

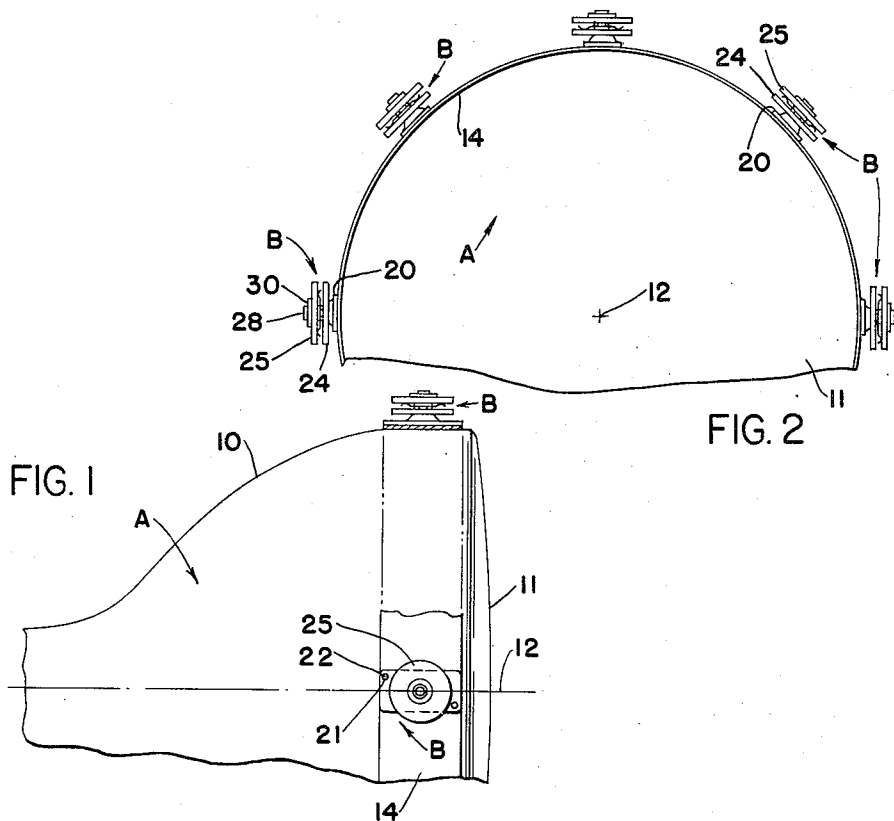
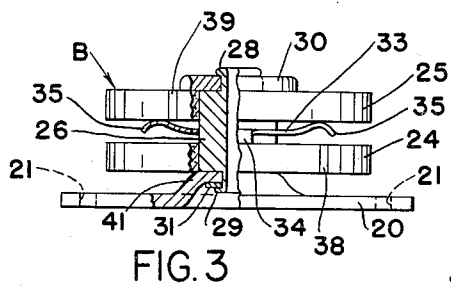
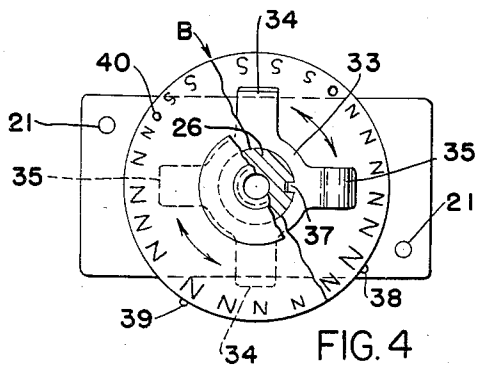
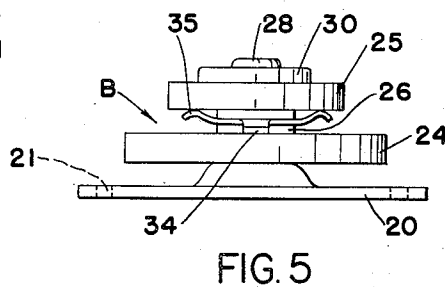
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MAGNETIC FIELD ADJUSTER FOR TELEVISION PICTURE TUBES

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MAGNETIC FIELD ADJUSTER FOR TELEVISION PICTURE TUBES

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This invention pertains to the art of magnets and more particularly to a magnetic arrangement for providing an adjustable strength and polarized magnetic field.

The invention is particularly applicable to providing an adjustable magnetic field for the electron stream impinging upon the viewing screen of a television picture tube and will be described with particular reference thereto although it will be appreciated that the invention has broader applications.

In the art of television picture tubes, it has heretofore been known to provide around the periphery of the viewing screen a plurality of magnetic devices so arranged that the magnetic strength and the magnetic polarity of each device may be independently adjusted.

One such device consisted of a round cup of non-permanent magnetically-permeable material and magnet magnetized transversely to axis of cup mounted for adjustment into and out of the cup as well as rotatable about an axis through the cup. When the magnet is in the cup, its magnetic flux flows through the material thereof and the device has a zero or substantially zero external magnetic field. As the magnet is moved out of the cup, however, less and less of the flux passes therethrough and the external magnetic field of the device is correspondingly increased. The magnet can then be rotated about the axis to vary the orientation of its magnetic polarization relative to the picture tube but without varying the strength of the previously adjusted magnetic field.

