

THE FILMO AUTOMATIC CINE-CAMERA AND CINE-PROJECTOR

BY J. H. McNABB

THE FILMO Automatic Cine-Camera, and Cine-Projector manufactured by the Bell & Howell Company are one of the types of machines using 16 m/m film. At the Atlantic City meeting a year ago the symposium on portable projectors included several papers having to do with machines using this film, and as the transactions since published contain a transcript and discussion of the papers, including reference to the uses and potential market for apparatus of this kind no attempt will be made to enlarge upon this phase of the 16 m/m equipment, but only a brief description of some of the important mechanical features of the FILMO instruments will be touched upon.

FILMO AUTOMATIC CINE-CAMERA

The camera, although of all metal construction, weighs but four and one half pounds. In operation it is held much like a binocular, the view finder being held to the eye, giving an upright position of

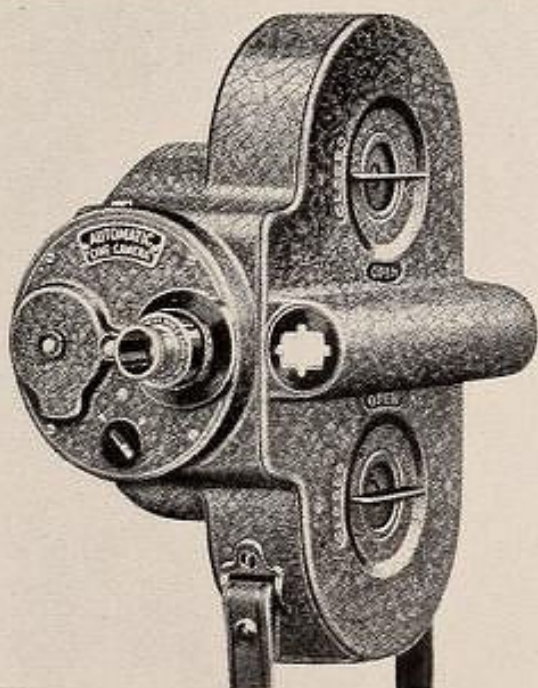


FIG. 1. FILMO Automatic Cine Camera Front.

the field, with resultant pictures as the eye sees. The movement is actuated by a self contained spring motor, housed in the main frame.

No tripod is required but provision is made for the use of one if desired. Contrary to universal oldtime beliefs relative to unsteadiness of the picture made with hand held cameras, the results upon the screen with this camera are remarkably steady, in fact much steadier than that obtained even with crank turning cameras, operated on



FIG. 2. Finder Side of Camera—Showing Holding Position.

heavy tripods. The motor is adjusted to permit of running through any desired film footage per winding, usually from twenty-five to thirty-five feet (equivalent to sixty-two to eighty-eight standard picture feet). As fifteen picture feet more than cover the average scene, it will be noted that ample capacity is anticipated for almost every emergency. The minimum usable shaft torque power of the spring ($3\frac{3}{4}$ lb.) is made applicable throughout the entire run, that is, there is no perceptible variation between the pictures exposed at the

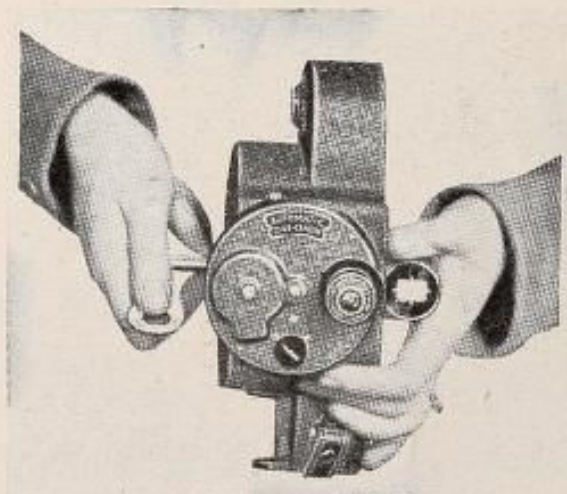


FIG. 3. Winding Position.

instant of starting and those exposed at the end of the run; the speed, however, is variable and is usually set for normal, but also graduated for half speed; a governor is employed to absorb the excess power at top winding and to effect uniform correct speed and motion. Speeds less than half and several times normal may be obtained by special adjustment of the camera at the factory.

