

[54] FILMSTRIP

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[22] Filed: Nov. 1, 1967

[21] Appl. No.: 679,886

[30] Foreign Application Priority Data

Nov. 10, 1966 Switzerland16216/66

[52] U.S. Cl.352/37, 352/233, 352/241

[51] Int. Cl.G03b 31/02

[58] Field of Search.....352/26, 27, 37, 59, 81, 83,
352/232, 233, 239, 240, 241

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[57]

ABSTRACT

The invention involves a filmstrip which includes at least one strip of picture film, at least one line of perforations and at least one soundtrack. The filmstrip is dimensioned and arranged so that for a filmstrip width of 35 mm. the picture strip width exceeds 20.9 mm., for a strip width of 17.5 mm. it exceeds 10 mm., and for a strip width of 16 mm. it exceeds 9.7 mm.

2 Claims, 10 Drawing Figures

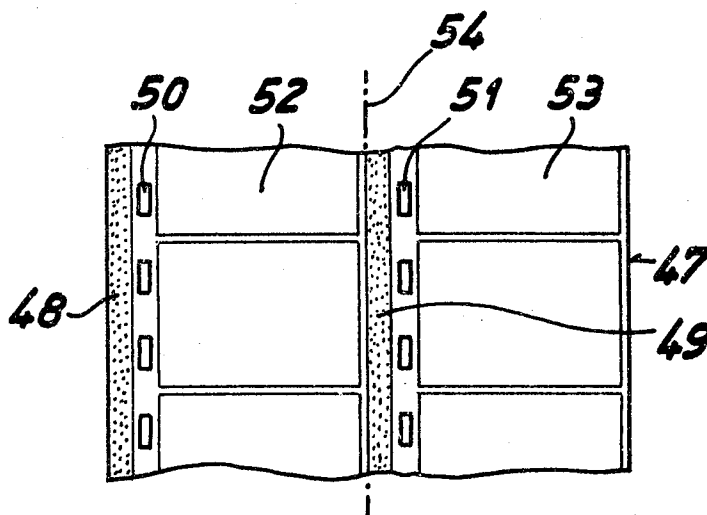


Fig.1

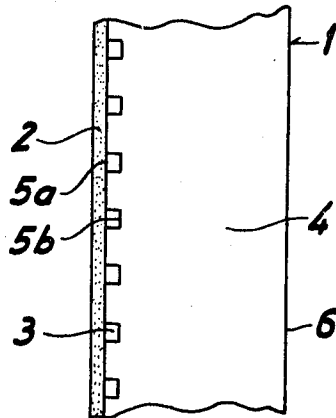
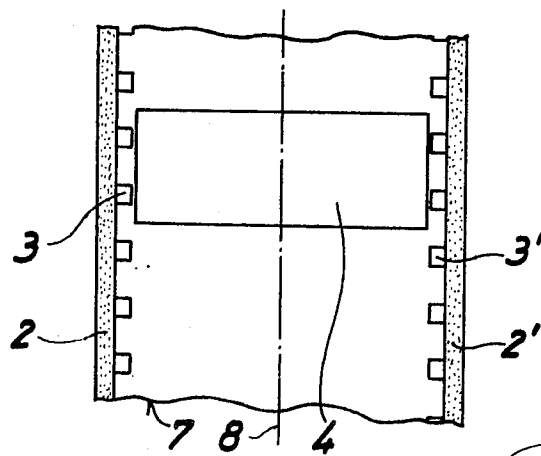
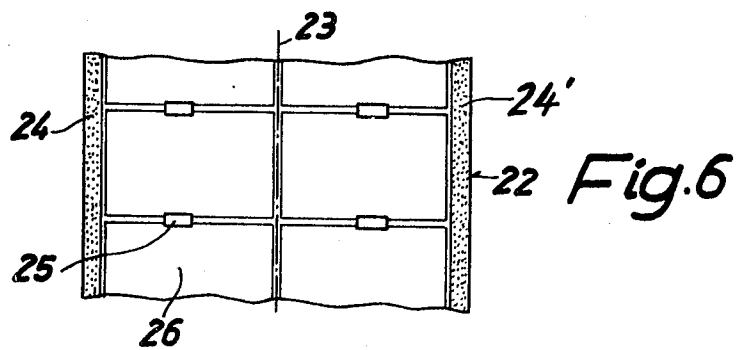
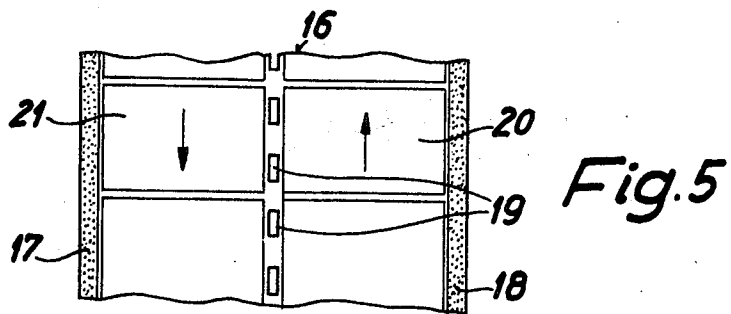
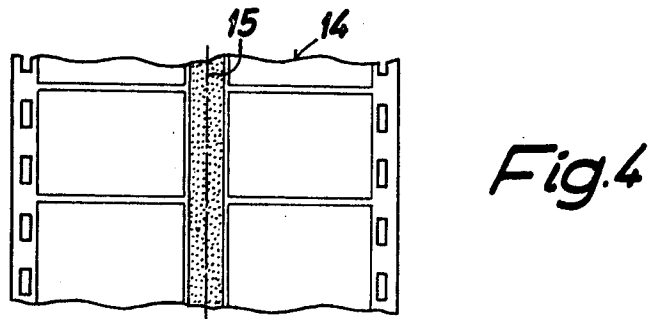
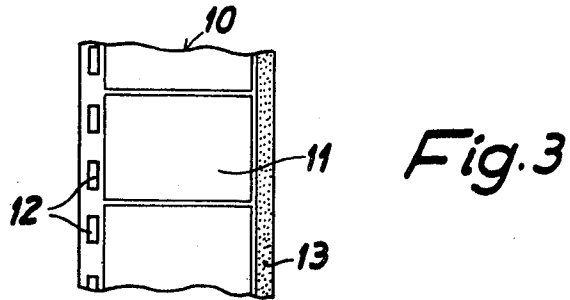