One of the principal problems with such a device is the axial dimensions required in order to obtain a full range of adjustment of the external magnetic field of the device. This is particularly so if the full magnetic force of the magnet is to be realized because in such a case a substantial axial spacing between the cup and the magnet must be provided. As this axial dimension actually is a radial dimension added on to the diameter of the television tube, it will be appreciated that a cabinet much larger than the diameter of the tube itself must be provided in order to allow room from the magnetic devices.

The present invention contemplates and has for its principal object a magnetic device of the general type referred to which provides for ready adjustability of the strength and polarity of the magnetic field, which overcomes all the above referred to difficulties, is simple in construction and cheap to manufacture.

Another object of the invention is the provision of a new and improved magnetic device for adjusting a magnetic field about the viewing screen of a television picture tube which has a minimum dimension on a radial line from the central axis of the tube.

A still further object of the invention is the provision of a new and improved magnetic device which can have its magnetic field readily adjusted from substantially zero to the full total strength of the magnets employed.

A still further object is the provision of a device of the type described wherein all of the magnetically permeable material employed may be used to create an external magnetic field.

A still further object of the invention is the provision of a new and improved device of the general type described comprised of a pair of magnets in close-spaced

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relationship and so polarized and so adjustable relative to each other that the external magnetic field about the two magnets can be varied from substantially zero to a maximum consisting of the combined magnetic strength of the two magnets.

In accordance with the present invention a plurality of permanent magnets are mounted in superimposed close-spaced relationship with the plane of the magnetization being generally parallel to each other, such magnets being adjustable about an axis transverse to the plane of polarization both relative to each other whereby the strength of the external magnetic field may be readily varied and as a group whereby the polarization of the combined external magnetic fields may be readily varied.

Still further in accordance with the invention, a pair of disk-like edge polarized magnetic members are provided in superimposed spaced opposed relationship with each other, such members being adjustable either simultaneously or individually in the plane of the disk.

The mounting for the members may be as desired but in accordance with one phase of the invention the magnets are so mounted that either may be adjusted without disturbing the adjustment of the other.

Further in accordance with the invention, the magnet members may be provided with external indicia to indicate the position of the individual magnetic poles.

Still further in accordance with the invention there is provided for use in combination with the television picture tube having a viewing screen a plurality of magnetic devices positioned around the edge of such screen, each device being comprised of a pair of superimposed relatively close spaced magnets, each magnetized in a plane perpendicular to a radial line through the center of the tube, and each being independently adjustable about such radial line to adjust the external magnetic field thereof or adjustable as a unit to adjust the magnetic orientation of the adjusted magnetic field.

The magnets may be of any desired or usual shape including bar magnets but are preferably edge-magnetized disks. Also they may be of any known magnetic material but preferably one having a high magnetic stability. Further, the magnetic members may be of any relative size or relative magnetic strength, it being appreciated that as one member is larger or stronger, the other may not be able to completely neutralize its external magnetic field.

The invention may take physical form in certain parts and arrangements of parts a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawing which is a part hereof and wherein:

Figure 1 is a fragmentary side elevational view of the viewing end of a television picture tube in combination with magnetic devices all constructed in accordance with the present invention and illustrating a preferred embodiment thereof.

Figure 2 is a front elevational view of Figure 1.

Figure 3 is an enlarged side elevational view of a magnetic device constructed in accordance with the present invention.

Figure 4 is a top elevational view, with portions broken away, of Figure 3; and

Figure 5 is a view similar to Figure 3 but showing a slightly modified embodiment of the invention.

Referring now to the drawing wherein the showings for the purposes of illustrating the invention only and not for the purposes of limiting same, the figures show a television tube A comprised of an outer shell 10 and a viewing screen 11 having a central axis 12 with a plurality of magnetic devices B constructed in accordance with the present invention arranged around the periphery of the tube A adjacent to viewing screen 11.

In the embodiment of the invention shown, the magnetic devices B are mounted on a strap or band 14 of non-magnetic material which completely surrounds the periphery of the tube. The outer shell 10 of the tube A is formed preferably of a non-magnetic material.

Obviously, any other desired arrangement may be provided for mounting the magnetic devices B than the one shown. For example, the devices B may be mounted in the housing in which the tube A is mounted or the devices may be mounted directly on the tube A by means of an adhesive or the equivalent.

In the embodiment shown, each magnetic device B is comprised of a base 20 of non-magnetic material having a pair of openings 21 through which fastening means 22 may extend for fastening the device to the strap 14, and a pair of permanent magnetic members 24, 25 held in superimposed spaced opposed relationship by a compression spring are mounted on the base 20 by a sleeve 26 extending through an opening in the base 20 and the magnets 24, 25. The ends of the sleeve are reduced in diameter to receive washers 30, 31 and are then flared over as at 28, 29 to maintain the assembled relationship.

