

OFFSET PROJECTION

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When a projecting machine is set in any other position than directly opposite the center of the picture screen, in other words, when the projecting machine is "offset" from the center of the screen, certain highly undesirable effects are produced in the picture. These undesirable effects are of two kinds, first, blurring of certain edges of the picture and, second, distortion of the objects appearing on the screen.

Taking up the first of these effects, blurring of the edges, this is seen to be due to the fact that one edge of the screen is further from the lens than the other edge, and, consequently, if any chosen part of the picture is "focused" clearly on the screen other parts of the picture must, of necessity, be "out of focus." When the "offset" of the projecting machine from the screen center is not greater than, say, 5° to 10° then the blurring effect is not particularly noticeable, but when, as in some theatres in present use, the angle is as great as 35° it is utterly impossible to produce a clear picture of any attractive size.

The second of the ill effects of "offset" projection, the distortion of the objects shown, is due to the fact that the light beam coming from the projection machine to the screen is cone shaped and grows rapidly larger in area as the screen is approached. Consequently, if a section is taken through such a light cone at an angle, then, since one edge of the section plane cuts a narrower part of the beam than the other edge, it follows that one edge of the picture will be larger than the other; and further, since the further the cutting section is taken from the lens the larger the projection is, it follows that the same object moving to different positions in the picture will undergo a change in size.

Considering now a special case, which is perhaps the most common case of "offset projection," let us consider that the projecting machine is placed in the balcony of a theatre directly in line with the center of the screen on the stage but considerably above it. Then the light cone will come down to the screen and strike at an angle and the following undesirable effects will be apparent:

1. The top and bottom of the picture will be blurred while the middle will be clear.
2. A body moving from the top to the bottom of the picture will become considerably larger.
3. All vertical objects will be large at the bottom and small at the top—for instance, a man will have big feet and a small head.
4. All objects will be abnormally tall.

When the projecting machine is horizontally in line with the center of the screen but a considerable distance to one side or the other of it, then the same distortions are present in the picture, but with some difference, as follows:

1. The sides of the picture will be blurred while the middle will be clear.
2. A body moving from one side to the other of the picture will become larger or smaller.
3. All horizontal objects will be larger at one end than at the other.
4. All objects will be abnormally long.

In some theatres the projecting machine is offset both horizontally and vertically, in which case the picture shows evidence of both kinds of distortion described in the special case above.

There have been certain attempts made to correct the bad effects of "offset projection" but, owing to the fact that offset projection is basically wrong, these methods have proved far from successful. These corrective methods consist in:

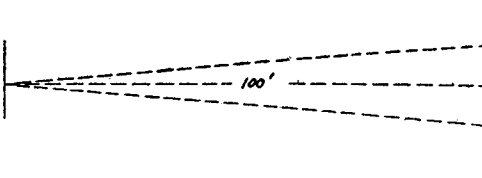
1. Filing the aperture plate of the projecting machine, and thus giving the light cone a distorted shape previous to its reaching the screen—the result of this distortion and the natural distortion being neutral and thus having a picture with a correct border line. **But, it should be noted that this method does not in any way correct the distortion actually within the border.**
2. Showing a small picture high upon the screen. The disadvantage of this method is apparent.
3. Tipping the screen one way or the other. This method makes the picture hard on the eyes of the audience and is, consequently, little used.

In conclusion it may be stated that there is at the present time only one way of preventing the ill effects of "offset projection" and that is to eliminate the "offset," in other words, to place the projecting machine nearly opposite the center of the screen.

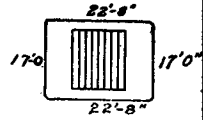
OFFSET PROJECTION
EFFECT ON PICTURE

DWG. No. 200-1

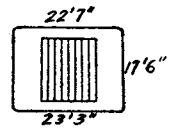
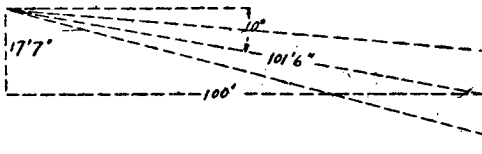
Picture Projected Horizontally



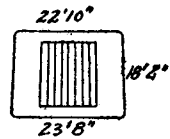
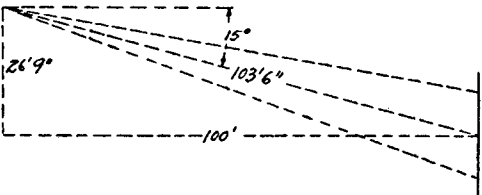
Picture Shape Rectangular



Picture Projected 10° Down from Horizontal

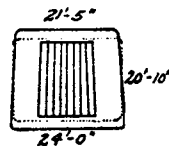
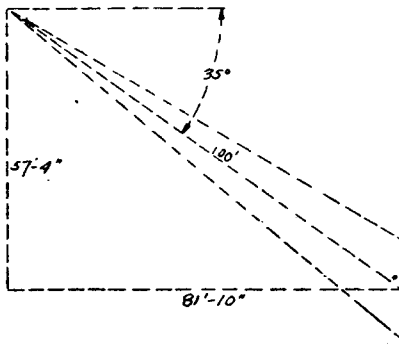


Picture Projected 15° Down from Horizontal



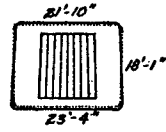
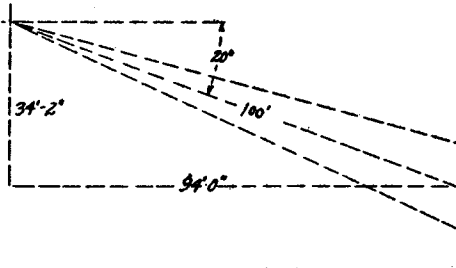
Picture Projected 35° Down from Horizontal

DWG. No. 200-3

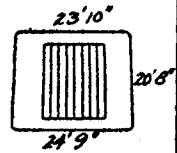
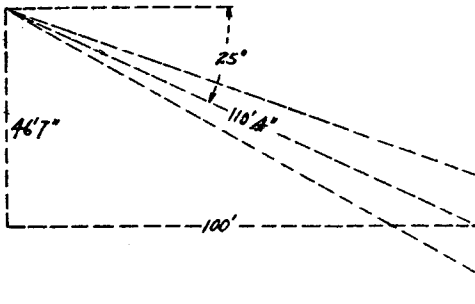


Picture Projected 20° Down from Horizontal

DWG. No. 200-2



Picture Projected 25° Down from Horizontal



Picture Projected 35° Down from Horizontal