The lens furnished as standard equipment is a Cooke Anastigmat, made by Taylor, Taylor and Hobson—England, 25 m/m focal length, working speed—F 3.5., mounted on the camera for universal focus. Other lenses such as the Carl Zeiss, Bausch & Lomb, Goertz, Astro, Dallmeyer, in any focal length, with or without focusing mounts are supplied on special order. In adopting the system of universal focusing for the lens supplied as standard, consideration was given to eliminating all operations possible for the amateur.

The film movement mechanism is of the shuttle type similar to that employed in the standard Bell & Howell Professional Camera, excepting no pilot pin registration is provided. The film is fed to and from the shuttle movement or aperture channel by means of two five toothed sprockets, spaced approximately one inch apart, thereby greatly minimizing the space required in housing the mechan-

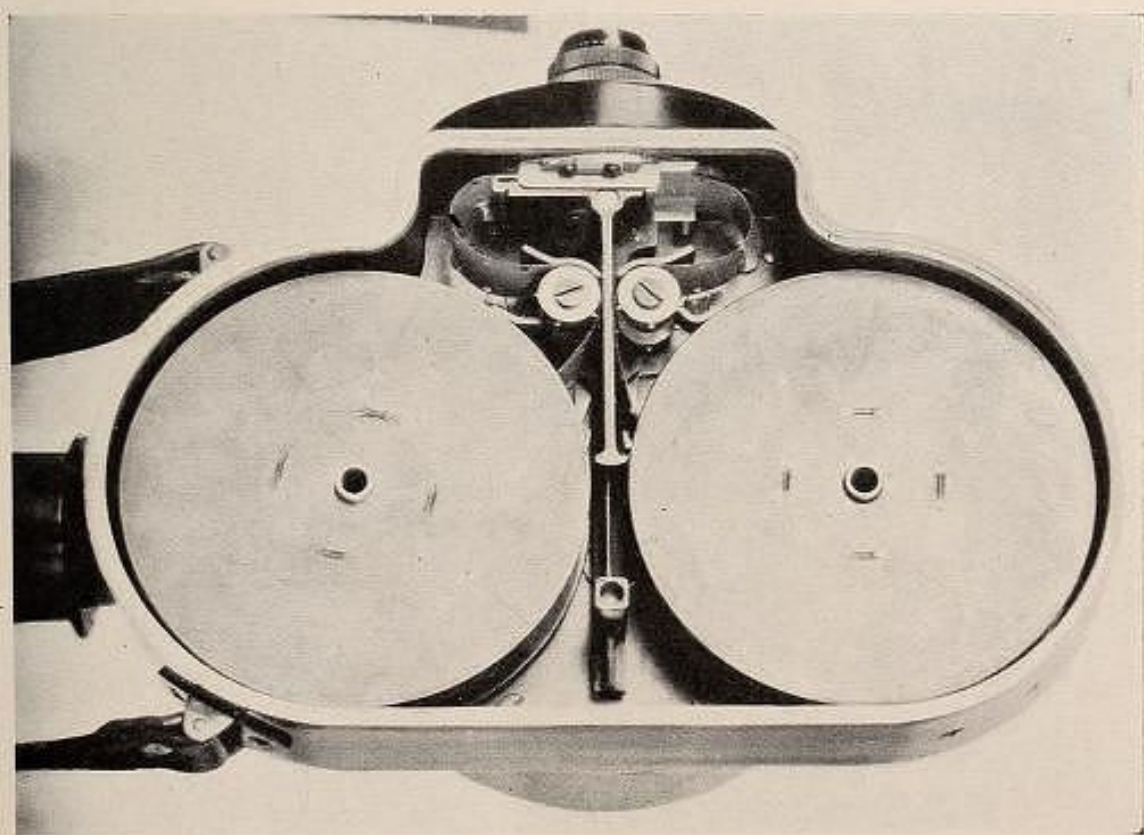


FIG. 4. Interior Showing Feed and Take-up Reels and Threading of Film.

ical units required for the feeding; taking up and loop forming of the film; threading is accomplished in about the smallest possible amount

of space without interference with a normal loop formation. The shutter has a fixed opening of 216 degrees; the takeup is of the friction type; a footage dial registers from 0 to 100 feet, which is the capacity of the camera.

