June 24, 1958 R. P. LATHROP 2,839,919

DYNAMOMETER BLOCK

Filed Jan. 19, 1956

FIG. 2

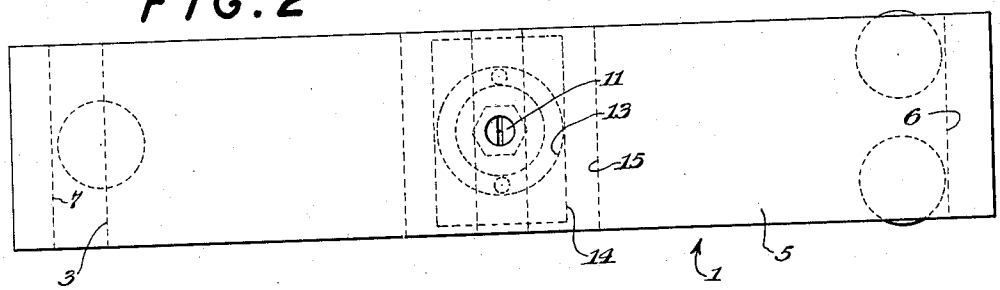
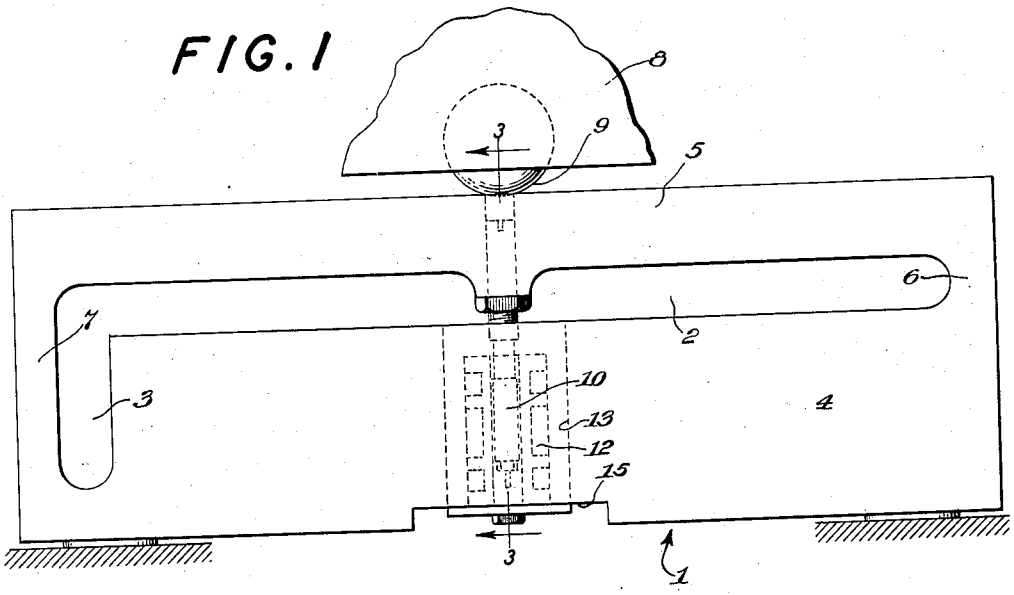


FIG. 1



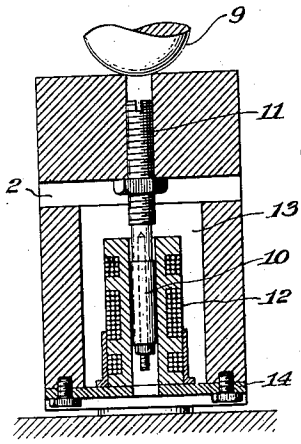


FIG. 3

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DYNAMOMETER BLOCK

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Application January 19, 1956, Serial No. 560,134

3 Claims. (Cl. 73—141)

This invention relates to dynamometer blocks and particularly to a bending beam type block which is sometimes referred to as a spring block that is especially useful in so-called creep type materials testing machines.

Dynamometer blocks of the so-called bending beam type have been proposed for creep machine service but they have been deficient either structurally or functionally such as being incapable of producing a linear relation between displacement and applied load. The bending beam in this type of dynamometer block, as heretofore made, has been supported at each end in a similar manner so that it was of symmetrical appearance and hence would seem to be ideally suited to producing uniform results. However, such a beam has produced a very undesirable non-leaner action within its normal operating range regardless of the type of means employed in combination with the beam to sense its deflection in response to load. A block type dynamometer is particularly desired for creep machine service as it is a rugged device and inherently has a high degree of self-contained lateral rigidity and stability that allows loads to be applied easily and directly to the load responsive beam without the use of stay plates or other guiding means.

