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R. MANNL

1,891,332

RONTGEN DIAPHRAGM

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Fig. 1

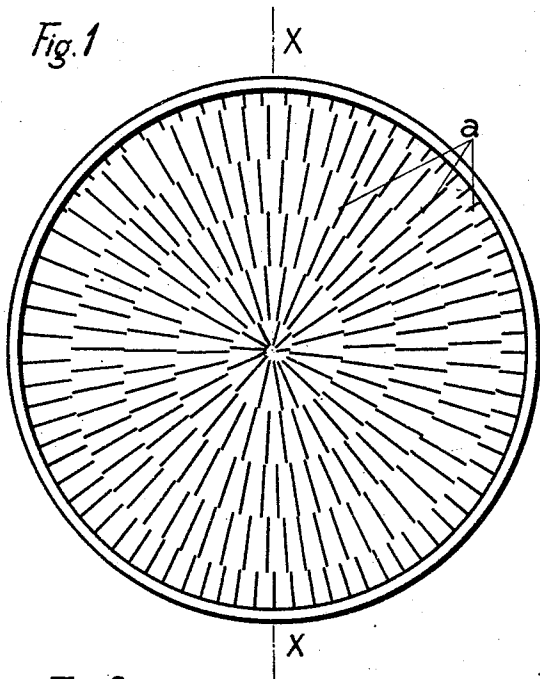


Fig. 2

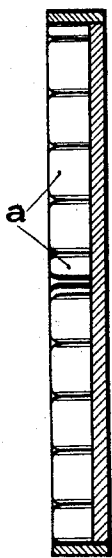


Fig. 3

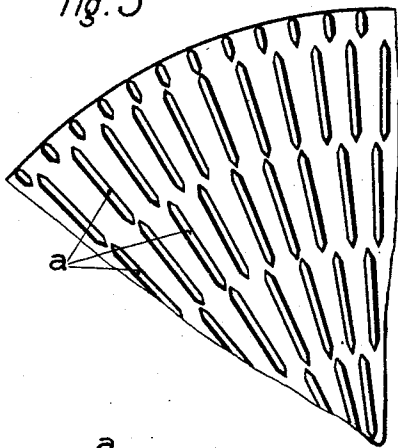


Fig. 6

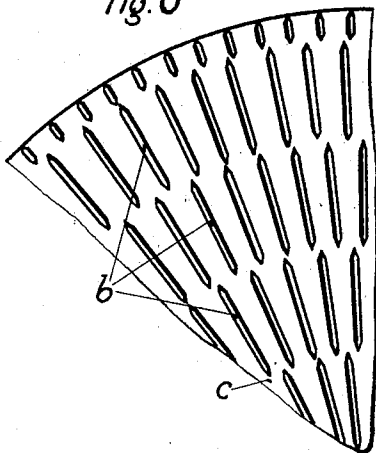


Fig. 5

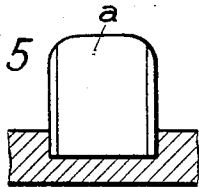


Fig. 4

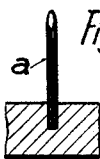


Fig. 7

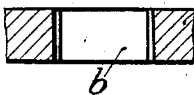
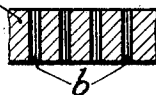


Fig. 8



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UNITED STATES PATENT OFFICE

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RÖNTGEN DIAPHRAGM

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My invention relates to a Röntgen-diaphragm having partition walls which are radially directed toward a common center or focus and are so arranged, that their screening effect over the whole area of the diaphragm is uniformly distributed.

There already exist Röntgen-diaphragms, capable of screening the interfering secondary rays, and showing a radial or star-shaped arrangement of the partition walls. Such diaphragms, as compared with other diaphragms, have the advantage that they can be used at any desired distance from the Röntgen tube, but their drawback is the non-uniform distribution of the partition walls over the area of diaphragm, there being too few at the periphery and too many at the center of the diaphragm, with the result, that the center of the diaphragm has more shadow than the portions near the periphery.

Now, according to the present invention, I use, instead of long radial partition walls for each radius, only short lengths, or parts which I arrange in such a way that they are uniformly distributed over the whole area of the diaphragm, preferably converging toward the center of the diaphragm.

In order to obtain this uniform distribution, I space the short parts equally apart. At the center of the diaphragm, some of the short parts or walls may assume a star-shaped formation, other parts or walls extending into the open spaces between said parts so as to produce the same shading effect in the center as near the periphery of the diaphragm.

Obviously, instead of such separate parts, acting as barriers against the lateral secondary rays, there may also be used slits provided in plates made of a Röntgen-rays absorbing material and arranged in the same way as the said parts or walls.

While the material between said slits would absorb comparatively many primary rays, the slits themselves would permit a high screening effect of the diaphragm, which arrangement may be useful in cases, such as researches concerning technical materials, where the time of exposure is of no importance. Since such slits form light-shafts,

which are not only limited in a radial direction, the total amount of brightness behind the diaphragm is reduced at short distances from the anticathode. However, this drawback is not great, provided that according to the invention—preferably long radially directed slits are used. The presence of not radially directed walls constitutes a permissible inaccuracy in the practice of this invention, the underlying principle of which may be modified, also where radial walls are used, in that, for instance, instead of walls of narrow rectangular contour also walls of T, H or O shape may be employed as long as the radially disposed portions predominate which is proved by the diaphragm being also available for use at short distances from the source of light. The invention requires such an arrangement of the walls or parts on the diaphragm, that the central and the peripheral edges of the walls are placed at different distances from the centre, so as to prevent their shadow circles from being formed into darker rings. Diaphragms, in accordance with the present invention, notwithstanding the large number of their elements will hardly produce any concentric bands on the field of vision. With a view to eliminate said bands even more thoroughly, the invention provides walls having tapering central and peripheral edges through which the primary rays can partially penetrate so that but an indistinct demarcation of the elements results. In a similar way, the said slits may also be formed with tapering peripheral and central edges, so as to prevent a sharp, distinct shadow circle causing demarcation.

It is of no consequence as far as my invention is concerned, in which way the elements for screening the secondary rays are produced or secured to the diaphragm, nor how the slits in the rays absorbing plates are produced.

In the annexed drawing showing schematically some examples how to practise my invention, Figure 1 shows an arrangement of the partitions or walls around a joint centre. It appears from the figure, that each of the elements is placed at a different distance from the centre and that it is uniformly spread from the adjacent elements. This manner of

distribution, for instance, results in a spiral arrangement. However, this spiral arrangement is not of any consequence, since any other mode of arrangement may be used without a departure from the principle of my invention. Fig. 2 shows a section along line $x-x$ in Fig. 1, while Fig. 3 shows a fragment of a diaphragm-plate on an enlarged scale. Figs. 4 and 5 are side and elevational views respectively of a partition wall. Fig. 6 is a fragmentary view of a modified diaphragm, which consists of a plate c containing slits b , while Figure 7 is a longitudinal and Fig. 8 is a transverse section through a portion of that plate.

The tapering of the edges of the partition walls is clearly shown in Fig. 3. Of course, a series of several diaphragms may be disposed one behind the other.

I claim:

1. A Röntgen diaphragm comprising a plate of ray pervious material and a plurality of short straight screening elements of ray impervious material mounted thereon, said screening elements being distributed over substantially the entire surface of the plate in substantially end to end and side to side spaced relation with the side to side spacing of all of the elements being substantially equal.

2. A Röntgen diaphragm as set forth in claim 1 in which the ends of the screening elements are tapered.

In testimony whereof I affix my signature.

RUDOLF MANNL.