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ASSAY TEST SIEVE SHAKER

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Fig. 1

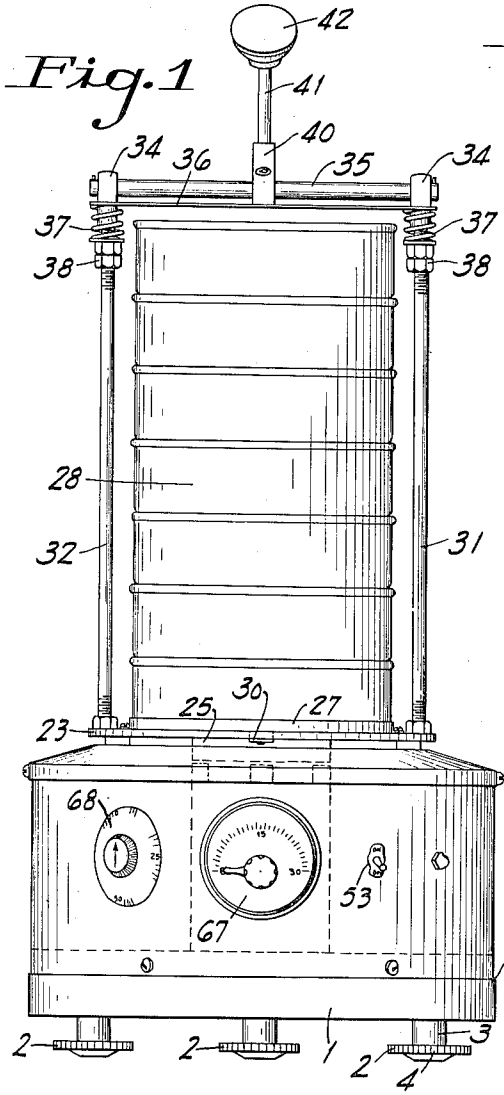


Fig. 3

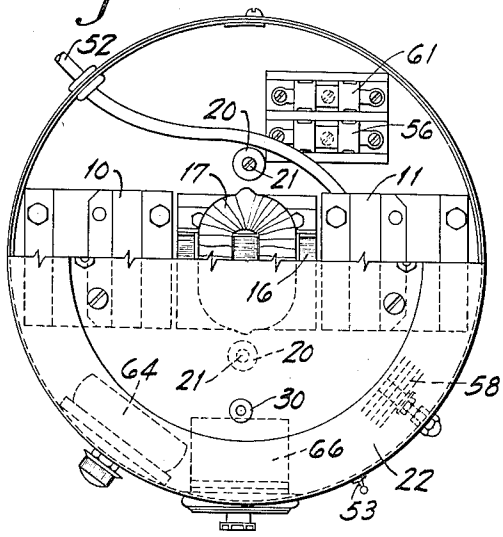
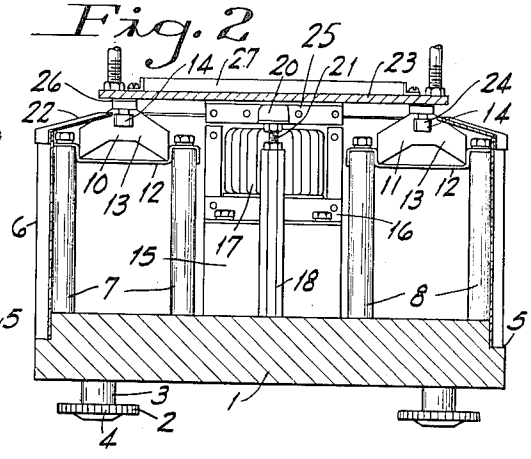


Fig. 2



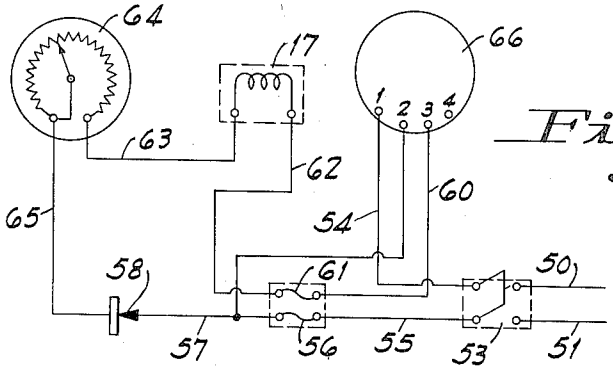


Fig. 4

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ASSAY TEST SIEVE SHAKER

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1 Claim. (Cl. 209—237)

This invention relates generally to assay machines and more particularly to an assay test sieve shaker wherein a series of graduated sieves are stacked one upon another with the large mesh at the top and are vibrated to determine the amount and the gradation of the fineness of material being tested.