Fig.2



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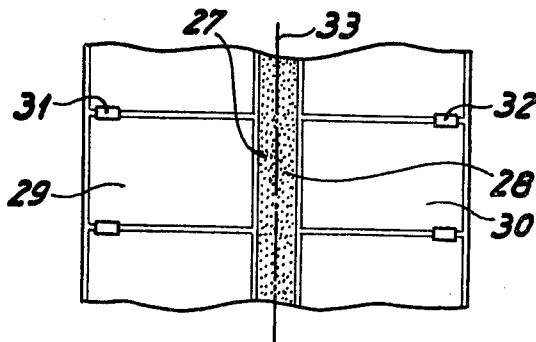


Fig. 7

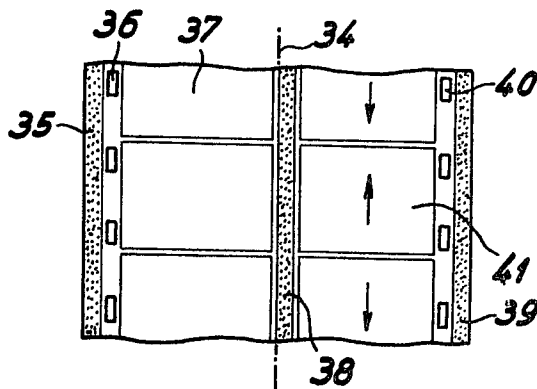


Fig. 8

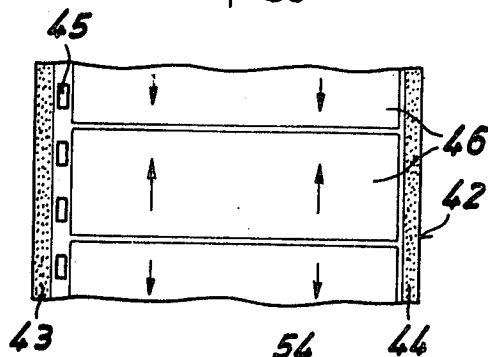


Fig. 9

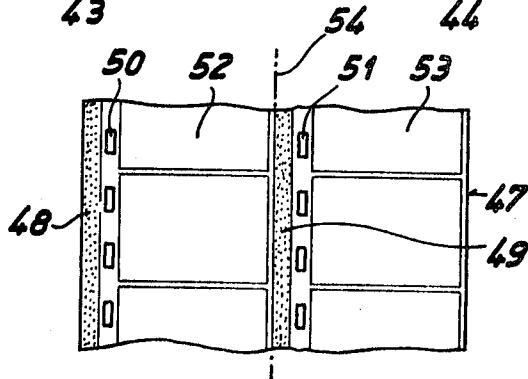


Fig. 10

FILMSTRIP

This invention relates to filmstrip with at least one strip of picture film, at least one line of perforations and at least one soundtrack.

