

# The Gramophone Pick-up

## How it May be Used

(By "MEGOHM")



PROVIDED that a good amplifier is in use on the radio receiver, reproduction of gramophone records upon the loudspeaker is now an easy matter, and involves practically no expense beyond the purchase of a pick-up to attach to the gramophone. Those who do not already possess a gramophone may, through the medium of a pick-up and the audio amplifier, provide themselves with a satisfactory substitute at comparatively low cost.

Any turn-table that is regulated by a governor may be used in connection with a pick-up, and may be quite capable of giving the best reproduction that may be obtained from the amplifier, as it is upon this latter that the quality of the music depends, provided, of course, that the pick-up is one of recognised merit.

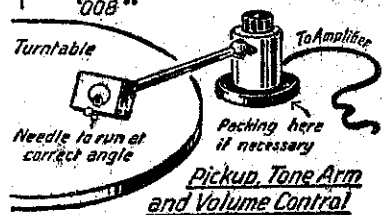
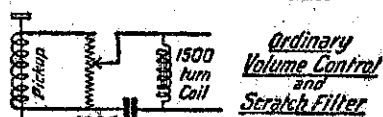
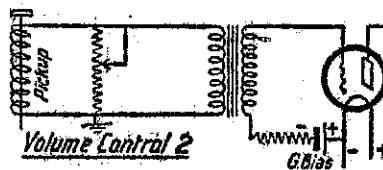
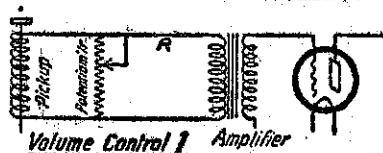
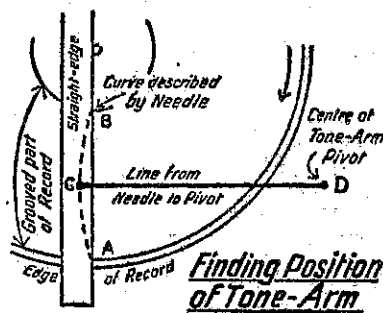
Some pick-ups now on the market may be obtained with or without tone-arm, the latter in many cases being accompanied by a volume control, which is a variable high resistance suitably connected. If the tone-arm type is purchased, the arm may be fastened in position on the gramophone, leaving the original tone-arm in place, to be turned back out of the way. The correct position for the tone-arm must be properly determined, or else the wear of records may be excessive, and reproduction may not be the best possible.

The method of placing the tone-arm is to lay a straight-edge upon the turntable, with one edge touching the central spindle. One of the largest records to be used must be upon the turntable, and the beginning and finishing positions of the music noted, as at A and B. Half-way between these two points (C), a line is drawn at right angles to the straight-edge, and carried out in the direction of D. A needle is now placed in the pick-up, and the tone-arm pillar moved along the line C D until the needle rests upon the central line at a point C on the straight-edge, that allows it to swing in an arc from A to B, the extreme points of the recording grooves, as shown in the diagram. The tone-arm is then secured in position with screws. When finding position the needle must be kept at its correct angle, and the tone-arm must be adjusted if necessary, with packing, so that it is the correct height to allow of the needle running at the proper angle.

If the pick-up unit alone is purchased, it will fit into the head of tone-arm instead of the regular reproducer. Some units are provided with two removeable sockets, each a different size to fit standard tone-arms.

Any ordinary gramophone needle is used, but some users may prefer to avoid constant changing by employing one of the semi-permanent type which play about two dozen records.

Constructors who are fixing up their turn-table movement may in some cases make a special tone-arm. Failing one of metal, this may be of wood, but should not be less than one inch square, otherwise rigidity will be lost. Such a tone-arm may be rather longer than the usual gramophone arm—say, 12 inches from needle to point of rotation.



Pick-ups generally weigh about five ounces, and this weight is usually allowed to rest upon the record, but where it is considered that the weight is more than is advisable for the life of the record, some kind of spring or counter-weight may be employed to take a little of the weight off the record. This, however, must not be carried too far, or the deep notes will not be reproduced correctly, and if the pressure is much too light, general quality suffers badly.

When a pick-up is attached to the ordinary gramophone tone-arm, it has a deceptive appearance with regard to finding the position for their attachment to the top of the cabinet. A straight line joining the needle to the centre of the tone-arm pivot must be considered as the tone-arm, ignoring any curves or turns constituting its actual shape. In constructing a tone-arm the pick-up must be attached at such an angle that fixes the case at right-angles to a line drawn from the needle to the pivot of arm.

### Connections and Volume Control.

THERE are two ways of connecting a pick-up to a broadcast receiver. The usual method is to connect the two leads either direct to the primary of the first audio transformer, or in an indirect way by means of an adapter, sometimes supplied, which plugs into the detector socket instead of the valve.

The alternative method is to connect the pick-up unit to the grid of the detector valve, conveniently by a flat adapter which connects to the grid and filament negative prongs, after which the valve is inserted in its socket. This method makes use of the detector valve as an amplifier, and so will give added volume, but on the other hand, the low frequencies (deep notes) will not be reproduced so well by this arrangement, as the presence of the valve causes the pick-up to give more output at the high frequencies, and thus amplification is rendered uneven.

Needless to say, if reproduction is equal or beats that of a good gramophone, the amplifier must be a good

one; it must give fairly even amplification throughout the musical scale, and must be capable of reproducing well the lower frequencies. The same remarks will apply to the loudspeaker, which should be a good cone or dynamic.

If a volume control is already provided on the amplifier, it may be used to regulate the gramophone music, unless it is desired to locate the gramophone away from the amplifier, perhaps in another room. In such case a volume control may be provided at the machine.

When running pick-up leads for distant operation, care must be taken to avoid running them near to the loudspeaker leads, otherwise a whistle or howl, caused by interaction, will be set up. Pick-up leads may be 26's to 30's d.c.c.

It is quite probable that a pick-up will give highly satisfactory results without either compensating resistances or scratch-filter, but the methods of utilising these are given to enable experimenters and others to deal with extreme cases.

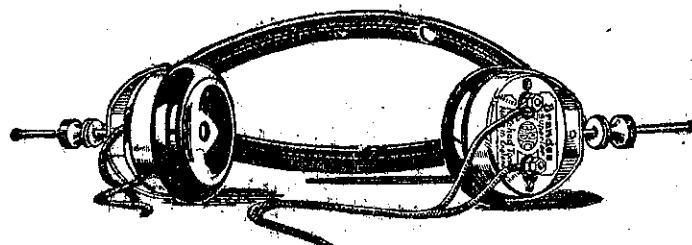
### Compensation Methods.

VOLUME control in direct connection with the pick-up may be effected in different ways, with particular regard to suiting the actual pick-up to be used. These methods are illustrated in diagrams. The first shows how amplification may be to some extent evened up when the first transformer has a high peak, that is, gives emphasis to the high audio frequencies.

With a volume control of comparatively low resistance, say 10,000 ohms, the pick-up will not respond well to high frequencies, and the lower this resistance, the less will be the response. The peak of the transformer is then relied upon to restore the weakened high frequencies instead of over-emphasising them.

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