FILMO CINE-PROJECTOR

The FILMO Cine-Projector is of the folding type, all metal construction, weight—9 lbs.; with case reels, film, etc.,—14½ lbs.; size when folded 6½"x9½"x10½", capacity 400 feet of 16 m/m film, which is equivalent to one thousand picture feet of standard film. The objective lens, a Gundlach, furnished as standard equipment includes a choice of either a two or two and one half inch focal length in micrometer mounting. Other lenses stocked include 1", 1½", 3",

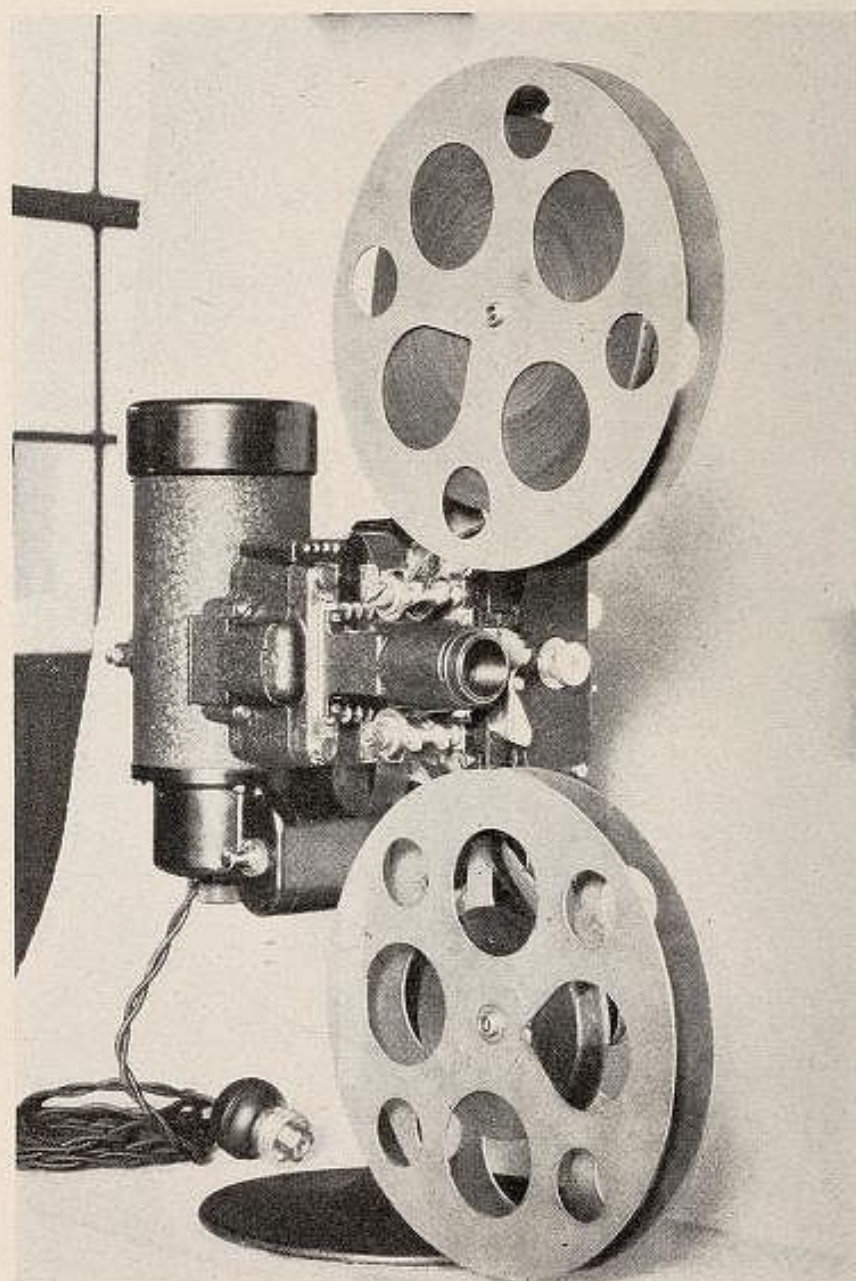


FIG. 5. FILMO Automatic Cine Projector Front.

3½" or 4" focal lengths, which are also provided with universal interchangeable micrometer mountings to suit the particular requirements of the user. The condensers are of the plano convex type, a double 75 m/m unit being employed as standard equipment; this permits of stopping the film on the screen without danger of warping or burning. A double 45/m/m Condenser is also supplied for users who desire to sacrifice the feature of stopping the machine for an individual frame. The light furnished with the latter condenser is approximately 25% greater than with the use of the double 75 m/m. The reflector is a spherical concave mirrored surface type, mounted with screw adjustment to obtain the maximum efficiency in focusing and intermeshing the reflected light image with the objective.