Film projection in medium and small cinemas is encountering ever-increasing staffing problems. Through lack of suitable technicians, insufficiently trained staff are often used, which frequently leads to interruptions in the projection and, in general, to less careful treatment of the film copy. For these and other reasons there have recently been attempts to automatize film projection.

An important condition for easy and complete automation of film projection is, however, that a complete evening's program should, if possible, be provided on a single reel. If one considers that with 35 mm. film such a program may have a length of about 4,000 m. and a weight of some 40 kg., it is immediately clear that the reduction in the weight and length of the copy (down to about 8 kg. and 2,000 m. for the same showing time), need in putting the whole program on a single reel, can only be achieved by reducing the filmstrip width and hence the picture size.

Reduction in the filmstrip size, however, immediately involves the question of adequate picture and sound reproduction.

As far as picture reproduction is concerned, i.e., the bright illumination of a sufficiently large screen area, Xenon lamps certainly provide light sources for very high intensity projection. However, with the small picture dimensions of 16 mm. narrow film not even the light intensity of a 900 watt lamp can be fully utilized. The magnification of a filmstrip of 7.16×9.6 mm. (picture size in 16 mm. narrow film) to the screen size of a large modern cinema is, therefore, inadequate, because of insufficiently bright screen area illumination, even with the best optical systems.

Similar difficulties arise with sound reproduction if one, for instance, changes from 35 mm. film to 16 mm. narrow film to reduce the weight and bulk of the copy. In view of the reduction in the film length traversed per second because of the reduced picture size, the limiting upper frequency of the photographic or magnetic sound recording and reproduction is so much lowered that sound reproduction is found inadequate by the audience.

To summarize, it is therefore found that known film formats are unsuitable for full automation of film projection while maintaining high-quality picture and sound reproduction, that 35 mm. format because of its weight and volume, and the 16 mm. format because of the inadequate quality of picture and sound reproduction.

The object of the invention is therefore to provide a filmstrip which is suitable for fully automatic projection and also ensures high-quality reproduction of picture and sound.

According to the invention this object is achieved by dimensioning and arranging the perforations and soundtrack so that for a filmstrip width of 35 mm. the picture strip width exceeds 20.9 mm., for a strip width of 17.5 mm. it exceeds 10 mm., and for a strip width of 16 mm. it exceeds 9.7 mm.

It is of primary importance with the filmstrip of the invention that the width of the perforations be considerably reduced as compared with known filmstrips (the openings of which have a width of 2.8 mm. in 35 mm. film), preferably to a value of about 1.4 mm., which is sufficient for effective film feed.

The widening, in accordance with the invention, of the picture width (i.e., the part of the filmstrip containing the pictures) enables a filmstrip of 17.5 mm. width for instance to achieve the picture and sound quality of the previously standard 35 mm. size. The cost of a 17.5 mm. copy in accordance with the invention is, however, only about a quarter of the usual 35 mm. copy cost. The same applies to the cost of a filmstrip provided by the invention for initial shooting.

A complete evening's program may readily be provided on a single reel of the 17.5 mm. film of the invention, so that a single projector suffices for a continuous performance. The transport and storage of copies are also simplified.

In a preferred embodiment of the invention, starting from one edge of the film, we have the soundtrack, the perforations and the picture strip extending from the perforations to the other edge of the film.

In the previous standard arrangement in filmstrip, starting from one edge there was first the perforation at a certain distance from said edge, then the soundtrack, followed by the picture strip. The strip lying between the film edge and the perforations is necessary to prevent the perforations from tearing. However, it appreciably reduces the area available for the picture striping, which is especially disadvantageous with the known 16 mm. narrow films.

With the above-mentioned division of the filmstrip in accordance with the invention, the soundtrack is, however, disposed in a previously unused zone of the film, i.e., the strip between the perforations and the adjacent film edge, needed to achieve sufficient strength in the perforations. Since this strip is now used to take the soundtrack a particularly large width remains for the picture strip.