It is an object of my invention to provide an improved beam type dynamometer block which, while still broadly retaining the desirable feature of a beam supported at each end, is now able to produce a high degree of linearity between displacement and applied load without sacrificing lateral rigidity of the block.

A further object is to provide an improved beam type dynamometer block that is relatively simple and economical in construction and operation and at the same time has a high degree of linearity combined with ruggedness and adaptability in using a displacement type sensing device incorporated within the block structure.

Other objects and advantages will be more apparent to those skilled in the art from the following description of the accompanying drawings in which:

Fig. 1 is a side elevation of my improved dynamometer block showing a fragmentary portion of a load applying member;

Fig. 2 is a plan view of Fig. 1; and

Fig. 3 is a transverse section taken substantially on the line 3—3 of Fig. 1.

In the particular embodiment of the invention disclosed herein, I have provided an integral steel block 1 which is preferably rectangular both in elevation and plan view, the dimensions of the block being determined by the capacities for which it is designed. An L-shaped slot 2 is cut, preferably on a milling machine, entirely through the block from one side to the other in the upper half of the block, the long leg of the L extending horizontally and the short leg 3 extending vertically, thereby providing a heavy base portion 4 and a narrower beam portion 5 which is integrally anchored against horizontal movement by a pivotal or fulcrum section 6 at one end of the block and is supported by and connected

to the other end of the block through a vertically elongated flexure section 7. The thickness of this elongated flexure section is sufficient to withstand compression loads applied to the center of the beam, as by a member 8 preferably through a ball contact 9, and yet is thin enough to be sufficiently flexible so that the left end of the beam 5 may float horizontally upon bending of the beam. While this asymmetrical arrangement would seem to produce erratic results, especially as compared to the symmetrical arrangements of the prior art, yet it has been found that highly improved results of linearity are possible.

To measure the deflection of the beam as a measure of the applied load, I preferably employ an electrical sensing means which herein comprises a so-called differential transformer having a magnetic core 10 which is axially adjustably secured to the beam 5 by a threaded connection 11. A series of primary and secondary electrical coils 12 surround the core. This displacement measuring unit is disposed within a centrally located vertical opening 13 within the base portion of the block and is supported on the underside thereof by a plate 14 disposed within a recess 15. Such a device is well known in the art and hence its operation need not be described beyond stating that movement of the core 10 within the coils produces a signal, proportional to the displacement of the core, to operate any well known indicating instrument.

From the foregoing disclosure it is seen that I have provided an extremely simple yet highly flexible beam type of dynamometer block which, by being anchored at one end 6 and flexibly supported by member 7, has been found to have a high degree of linearity between displacement and applied load without sacrificing in any way the desired lateral and longitudinal ruggedness.

It will, of course, be understood that various changes in details of construction and arrangement of parts may be made by those skilled in the art without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A dynamometer block comprising, in combination, a base portion and a superimposed horizontally extending vertically flexible load responsive beam to be loaded substantially midway of its length so that it flexes between its ends, means for pivotally connecting one end of the beam to the base and for anchoring said end against horizontal movement upon application of vertical load to the beam, means for supporting the other end of the beam on the base by a vertically elongated flexure member so as to allow said latter end of the beam to move horizontally upon flexure of the beam, and means located between the ends of the beam for measuring the deflection thereof in response to load.

2. The combination set forth in claim 1 further characterized in that the beam is vertically spaced from the base and the flexure member is horizontally spaced from a portion of one end of the base to form an L-shaped slot which provides free spaces in which the beam and flexure member may move.

3. A dynamometer block comprising an integral horizontally extending block having an L-shaped slot with the long leg of the L extending horizontally to form a base portion and a superimposed horizontal beam portion, one end of the long leg of the slot terminating in spaced relation to one end of the block to provide a pivotal connection with the base and to anchor that end of the beam against horizontal movement, and the short leg of the slot being disposed adjacent the other end of the block and extending vertically down to a point near the bottom of the base thereby to provide

a vertical flexure member connecting the other end of the beam to the base so as to support and allow horizontal movement of such end upon bending of the beam in response to application of load.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

'atent No. 2,839,919 June 24, 1958

Robert P. Lathrop

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 29, for "non-leaner" read -- non-linear --.

Signed and sealed this 14th day of October 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents