Provision is made for connecting a microphone to the amplifier input so that the operator may make announcements to the audience.

The use of a special low-current sound exciter lamp makes it feasible to supply this lamp with rectified and filtered current from the amplifier power supply. Thus a non-pulsating light-source results without the use of bulky and expensive auxiliaries.

Conclusion.—No quality feature has been omitted in the design of this projection equipment. High-power illumination and high-quality sound of great volume have been obtained with equipment of smaller size and weight than any heretofore designed; more important, these features, plus extreme quietness, have been achieved in a machine that is very rugged and simple.

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THE MAGAZINE CINÉ-KODAK*

O. WITTEL**

The desirability of magazine loading for sub-standard motion picture cameras has long been recognized. The principal advantages are two:

First, the avoidance of a threading operation, with consequent delays when lost time may mean a lost picture, plus the ever-present possibility of failure due to improper threading.

Second, the opportunity that magazines provide for changing quickly from one type of film to another without undue fog, even though the film has been exposed but part way through its length.

Several makes of motion picture camera have been marketed in which the broad principle of magazine loading is employed. Both the advantages inherent in this method of loading were not realized, however, before the advent of the Magazine Ciné-Kodak (Fig. 1).

The Magazine.—The magazine (Fig. 2) holds a net 50 feet of film. Its shell is drawn from 0.020-inch steel to withstand rough handling, and a baked black synthetic lacquer finish is applied to protect it against climatic conditions. The cover is held on with screws, but an adhesive tape acts as a seal against tampering and as an added barrier to the entrance of light. Inside the magazine are the

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driving sprocket, the chromium-plated gate where exposure takes place, a gear-driven take-up, and the necessary studs, guides, springs, *etc.*, to insure the proper running of the film, the maintenance of correct loops, and the recording of steady pictures at speeds varying from 8 to 64 frames per second.

The path of the film can best be understood by examining Fig. 2. It is evident

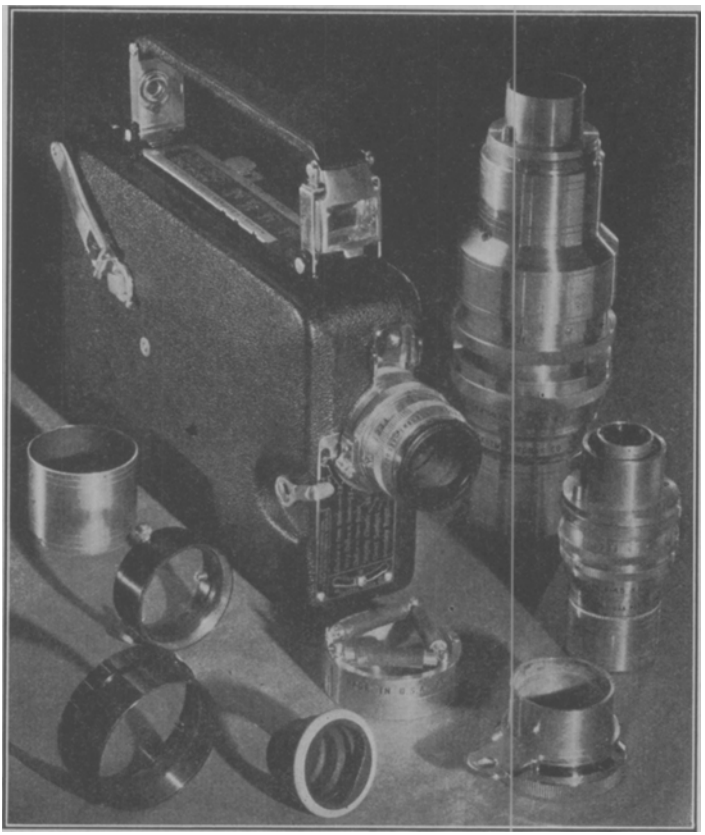

FIG. 1. The camera with an assortment of optical accessories.

that there is no departure from standard procedure as followed in the highest grade apparatus. Unlike other film magazines, there are loops, so that the intermittently moving section of the film is correctly separated from the continuously moving sections.

A feature that is particularly advantageous when the user shifts from one film to another is the sliding metal shutter that covers the picture aperture and the claw slot (Fig. 3), except when the magazine is in the camera and the safety lever

is set to *run*. This sliding shutter reduces the fog, and means, of course, that a magazine can be removed from the camera at any time, set aside, replaced later, and exposure completed.

Another feature is the film footage indicator, which is actuated by the varying diameter of the supply roll. Footage can be read through a window in the camera door and also directly upon the magazine if the latter is removed from the camera.

Even with all these features a magazine is, of course, only a film container until it is placed into the camera. The design of both units must be properly coördinated to give best results.