The broadening of the film picture strip effected by the invention can, however, also be effected (although not quite to the same extent as by the method outlined above) if the picture strip is disposed between the perforations at one edge of the film and the soundtrack at the other edge thereof. In this case the broadening of the picture strip is mainly produced by the reduction in size of the perforations.

These and numerous further details of the invention appear from the following description of same embodiments shown in the drawings.

FIGS. 1-9 show various embodiments of the filmstrip of the invention.

Starting from the left-hand film edge, the filmstrip 1, shown in FIG. 1, has in sequence a photographic and/or magnetic soundtrack 2, perforations comprising rectangular holes 3 and a picture strip 4 extending from these perforations to the other edge 6 of the film. The long sides 5a, 5b of perforations 3 run longitudinally of the film.

Soundtrack 2 has a width between 0.5 and 4 mm., sufficient for photographic or magnetic sound recording. A zone 2.5 mm. in width is preferably provided to take the soundtrack. The perforations 3 are preferably 1.4 mm. wide.

Proceeding from these preferred dimensions (width of zone for taking soundtrack 2.5 mm. and width of perforations 1.4 mm.), the following examples clearly show the increase in the film pictures achieved by the invention:

EXAMPLE I

A 16 mm. narrow film of standard type has a picture size of 9.6×7.16 mm. The picture area is therefore about 69 mm.². A good screen image of about 3×4 mm. size can be projected by using a specific light source.

A 16 mm. narrow film in accordance with the invention, having room to take a photographic soundtrack, has, however, a picture size of 12.1×7.16 mm. with an area of about 87 mm.². By using the same light source there may thus be projected an appreciably larger and well-illuminated screen image than with the known 16 mm. narrow film.

If there is no photographic sound reproduction and a narrower strip of about 0.6 mm., adequate for magnetic sound recording, is provided, the picture area can be even more increased.

EXAMPLE II

A standard 35 mm. film has a picture of 15.2×20.9 mm. with an area of about 318 mm.².

On dividing a 35 mm. film in accordance with the inventions as in FIG. 1 and choosing a marginal zone 2.5 mm. wide to take the soundtrack and a perforation width of 1.4 mm., a picture 19×31.1 mm. is, however, obtained, with an area of 590 mm.². A considerably greater image area can thus be illuminated on the screen, with the same light source, than with previously used standard film.

FIG. 2 shows a starting filmstrip with a width of 35 mm. for making two filmstrips as in FIG. 1, each with a width of 17.5 mm.

On the starting filmstrip 7 a soundtrack 2, 2' is provided at each edge, and adjacent each are perforations comprising holes 3, 3'. The film picture strip 4 (2 pictures) is disposed between the two perforations.

The dimensions are preferably selected as follows: 2.5 mm. from the edge of the perforations, perforation width 1.4 mm., perforation height 1.98 mm., spacing between perforation centers 4.75 mm.

The two 17.5 mm. wide filmstrips formed by dividing along line 8 then have picture sizes of 9.5×13.6 mm. (area 129 mm.²), which with currently available light sources gives brilliant illumination of the standard projection screen. The area of a picture filed is thus almost twice as big as with the known 16 mm. film referred to in example 1.

In this 17.5 mm. filmstrip provided by the invention, the frame gauge is preferably 9.5 mm., so that with projection of 24 frames per second, the soundtrack speed is about 23 cm./sec., which permits good sound recording and reproduction.

In this way the picture and sound quality of the previous standard 35 mm. size can be provided by the 17.5 mm. size provided by the invention, at a fraction of the weight and bulk of the usual copy.

FIGS. 3-9 show further embodiments of the invention.

In the filmstrip 10 of FIG. 3, the picture strip 11 is positioned between the perforations 12 provided at one edge of the film and the soundtrack 13 at the other edge thereof. If the marginal zone for taking the sound track is given a width of 2.5 mm., the perforation width is 1.4 mm. and these holes are 0.8 mm. from the edge, a width of 12.8 mm. is available for the picture strip with a film width of 17.5 mm.; a width of 11.3 mm. with a film width of 16 mm.; and a width of 30.3 mm. with a film width of 35 mm. For a frame height of 9.5 mm. the distance between perforation centers is preferably 4.75 mm.

FIG. 4 shows a starting filmstrip 14 for making two strips as in FIG. 3 by cutting along the centerline 15. As with the other embodiments, the cutting of this starting film strip may take place before or after exposure. It is preferably effected after the film is developed and dried.

