Dec. 8, 1959 A. S. ITTERMANN ET AL 2,916,248

MAGNETRON SUPPORTING APPARATUS

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FIG. 1

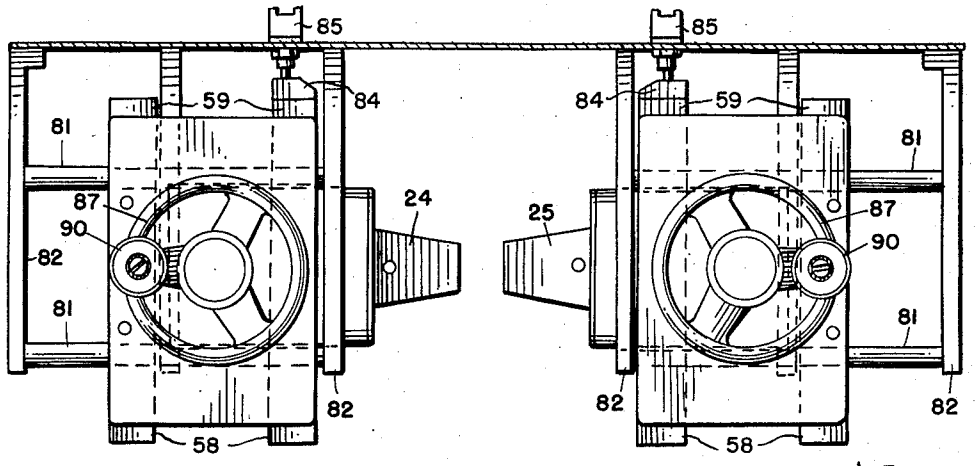
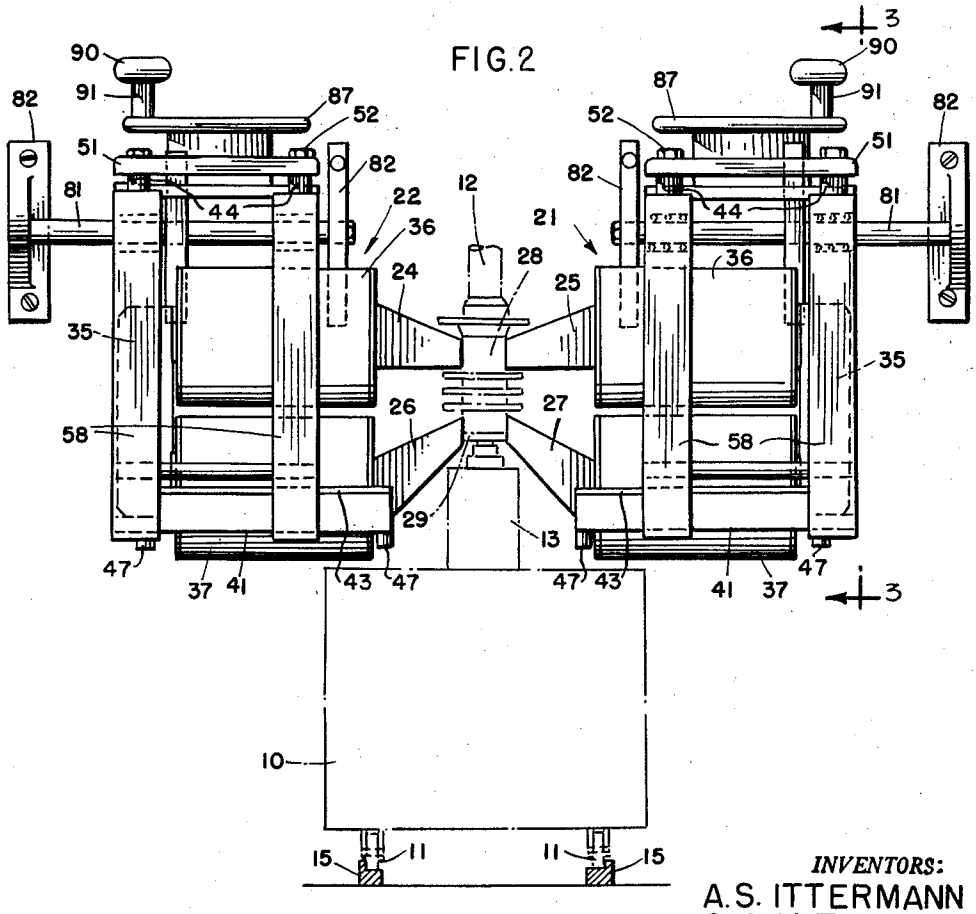