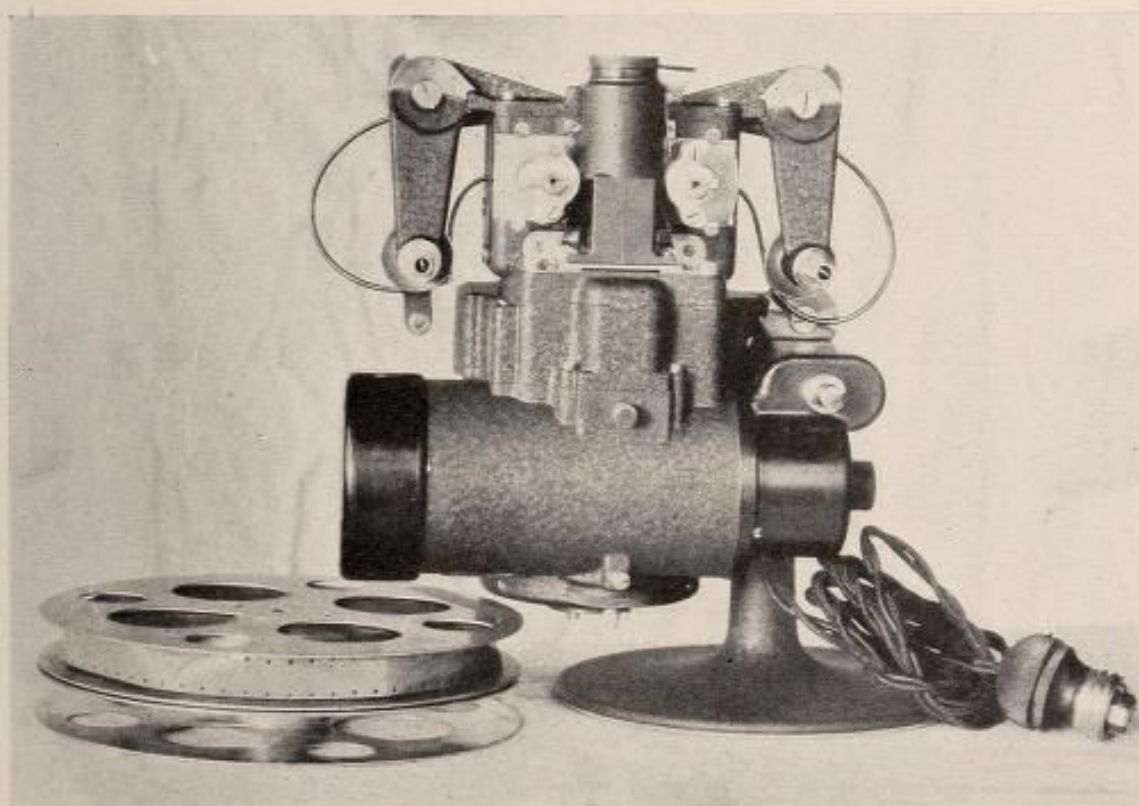


FIG. 6. Filmo Automatic Cine Projector Folded Ready for Case

The movement is of the shuttle type, the pull down taking place is 40 degrees, thereby producing a nine to one movement, a single blade shutter is employed with approximately 216 degrees opening; this shutter travels at high speed rotating three times for each pull down. A diagram of the relative time of the shutter action is appended and shows a complete analysis of the movement of the film. The motor which drives the projector is 110 volt A.C. or D.C., the housing for which forms a part of the machine. One cord is used for connection of both lamp and motor, and a switch is provided for starting both simultaneously; a cooling system supplies a forced feed air draft to the lamp house, resistance, film and aperture, allowing single frames to be projected without damage to the film.

The lamp is a 200 watt, 50 volt T-10 bulb; a self centering ring is soldered to its base, for accurately centering the filament in proper position relative to the focal axis.

There is no flat tension employed at the film aperture, the control being obtained wholly by marginal contact in combination with