In the embodiment in FIG. 5 the two edges of film strip 16 each have a soundtrack 17, 18, with perforations 19 in the film center (they may also lie at the picture filed corners) and between perforation 19 and each of soundtracks 17, 18 is disposed a picture strip 20, 21, the two picture strips traveling in opposite directions (see the two arrows) during shooting and reproduction. If the two soundtrack edges are given a width of 2.5 mm. each, and the perforations a width of 1.4 mm., a width of 14.3 mm. each is available for the two picture strips with a film 35 mm. wide.

FIG. 6 shows an embodiment wherein the filmstrip 22 can be cut along centerline 23, with each of the resulting filmstrips having a soundtrack 24, 24', perforations 25 and a picture strip 26. In this embodiment the perforations 25 are not placed laterally adjacent the picture areas, but between each frame.

In this embodiment as also in all those previously described, the frame gauge is preferably a whole-number multiple of 2.375 mm. or of 1.905 mm.

FIG. 7 shows an embodiment of a 35 mm. wide film strip having two soundtracks 27, 28, two picture strips 29, 30 and two rows of perforations 31, 32. In this case the perforations are adjacent the outer corners of the individual picture frames. If the zone intended to take the two soundtracks is given a total width of 5 mm., then 15.0 mm. is available for the picture frames. The gap between perforation centers and the

frame height are both preferably 9.5 mm. The filmstrip of FIG. 7 can be divided into two 17.5 mm. films by cutting along line 33.

FIG. 8 shows a 35 mm. filmstrip which can be divided by cutting along line 34 into two 17.5 mm. filmstrips of differing subdivisions. The left-hand filmstrip has a sound track 35, perforations 36 and a picture strip 37 (arranged as in FIG. 1), the picture strip width being 13.6 mm. The frame gauge is 7.125 mm. giving a height/side ratio of 1:1.9. Distance between perforation centers is 4.75 mm.

The film strip made from the right-hand half of the starting strip shown in FIG. 8 has, however, two soundtracks 38, 39, perforations 40 and a picture strip whose individual frames seen in opposite directions during shooting and reproduction, in each case skipping the adjacent frame (one sound track is associated with each arrowed direction). If the two soundtracks are each made 2.5 mm. and the perforations 1.4 mm., the picture width becomes 11.1 mm., which with a frame height of 7.125 mm. gives a height/side ratio of 1:1.56.

FIG. 9 shows a film strip 42 having two soundtracks 43, 44, perforations 45 and a picture strip 46. As indicated by the arrows, successive picture areas are exposed and projected in opposite traveling directions of the edge zones for taking the two sound tracks and each has a width of 2.5 mm.; the perforations have a width of 1.4 mm., with a width of 28.6 mm. being available for the individual pictures which, together with a frame gauge of 9.5 mm., gives a height/side ratio of about 1:3.

Finally, FIG. 10 shows an embodiment of a filmstrip 47 having two soundtracks 48, 49, two lines perforations 50, 51 and two picture strips 52, 53. By cutting along line 54 the filmstrip 47 can be divided into two identical film strips in accordance with the invention (corresponding to FIG. 1).

While in the previously described embodiments the longer side of the frame rectangle lies transversely of the filmstrip, the scope of the invention includes film wherein the longer side of the rectangle lies parallel to the film strip.

In that case the width of the frame is preferably 13.6 mm. and the height 19 mm. The film can then have basically the division of FIG. 2, but with the long sides of the frames running parallel to the film strip.

With such filmstrip a very large screen may readily be brightly illuminated, with 50 percent of the copy costs being saved as compared with standard 35 mm. film. The length of photographic soundtrack per frame does not have to be reduced, so that no deterioration of sound quality can occur.

Finally, the filmstrip of the invention can be used with the so-called three-D process, wherein two pictures are taken adjacent each other amorphaically (i.e., with deliberate distortion).

That which is claimed is:

1. A longitudinally divisible picture filmstrip having a longitudinally extending soundtrack located adjacent an edge of said filmstrip, an array of perforations extending longitudinally adjacent said soundtrack, a picture area located adjacent to the perforations, a longitudinally severable line extending adjacent to said picture area at the midpoint of said picture strip, a second longitudinally extending soundtrack adjacent said severable line on the side opposite side picture area, a second array of perforations extending longitudinally adjacent said second soundtrack and a second picture area located adjacent said second array of perforations and occupying the remaining space.

2. A picture filmstrip as claimed in claim 1, having a width of 35 mm. and in which the width of each perforation is 1.4 mm., the width of each soundtrack is between 0.5 and 4 mm. and the width of each picture area is between 15.6 and 12.1 mm.

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