

FRED K. LANDGRAF.
WILLIAM LAWRENCE TURNER.

Witnesses:
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W. F. RUSSELL.