The spring 33 is in the form of a washer having outwardly extending arms 34, 35 biased downwardly and upwardly respectively and is preferably keyed to the sleeve 26 by means of a tab 37 extending into a corresponding groove in the surface of the sleeve 26.

The magnets 24, 25 may be of any known permanent magnetic material such as the various Alnico alloys, the various known ceramic magnetic materials and may be molded to the shape shown and bonded into such shape either by a sintering process, use of a plastic binder or the like. The magnetism may be induced therein during the molding process or after as is conventional.

In the preferred embodiment, the magnetic numbers 24, 25 are each of the same diameter and are in the form of a flat circular disk with the magnetic pole being in the plane of the disk. Thus, as shown in Figure 4, both disks 24, 25 have a north polarity over approximately 180 degrees of their circumference and a south polarity over the opposite like amount of the circumference. The pole strength tapers off gradually to a point 40 of neutral polarity as is indicated by the height of the letters indicating polarity. The edges of the disks 24, 25 may have suitable indicia 38, 39 respectively to indicate the center of and polarity of each pole. Thus, the indicia 38 may be one color or texture to indicate a north pole and the indicia 39 a different color or different texture to indicate a south pole.

It will be noted from Figure 3 that the indicia 38, 39 are oriented one from the other. Each disk 24, 25 is rotatable in its plane about the axis of the sleeve 26 and by so rotating the disks, the orientation of the pole of each may be adjusted either relative to each other or to the television tube A.

Obviously, when the north poles are adjacent each other, the magnetic strength of the two disks will add to each other. If oriented 180 degrees from each other so that a north pole is adjacent to a south pole, the external magnetic field of the two disks will be substantially cancelled. The external magnetic field may obviously be adjusted by any intermediate relative orientation of the magnetic poles.

With magnetic poles oriented as above indicated, both disks are simultaneously adjusted to provide the desired magnetic polarity for the television tube A.

It will be noted that the arrangement for mounting the disks 24, 25 on the base 20 assists in the making of such adjustments. The sleeve 26 is rigidly held to the base 20 and the spring is keyed to this sleeve. Movement of one magnet does not effect the position of the other.

Figures 3 and 4 show the disks 24, 25 to be of the same diameter and shape and axial thickness. Obviously, the disks 24, 25 need not be identically dimen-

sioned as is shown generally in Figure 5 wherein the upper or outer disk 25' is of a somewhat lesser diameter than that of the lower disk 24. Normally, the disk 25' will then have a lesser total magnetic force than that of the disk 24 and even when a north and south pole are adjacent each other, the external magnetic field of the lower disk 24 will not be entirely neutralized. The relative axial thickness and spacing of the two disks may be varied as desired to be either greater or less than that shown.

Furthermore, the members 24, 25 have been shown as being circular in elevational view. Obviously, the members could have any other extrenal shapes such as rectangular, square, octagonal or the like. Also the disk 25 could be cup-shaped so as to fit over the outer edge of the disk 24 or vice versa. Adjustment of the disks is more difficult but a more complete neutralization or a stronger overall external field can be obtained.

The invention has been described with reference to a preferred embodiment. Obviously, the invention may take physical form in other arrangements differing radically from the embodiment herein described. It is my intention to include all such embodiments insofar as they come within the scope of the appended claims.

Having thus described my invention, I claim:

1. In combination with a television picture tube having a viewing screen a plurality of magnetic devices positioned around said tube adjacent to said screen, each device being comprised of a plurality of magnets in superimposed close-spaced relationship and magnetized in a plane perpendicular to a radial line through the center of said viewing screen, each magnet being independently adjustable about such radial line.

2. In combination with a television picture tube having a viewing screen a plurality of magnet devices positioned around the edge of said tube adjacent to said screen, each device being comprised of a pair of superimposed close-spaced permanent magnets each magnetized in a plane perpendicular to a radial line through said screen, each being independently rotatable about such radial line.

3. In a magnetic device for providing an adjustable strength and polarized magnetic field about a television viewing screen, a pair of magnets in superimposed relatively close-spaced relationship and each adjustable relative to the other about an axis, each member being magnetically polarized in a plane perpendicular to said axis.

4. A magnetic device comprised of a pair of bi-polar magnets in superimposed close-spaced relationship, means mounting said magnets for either relative adjustment in the plane of the poles or for simultaneous adjustment of the plane of said poles.

5. A magnetic device for providing an adjustable strength and polarized external magnetic field comprising in combination a base, a first magnet, a second magnet having a parallel plane of polarization to said first magnet, means mounting said magnets in superimposed spaced relationship on said base, friction means permitting said magnets to be fixedly adjusted relative to each other and to said base.

6. The combination of claim 4 wherein said magnets are in the shape of flat disks and are edge magnetized.

7. The combination of claim 1 wherein indicia are provided on the surfaces of said magnets to indicate the magnetic polarity thereof.

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