The Camera.—The mechanism is housed in a rectangularly shaped aluminum die-casting covered with leather. The camera measures $4^3/_4$ inches high $\times$ $1^3/_4$

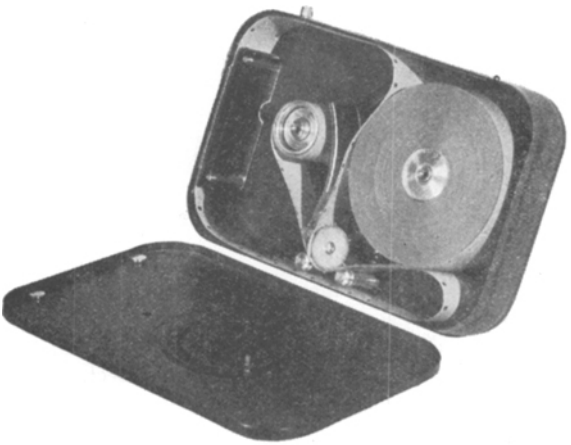

FIG. 2. Interior of magazine.

thick $\times$ $6^1/_4$ long with the handle folded and exclusive of the lens. The weight is a little more than 3 pounds when loaded.

The mechanism is driven by two spring motors connected in parallel and wound by a folding crank. Eleven feet of film are exposed at one winding, with a positive stop at the end of the run. A train of gears, most of the elements of which are of steel alternating with phenolic material, drive the pull-down, shutter, governor, and magazine sprocket. At 64 frames per second the governor speed is 10,250 rpm. Such a high governor ratio has been found desirable to assure proper regulation over the wide range of camera speed.

The shutter problem in the thin camera was met, not by resorting to the oscillatory type, but by using a cone-shaped rotary shutter instead of the conventional disk. It gives an exposure of $^1/_{35}$ second. The pull-down claw is crank-driven, operating on the rachet principle. Loading is merely a matter of opening the hinged camera cover and inserting the magazine.

The camera is regularly equipped with a 1-inch $f/1.9$ lens, which is attached by a bayonet fitting, and for which other Ciné-Kodak lenses may be substituted.

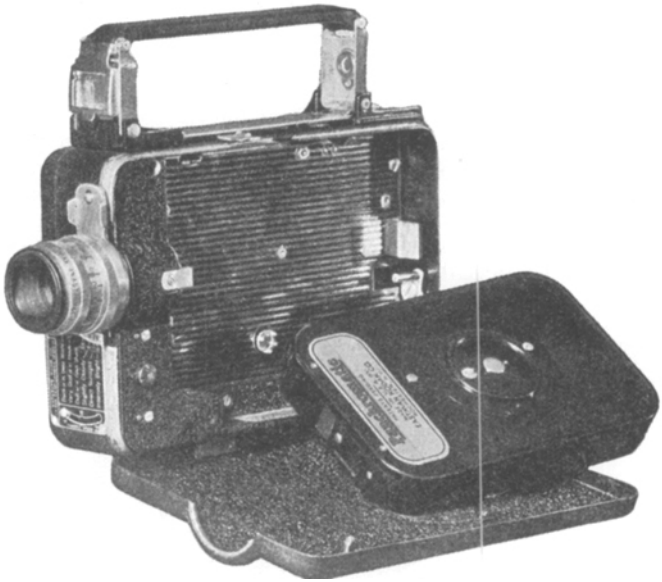

FIG. 3. Camera and magazine. (Note film indicator on magazine.)

The extra lenses with suitable adapter, filters, lens caps, and hoods give this camera the complete versatility that 16-mm. workers expect.

A novel and very practical finder system gives correct fields for any of the lenses. The optical elements are supported in metal frames that serve also as carrying-handle brackets (Fig. 4). Instead of the ordinary front negative lens there are two elements, one stationary positive lens and one slidable negative element. When located at the forward end of the track, the finder covers the field of the 1-inch lens. As it is moved back the field narrows and the various longer focal

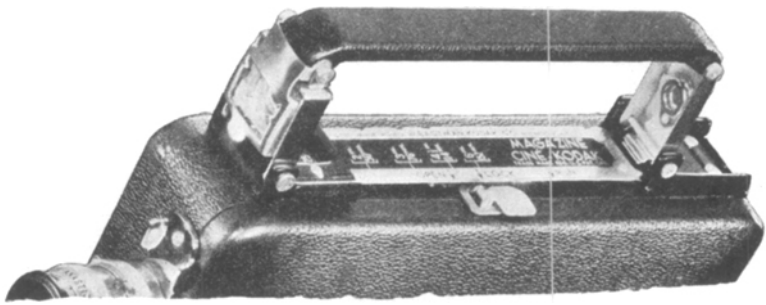

FIG. 4. Combination carrying handle and variable finder system.

lengths are accommodated. The front positive element can be raised out of the way, thus giving a still wider finder field for lenses shorter than one inch.

The sliding of the latch on the camera performs three different functions: it locks the cover, releases the mechanism lock, and opens the sliding magazine shutter. When the camera is not in use, this latch can be set midway, locking both cover and mechanism.

Another novel feature is the "pulse," located below the crank, which beats beneath the user's finger once every half-foot of film. It provides a most convenient method for determining scene length. On the front are the exposure guide plate with its diaphragm markings, and the camera speed lever with graduations marked 8, 16, and 64 frames per second.

Two carrying cases are provided. One is a soft leather case with zipper, for holding the camera only. The other is a sole-leather case for the camera, three additional lenses, and incidental attachments. If preferred, two magazines may be substituted for the lenses.

When designing the camera and all the accessories, no effort was spared to combine richness of appearance with mechanical strength. Magazines are available loaded with four different types of film—panchromatic, supersensitive, regular Kodachrome, and the new type *A* Kodachrome for artificial light.