The principal object of this invention is to provide a complete and readily portable machine for supporting a series of sieves of various mesh in stacked relation so that the materials from the batch will flow from the upper sieve through the succeeding meshes of finer degree to the lowermost pan and thus provide a percentage of the fineness of the material depending upon the mesh of the sieves employed. This device not only supports the sieves for vibration to cause the material to be sifted from one sieve to another in a descending path in accordance with the size of the material, but it also provides for an adjustable period of vibration and means for timing the length of the period of vibration which in some instances is highly important for comparative tests; particularly when materials are fragile and will break up and become finer if they are subjected to vibration for too long period of time.

It is also important to measure the length of the period of time for vibrating the material in order to provide a true picture of the assay particularly where one quantity of material is being compared with a corresponding quantity of material and they are measured for the assay test by weight.

Another object is the provision of means for controlling the amplitude of vibration of an assay test.

Another object is the provision of an assay machine that is readily portable and which will operate on an electric source of supply for the purpose of conducting tests close to the place where the materials are obtained.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawings show, for the purpose of exemplification without limiting the invention or claims thereto, certain practical embodiments of the invention wherein:

Fig. 1 is a view in side elevation of the assay machine comprising this invention.

Fig. 2 is a vertical section of the lower portion of the assay machine as shown in Fig. 1.

Fig. 3 is a plan view of the structure shown in Fig 2 with a portion thereof broken away.

Fig. 4 is a diagrammatic view of the circuit of the assay machine.

As shown on the drawings the base 1 is a heavy casting that is preferably provided with three feet 2, each foot being made up of a resilient vibration dampener member 3 of elastomer material and a level adjusting pad member 4.

The base casting 1 has an annular shoulder 5 formed thereon for the purpose of receiving the annular shell 6 that forms a cover for the mechanism. The base is also provided with upstanding spacer posts 7 which are in

groups of four. The spacer post group 7 is constructed to support an elastomer such as the rubber spring 10 and the group 8 supports the rubber spring member 11. The spring members 10 and 11 are similar to each other and are provided with a lower mounting bracket 12, a rubber spring member 13, and an upper mounting bracket 14. The lower mounting bracket runs the full length of the spring 13 and rests on top of the spacer posts in groups 7 and 8 and are secured thereto by means of bolts as shown in Fig. 2.

Intermediate of the quadrangular groups 7 and 8 of spacers, the base is provided with an upstanding block 15 which is constructed to support the core member 16 of the electromagnetic vibratory motor, which core member has three legs and the center leg is encircled by the coil 17.

On the opposite sides of the electromagnetic motor field member, the base is provided with the spacer posts 18 which are disposed in a plane at right angles to the posts supporting the spring members. Each of these posts 18 is provided with a resilient bumper member 20 which is made of suitable elastomer material and which is adjustably supported on top of their respective posts 18 by means of the adjusting screws 21.

The annular shell 6 is provided with a ringlike top member 22 which encloses the upper portion of the base and extends around the outside of the spring members 13.

An annular table 23 is supported by means of the bolts 24 secured to the upper bracket members 14 of the spring members 13. Each of these bolts supports the table 23 on the springs 13 relative to the base 1. The underside of the central portion of the table has secured thereto the armature member 25 which is disposed directly above the pole faces of the core 16 as shown in Fig. 3. In view of the fact that the armature 25 is secured relative to the table 23 it will cause the latter to vibrate in synchronism with the current impulses passing through the electromagnetic field coil 17 when the natural period of vibration of the system is tuned to within a few cycles of the pulsating driving current.

The rubber springs 13 support the table for vibration in a vertical path only and the table strikes the rubber bumpers 20 located on either side of the electromagnetic motor and at right angles from the plane passing through the opposed spring members 13. Thus by adjusting the height of the rubber bumpers 20 one may determine the amplitude of vibration which could be materially less than that which would be normally permitted by the spring members 13. By limiting the amplitude of vibration in this manner one is enabled to more readily tune the mechanical vibratory system to function properly for assaying material regardless of the period of vibration.