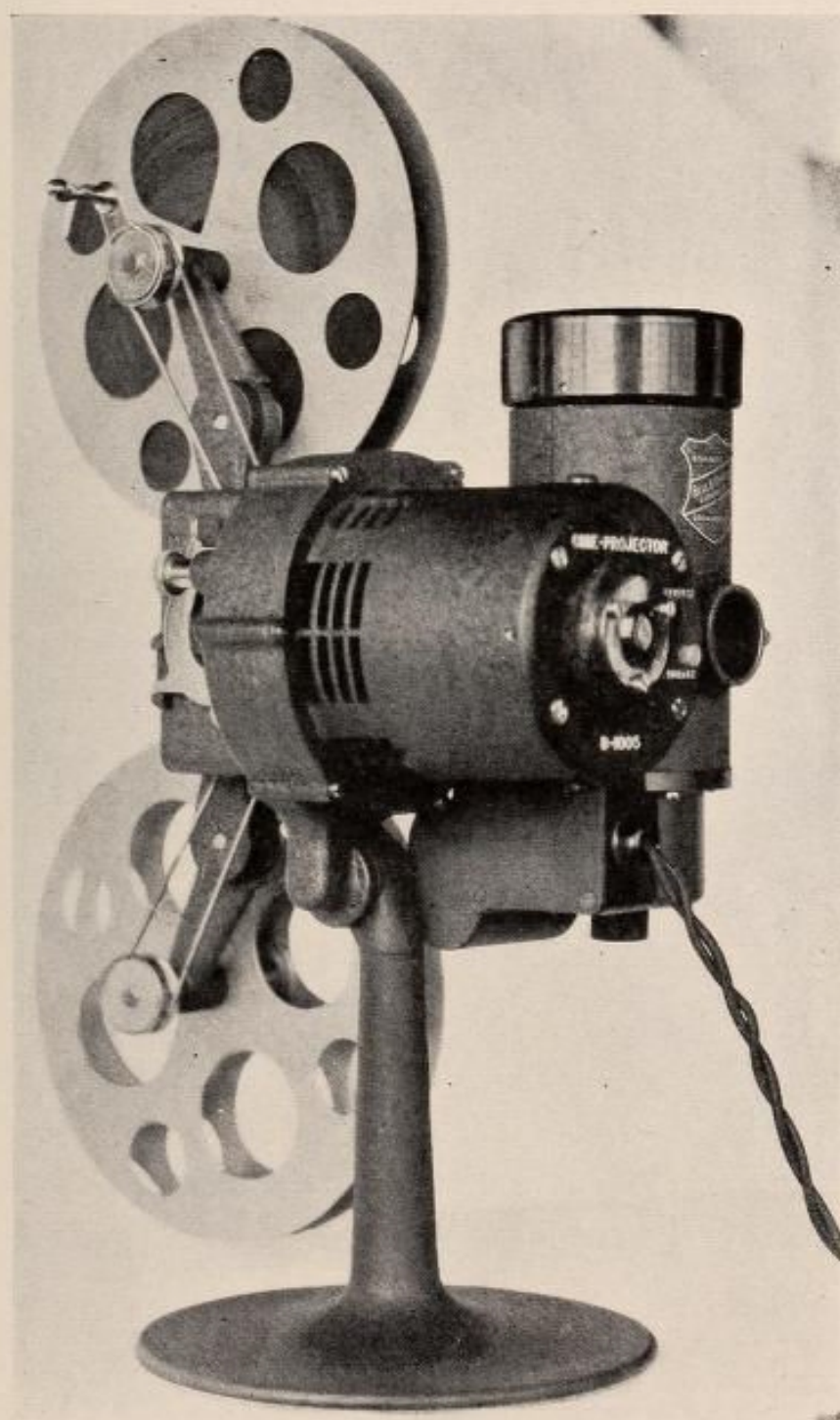


FIG. 8. FILMO Automatic Cine Projector Bear.

several rollers situated both in the aperture channel and film gate. The threading of the projector is exceptionally simple; the path of the film being in a direct vertical line, and like the camera the film is fed

to and from the shuttle movement mechanism by means of two closely situated sprockets. A small handle operating off the feed spindle permits rewinding as desired.

The resistance employed for cutting down the line current to fifty volts is unique, in that it has been possible to keep the unit down to a weight of less than 3 ounces. It is of fixed type accommodating ranges of voltage up to 115; a variable resistance is also provided for boosting the delivery to the lamp and to cut down where voltage conditions are excessive; twelve points of adjustment, ranging from forty volts to sixty-five volts is obtained, for varying the lamp current voltage.

The speed of the motor is controlled by a load brake; a clutch engages the film movement mechanism while motor is running, thereby providing a constant force of air at all times to dissipate excessive heat. If for any reason the motor should fail to function or the speed falls below normal, an automatic fire shutter working by air pressure intercepts the light from reaching the film should the machine be at the stop point or engaged in single picture projection.

A switch button controls the direction of movement, the machine will function on the reverse as readily as forward, and a change from one to the other is accomplished by shifting a lever button changing the polarity of the motor brush mechanism.

