A Modification of the Mitchell Mark II Reflex Camera

By VICTOR DUNCAN

THE SO-CALLED "conversion" on the Mitchell Mark II reflex camera, was based on a review of the comments of several knowledgeable cameramen, plus personal experience with the camera. The conversion attempted to accomplish several basic things:

(1) Reduce the bulk displacement and, if possible, the weight of the assembled camera.

(2) Balance the camera geometrically, and lower the center of gravity.

(3) Simplify the film path and threading of the camera, and otherwise make changes or additions to increase speed and ease of handling in setting up and operating the camera.

(4) Accomplish these things without in any way disturbing the fine optical system, movement, or mechanical drive train.

When the project was started, the camera was available only in a slant-back configuration. The first experiment, therefore, was to bring the magazine to top and center of the camera to help achieve balance, and to shorten the camera by almost eight inches (Fig. 1). This was a simple milling job, and the fitting of an NC-type magazine hold-down assembly. However, it was not possible to bring the take up power directly to the magazine center without redesign of the drive train. Consequently, power for take-up was taken from its original point at the rear of the camera and converted to conventional pully and leather belt take-up. Film was then fed directly from the top of the camera box. This required design of a new stripper, the use of a smaller idler roller assembly, and a change in the shape of the buckle trip.

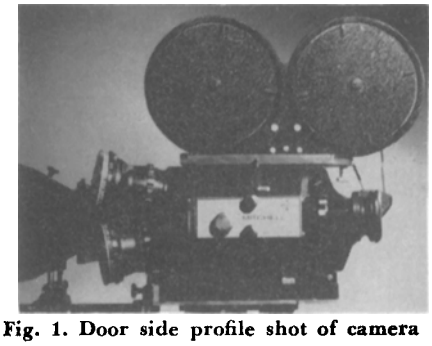

Fig. 1. Door side profile shot of camera with magazine on top.

In later models of the Mark II camera, called the SR (System Reflex) camera, Mitchell also put the magazine on top of the camera and brought power take-up to center through a redesigned drive train. Nevertheless, the magazine placement was moved forward by another $\frac{3}{4}$ in. so that the take-up drive was truly centered to the magazine, and that one belt could be used for either forward or reverse operation of the camera (Fig. 2).

The original platform base for the Mark II was $4\frac{1}{2}$ in. high. It held a matte box or a geared follow-focus to the camera. The baseplate for our conversion serves the identical purpose and measures only $1\frac{1}{4}$ in. high. It also incorporates a level easily visible from the operators point of view.

The camera's matte box is a conventional and much smaller unit, roughly one-eighth the size of the original (Fig. 3). It accepts standard 3-in. square filters. For Academy photography it will clear all lenses 20mm up with one filter stage; 35mm up with two filter stages and a pola screen stage.

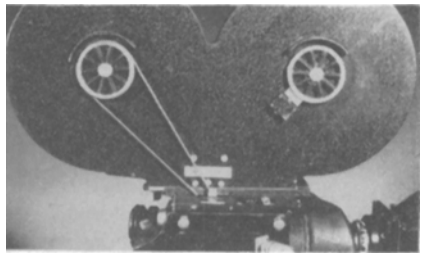

Fig. 2. Motor side and top of an S-R model camera, showing belt-to-magazine take-up from camera center.

In the first design, pushbutton motor controls and a rheostat for operating a motor driven 25–250mm zoom lens were incorporated into the baseplate. These were subsequently deleted because of the difficulty of using them when operating the camera on a geared head or on a camera crane. The present zoom control is in the form of a small handle which is connected to the zoom motor directly through a coil cord. It has a variable-speed type of pushbutton with a $\frac{7}{8}$-in. stroke. This allows the operator (or his assistant) to graduate zoom starts and stops at his own discretion.

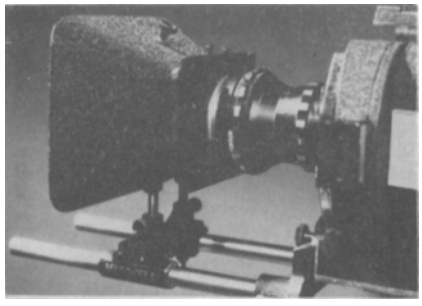

Fig. 3. Motor side profile, front half of camera, features matte box.

The greater part of the reason for this camera conversion is in the concept of a lighter weight, faster, and more portable camera for location photography and documentary work. We set about therefore to adapt a smaller 12-V variable-speed motor

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to the camera which serves to reduce size and also allows use of the small, rechargeable voltabloc batteries to drive the camera. The motor is a 12-V Mitchell designed originally for their 16mm camera. The direction of motor rotation is reversed at the gearbox. It is mechanically and electrically mounted to fit the Mark II camera. To attain the full speed range with the motor, we use the 16-V Arriflex Model 14VO4 battery, which means that the motor is essentially overdriven in terms of voltage. Nonetheless, these motors have run literally millions of feet of film with no breakdowns and minimal maintenance. A fully charged battery will run approximately 2,000 ft of film.

Most cameramen who were consulted expressed interest in an indicator for the variable shutter at the rear of the camera where they could see the adjustment from their operating position. Through a rack and spring-loaded pinion, with an engraved disc attached, the shutter readings are brought to a window cut into the rear of the camera top plate.

Probably the most obvious alteration to the camera is the inversion of the camera door. Originally hinged at the top, the door swing was upward. In our converted camera, the door is hinged at the bottom and opens downward, which allows more light to enter the film compartment, affords unobstructed vision at normal operating heights, and easy access for threading.

The camera blimp too was modified slightly to work with the converted camera. Through different capacity resistors, the precision zoom motors which are used on the silent camera, are made to work also in the blimp with the dc supply built into the base. To increase the total speed range of the motor, voltage is split into two ranges: fast range for 2½-s to 7-s zooms; slow for 8-s to 30-s zooms.

In keeping with the overall idea of compacting the camera, the carrying cases were redesigned too. One case carries the camera and lenses; another the matte box, motor, finder and accessories.

Fig. 4. The assembled camera, ready for use.

Excepting for a tripod and magazines, the entire camera outfit can be shipped or assembled for photography out of the two small cases (Fig. 4). The bulk displacement of the assembled camera was reduced to 2,000 in.,[3] the overall weight reduced by 4¾ lb, and the center of gravity lowered by more than 3½ in. Also, the lower profile allows the use of lighter weight tripods which further extend the portability of the converted camera outfit.