If it is desired to adjust the air gap between the armature 25 and the pole faces of the core 16, one may add or take away the shims such as illustrated at 26.

The table 23 has supported thereon the semicircular fence member 27 for the purpose of receiving a pan on which is a stack of assay sieve members such as illustrated at 28 in Fig. 1. The fence 27 merely functions to guide and promptly center the sieves on the table 23 and also centers the same relative to the armature 25.

The table 23 is likewise provided with a leveling indicator, as indicated at 30, for properly leveling the table before conducting the assay test in order to eliminate some of the variables while making comparative tests. Whether or not the springs 13 actually support the table in the exact horizontal plane is not as important as adjusting the machine by means of the pads 4 for the purpose of always centering the bubble in the level 30 so as to insure that the same relative position is obtained for making comparative assay tests.

The table 23 has the upstanding tie rods 31 and 32

on which are the adjustable guide members **34** at the upper end thereof. These guide members have the ends of the shaft member **35** journaled therein and the guide plate **36** and the springs **37**, the tension on which may be adjusted by the nuts **38**. The shaft **35** has the cam member **40** on the central portion thereof. This cam has the lever **41** extending therefrom and is provided with a handle **42**.

After the sieve members **28** are stacked on the pan with their mesh becoming finer toward the bottom of the stack, and are inserted on to the table against the fence or guide **27**, the handle **42** is pulled downwardly so as to rock the cam **40** and press the circular plate **36** downwardly against the uppermost sieve. The plate **36** is guided by the members **34** and when the cam is over center it will apply locking pressure to the sieve members causing them to stay in their stack relation on top of the table **23**. The springs **37** lift the plate **36** when the lever **41** is raised to unlock the plates from their stacked position.

The electromagnetic motor energizing control circuit is illustrated in the circuit diagram of Fig. 4, wherein the lines **50** and **51** represent the alternating current supply which is transmitted through the cable illustrated at **52**, to the switch **53** from whence the line **50** is conducted to terminal **1** of the timer wire **54**. Line **51** is connected by means of the wire **55** to the fuse **56** from thence it is connected by the wire **57** to the half wave rectifier **58** on one hand and the terminal **2** of the timer. The terminal **3** of the timer is connected by the wire **60** to the fuse **61** and thence by the wire **62** to one end of the electromagnetic coil **17**. The other end of said coil is connected by the wire **63** to one side of the rheostat member **64**, the other side of which is connected by the line **65** to the other side of the rectifier **58**. The timer **66** is provided with a dial **67**, as shown in Fig. 1, and the rheostat **64** is also provided with a dial **68**. The timer **66** is mounted within the housing **6** and provides accurately measured periods during which the coil is energized. When this timer is operated in conjunction with the proper magnitude of vibration set by the rheostat **64** within the limtis set by the bumpers **20** and their resiliency. Accurate comparisons of different assay samples may be made.

The comparative results of an assay test on similar materials provide a very accurate testing with this apparatus.

While, for clarity of explanation, certain embodiments of this invention have been shown and described, it is to be understood that this invention is capable of many

modifications and changes in the construction and the arrangement, and certain parts may be employed without the conjoint use of other parts and without departing from the spirit and scope of this invention.

I claim:

An assay machine comprising a base member, a plurality of adjustable resilient vibration dampeners supporting said base member, a plurality of elastomers each having one side mounted in parallel spaced relation on said base member, a table member secured to the other side of said elastomers to provide the sole support of said table member for reciprocation in a vertical rectilinear path without tilting and as a free body, a set of assay sieves and a pan removably clamped to said table member, an electromagnetic motor having a field means and an armature means, a mounting to secure one of said motor means to the under side of said table member, a mounting to adjustably secure said other motor means to the said base member midway between said elastomers and in operative spaced relation with said one motor means, a rheostat, a circuit connecting said rheostat in series with said field means, spaced elastomer bumpers each adjustably mounted on one member and symmetrically located midway between said elastomers and on opposite sides of said motor to simultaneously engage the opposite member to stop the table member short of its full downward movement when the field means is energized, said rheostat controlling the effective magnitude of the reciprocation and thereby the effective stopping force simultaneously applied by said bumpers.

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