Very satisfactory pictures have been projected up to nine by seven feet, although larger sizes may be obtained by the use of the variable resistance and the double 45/45 condenser combined with an objective of appropriate focal length. This may be one inch, for extremely short distances, up to twenty-five feet, $1\frac{1}{2}$ for thirty-six feet, 2 inches for fifty feet, $2\frac{1}{2}$ inches for 65 feet, 3 inches for seventy-five feet, and 4 inches for one hundred feet. These lenses at the distances indicated will furnish a very satisfactory picture—size nine by seven feet.

DISCUSSION

MR. RICHARDSON: I don't see anything to discuss about the paper. We could discuss the demonstration, but I move that the paper be published.

MR. BRIEFER: I have sublime faith in the amateur. Anything we can do to stimulate the interest of the amateur in motion picture photography will advance it materially as has been the case with still photography. This is one of the most beautiful demonstrations I have ever seen.

MR. COOK: For the benefit of any of the gentlemen interested in home entertainment with the 16 mm. film I should like to remark that the short sections Mr. McNabb showed of "The Adventurer" and "The Emigrant" are from two of the films obtainable from the Kodascope Libraries.

MR. EGELER: I think this a good example of a projector in which real engineering has been used, where the manufacturer has not tried to follow precedent but has utilized engineering ingenuity and new features of design to gain definite objectives.

MR. GRIFFIN: We are supposed to know something about projecting motion pictures, and I want to say that is the finest demonstration of a home projector I have ever seen, and I think Mr. McNabb is to be congratulated. As result of that, I think he should remember all the engineers with a complete outfit at Christmas time.