

rays from the condenser lens pass through the light-valve ribbon opening and strike the glass refractor plates at an angle. The rays are then refracted toward the normal, depending upon the angle of the plate and its index of refraction, and emerge from the other side of the refractor plate at the same angle at which they entered, but displaced in the vertical plane, provided the sides of the refractor plates are optically parallel to each other. Thus the objective lens sees the two halves of the light-valve ribbon openings as if they were in line.

The magnetic flux for the ribbon air-gap is supplied by two permanent magnets made of "Alnico." This material is an alloy of iron, aluminum, cobalt, and nickel, and has the characteristic of very high retentivity along with high magnetomotive force, the latter determining the value of light-valve sensitivity.

Stringing and adjusting the ribbons of this new type of light-valve is reasonably simple. As already mentioned, separate screw adjustments are provided for spacing and tuning each ribbon independently, even after the light-valve is completely assembled.

The entire light-valve and double-magnet assembly is quite compact, as shown in Fig. 7. The overall dimensions of the unit are 1.4 inch wide, 1 inch thick, and 4 inches long overall. The overload point is about 9 db. above 0.006 watt, and the closure current approximately 170 milliamperes per ribbon. Field tests under actual operating conditions have shown this type of valve to be very constant in performance and easy to maintain in proper adjustment.

A BASICALLY NEW FRAMING DEVICE FOR 35-MM PROJECTORS*

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The motion picture projection machine has undergone fewer radical changes and improvements than perhaps any other mechanical electrical device in daily use by so many thousands. This is due partly to the fact that the old designers did a very good job so that radical improvements seemed improbable. However, any mechanical contrivance or machine that has suffered no changes except refinements in 15 to 20 years can hardly be expected to be a really modern machine.

With this thought in mind we have developed not only an improvement, at least so far as simplicity and cost are concerned, but quite a novel and unique application of a silent chain drive, which so far as we or the manufacturer of the chain know, has not been made before.

The feature of the device lies in changing the course of the chain without affecting the shutter. Both shutter and sprocket are motivated by the same chain (Fig. 1).

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Our original idea of about three years ago was to frame the intermittent sprocket straight up and down below the aperture, which worked out very satisfactorily in hundreds of machines in all parts of the world. Another advantage of the first model was that by removing three screws the entire intermittent assembly can be exchanged or replaced practically between reels.

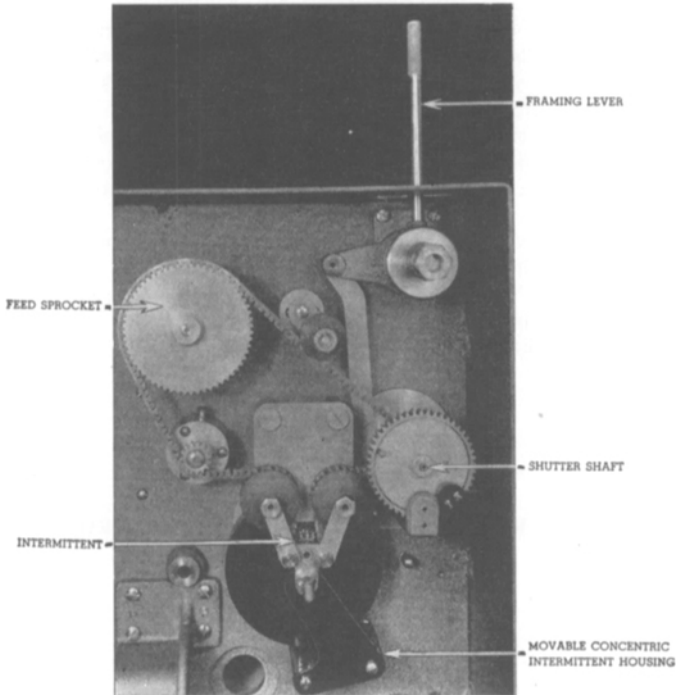


FIG. 1. Framer in neutral position; moving lever to the right moves film up, and *vice versa*.

The only disadvantage of this framing method, if it can be called a disadvantage, was that when the intermittent sprocket was positioned all the way down (which, of course, is not necessary when threaded by a good projectionist), it left a space of the height of one frame between the aperture plate and the sprocket, which might cause some film to buckle slightly at that point by slightly overthrowing the film.

When this was called to our attention this objection was overcome by a slightly different application of the same basic principle. The revolving intermittent sprocket framer was arranged as in Fig. 2. Note that at the point indicated by the arrow, there is no possibility of film buckling, as the sprocket always remains close to the gate, regardless of the position of the film.

This particular type of chain drive thus achieves freedom from film buckling while framing, and also removes the possibility of the shutter's being put out of synchronism with the film. In addition, the cost of manufacture is cut to the minimum.

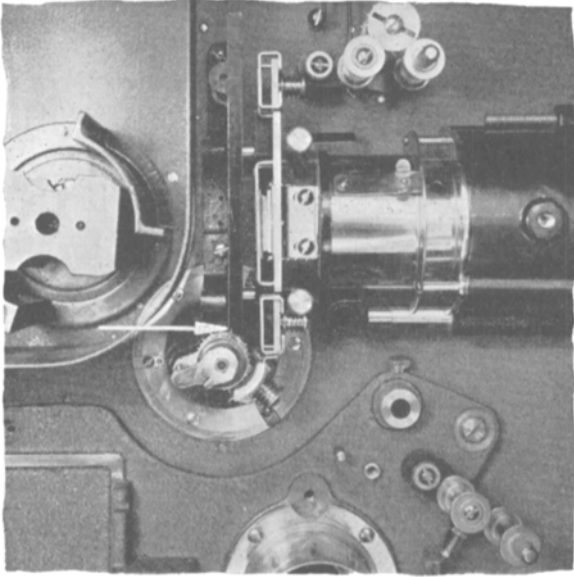


FIG. 2. Showing arrangement of intermittent sprocket framer.

The advantage of the silent chain drive is perhaps best attested by the fact that the Ford Motor Company, like Cadillac, Chrysler, and other automobile manufacturers, use silent chains for driving cam shafts, which is perhaps the most particular job on an automobile engine.