FIG. 2



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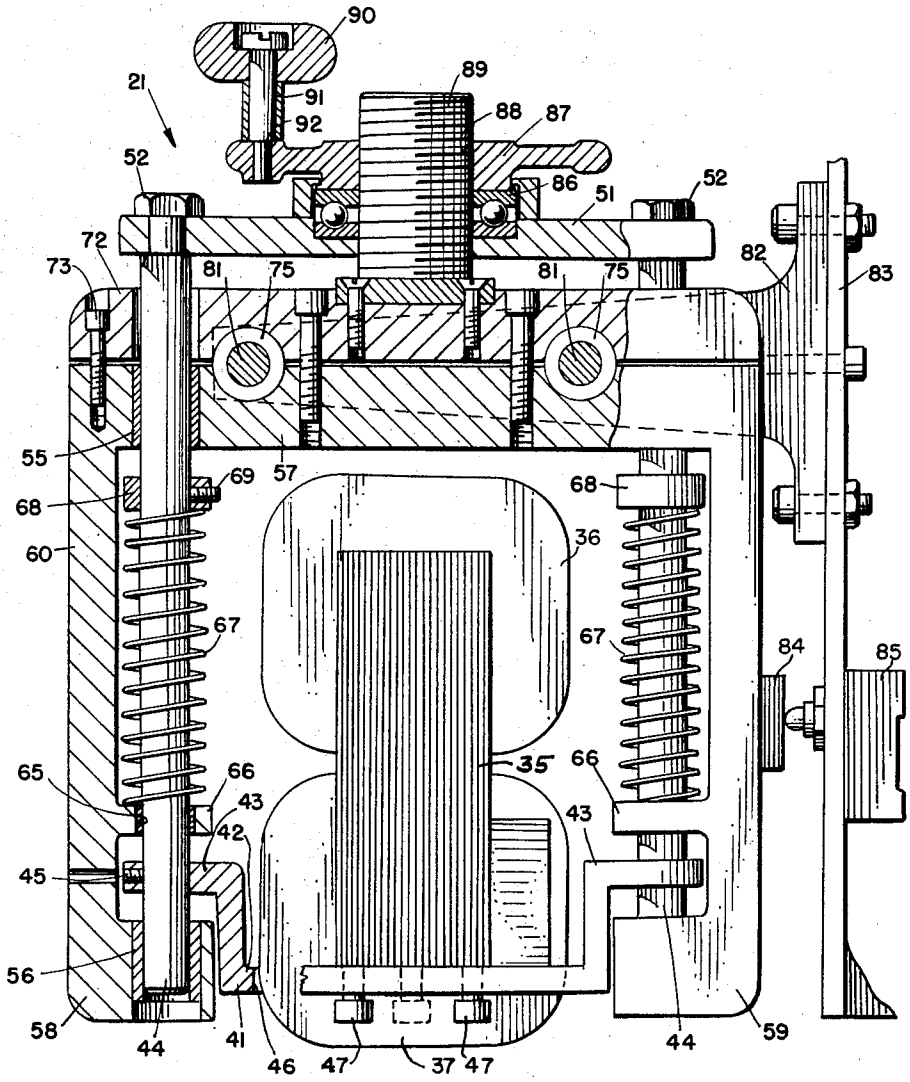
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FIG. 3



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MAGNETRON SUPPORTING APPARATUS

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2 Claims. (Cl. 248—287)

This invention relates to magnetron-processing apparatus, and more particularly to apparatus for supporting electromagnets adjacent to magnetrons.

In the manufacture of magnetrons, or the like, magnetrons are often built by first completely assembling each magnetron without sealing it, and then pulse-pumping the magnetron which comprises continuously evacuating the magnetron while energizing it to cause the cathode thereof to emit any gas which it may have to bring the magnetron to a uniformly operable state. The magnetron then is moved while still under vacuum to a sealing-off station in which it is hermetically sealed and then is tested. In the energization of the magnetron during the pulse-pumping, heavy electromagnets must be brought into proximity with the magnetron. In the past, it has been difficult to bring the magnets to proper operating positions relative to the magnetron.

An object of the invention is to provide new and improved apparatus for processing magnetrons.

A further object of the invention is to provide new and improved apparatus for supporting electromagnets.

Another object of this invention is to provide apparatus for supporting a heavy electromagnet in close adjustable proximity to a magnetron under test.

One embodiment of the present invention may include a member which supports an electromagnet in close proximity to a magnetron under test and which is supported jointly by springs and a mechanism operable to adjust the position of the electromagnet. Additional adjusting means mounted on the electromagnet supporting member provide for further adjustment of the position of the electromagnet.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment of the invention, when read in conjunction with the appended drawings, in which

Fig. 1 is an enlarged, fragmentary top plan view of a portion of a device embodying the principles of the present invention;

Fig. 2 is an enlarged, fragmentary front elevation of the device, and

Fig. 3 is an enlarged, fragmentary vertical section taken along line 3—3 of Fig. 2 with portions thereof shown in elevation.

Referring now in detail to the drawings, there is shown therein a cart **10** supported by rollers **11** spaced a predetermined distance apart for supporting a magnetron **12** in a fixed predetermined position on a housing **13** of the cart. The cart **10** also is provided with evacuating equipment in communication with the interior of the magnetron **12** and serving to continuously pump down the interior of the magnetron to a high vacuum. Vertically adjustable electromagnet assemblies **21** and **22** are movable between retracted positions in which pole pieces **24**, **25**, **26** and **27** are located in retracted positions widely separated from one another, and operative positions in which the pole pieces **24** and **25** are positioned adjacent a portion **28** of the magnetron and the pole pieces **26** and **27** are adjacent to a portion **29** of the magnetron.

The assemblies **21** and **22** are identical with one another and are mounted identically, except that they are reversed with respect to one another, and, for convenience sake, only the assembly **21** and its mounting will be described in detail. The assembly **21** includes a core **35** of which the pole pieces **25** and **27** form the ends, and electromagnetic coils **36** and **37** are mounted on the arms of the core **35**. The pole piece **27** and the base of the core **35** rest on a tray **41** composed of nonmagentic material which is provided with an annular base portion **42** and L-shaped flanges **43** fastened to rods **44** by set screws **45**. The base **42** is provided with an opening **46** to provide clearance for the coil **37**, and three screws **47** engage the core **35** to adjustably support the electromagnet in a tripod arrangement.

The rods **44** are fastened to a plate **51** by cap screws **52**, and are mounted slidably in bushings **55** and **56** located in a base **57** and arms **58** and **59** of a U-shaped frame **60**. The rods **44** also are slidable freely in bores **65** in lugs **66** formed rigidly on the frame **60**, which form spring seats for compression springs **67** bearing against the lugs **66** and against collars **68** secured against movement along the rods **44** by set screws **69**. A plate **72** is secured to the frame **60** by screws **73** to clamp anti-friction bearings **75** between the frame **60** and the plate **72**, the anti-friction bearings being mounted on guide rods **81**, which are supported by brackets **82** bolted to the wall **83** of the test set. The plate **72** and the frame **60** may be slid between a retracted position, in which the lefthand arms **58** and **59**, as viewed in Fig. 3, are adjacent the lefthand bracket **82** to provide clearance for moving the magnetron **12** into its operative position, and an operative position in which the righthand arms **58** and **59** are adjacent to the righthand bracket **82**, and a cam **84** closes a limit switch **85** to set up the set **19** for operation.

The brackets **82** and the rods **81** support the frame **60** through the anti-friction bearings **75**, and the plate **72** and the lugs **66** on the frame **60** support the rods **44** and the tray **41** through the compression springs **67** and the collars **68**. The springs **67** press the plate **51** continuously upwardly as far as it is permitted to go by a thrust bearing **86** positioned between a handwheel **87** provided with a tapped bore **88** therein screwed on a post **89** fastened rigidly to the plate **72**. The handwheel **87** is provided with a handle **90** mounted rotatably by a screw **91** threaded into a bore **92**.

The springs **67** urge the plate **51** continuously to its upper limit with only a limited amount of force greater than that of the combined weight of the electromagnet assembly **21** so that the plate **51** presses against the thrust bearing **86** with a light force and the handwheel **87** may be turned easily to move the plate **51** downwardly farther than it is shown in the drawings or to permit the plate **51** to be raised by the springs **67** above the position of the electromagnet shown in the drawings. This prevents heavy forces between the handwheel **87** and the plate **51**. That is, in effect, the springs serve as counterbalancing elements relative to the weight of the members supported thereby, and are just strong enough to maintain the plate **51** at its upper limit permitted by the handwheel **87** and the thrust bearings **86**. The height of the assemblies **21** and **22** can be readily adjusted by the handwheels **87** so that, even though the magnet assemblies **21** and **22** are heavy, very little actuating effort is required to adjust the positions of the assemblies which may be effected very rapidly whenever needed. The

screws 47 serve to tilt the magnet assembly 21 if necessary for properly locating the assembly 21 relative to the magnetron.

The above-described apparatus serves to permit magnetrons to be located quickly, and the electromagnet assemblies 21 and 22 to be precisely located relative to the magnetrons without loss of time.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A device for mounting an article, comprising a pair of spaced brackets, a pair of parallel guides supported by the brackets, a frame mounted slidably on the guides and provided with a pair of depending arms, each of said arms being provided with a perforated lug projecting toward the other arm, a plurality of guide rods mounted slidably in the lugs, compression spring means supporting the guide rods on the lugs, a tray carrying the article fastened rigidly to the guide rods and supported thereby, a plate connected rigidly to the guide rods, a threaded rod projecting from the frame, a handwheel mounted threadably on the threaded rod, and a thrust bearing positioned between the plate and the handwheel for limiting upward movement of the guide rods by the compression springs.

2. A device for mounting an article, comprising a pair of spaced brackets, a pair of parallel guides supported by the brackets in horizontal position, a frame mounted slidably on the guides and provided with opposed pairs of depending arms, each of said arms being provided with a lug projecting horizontally toward the other arm of the pair, said lugs having vertical bores therein, a plurality of guide rods mounted in vertical positions slidably in the bores in the lugs, compression spring means on the guide rods and supported by the lugs, collars fixed to the rods for supporting the rods from the springs, a tray carrying the article fastened rigidly to the lower ends of the guide rods and supported thereby, a plate connecting the upper ends of the guide rods together, a threaded rod projecting upwardly from the frame, a handwheel mounted threadably on the threaded rod above the plate, and a thrust bearing positioned between the plate and the handwheel for limiting upward movement of the guide rods by the compression springs.

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