

The Synchronflex, here seen fitted to a Bolex H.16 camera, is a recorder using fully-coated 16mm. magnetic film, mechanically linked frame-for-frame with the film in the camera. Perfect synchronisation is therefore assured.

SINCE the first appearance of the Synchronflex magnetic film recorder some time ago, the design has undergone certain important modifications and improvements. Now that Mk. III versions are on sale, we felt the time had come for a fresh review of the whole Synchronflex situation, so we spent a good deal of time recently, trying out the latest models and their associated equipment.



Peter Ryde uses the Synchronflex to play back a recording, after unloading the camera. The Edric blimp, here seen open, zips up around the camera-plus-sound unit, for a "take".

As many readers will know, the Synchronflex is a portable magnetic recorder designed to be fitted rapidly to the side of certain 16mm. cameras. It uses standard 16mm. magnetic film and enables sound to be recorded in lip-sync during shooting, whether indoors or on location. This is achieved by mechanically interlocking the camera and recorder, and driving both from an electric motor which is an integral part of the Synchronflex.

The recorded magnetic film matches the picture, frame-for-frame, and can subsequently be used for dubbing in sync on to a striped print, or for making an optical track. The Synchronflex is not claimed to be suitable for music, or for sounds of a basically musical nature, but is capable of high class results with speech, and with most effects.

The Synchronflex consists of two parts; the mechanism, which is fitted to the camera, and the separate transistor amplifier. The mechanism is now produced in two versions, one for Bolex H.16 cameras, and the other for Bell & Howell D.70's. There are no essential differences between the two versions, but they are not interchangeable, because there are a number of small variations made necessary by the differences between the two types of camera.

In each case, the mechanism is built up on to an anodised aluminium chassis-

plate about the same size as the side of the camera. This plate carries spindles for the two 100 ft. spools. A third spindle, in the top right hand corner, is connected to the feed reel by a belt and is used for hand rewinding after recording. The belt, by the way, is now a flat rubberised canvas one, which gives a much better grip than the previous round rubber version which was inclined to slip and stretch when the reel was getting full.

The recordings are made on standard 16mm. magnetic film, which costs about 12s. 6d. per 100 ft. The track position used is the one which corresponds to a full-stripe on picture film. So recordings made on the Synchronflex can be re-played on a stripe projector without any preliminary transferring.

The film is pulled past the head of the Synchronflex by a sprocket, mounted on one end of an eight-frames-per-turn shaft. The other end of this shaft takes the drive to the camera's hand-cranking hub, either directly (Bolex version) or via a gear train (Bell & Howell). At the middle of the 8 f.p.t. shaft is a pinion wheel, and also a pulley from which the take-up is driven via a spring belt.

Between the capstan and the head is the stabilising mechanism—a 3½ in. diameter flywheel to produce general smoothing, and a snubber to isolate the film on the flywheel from the potentially

On the Cover. This week's cover picture shows the Synchronflex on the side of the H.16 camera; and Peter Ryde objecting volubly at having to act as his own clapper-boy, at the start of the tests.

We Shoot Sound with the SYNCHROFLEX

by Peter Ryde and Philip Jenkins

jerky drive of the toothed capstan. The flywheel is driven by the film as it passes round a rubber-covered film guide fitted to the other end of the flywheel shaft, and the snubber absorbs any slack which might otherwise occur between the capstan and the flywheel. This arrangement gives fully adequate smoothing on speech recording, for which the Synchroflex is intended.

The 18v. electric motor which drives the camera plus recorder is housed below the rest of the mechanism, and is linked to the pinion on the 8-frame-per-turn shaft by a worm gear driven by a flexible steel cable. The flexible shaft allows the worm gear to be slid sideways, and thus disengaged from the pinion, so that the mechanism can free-wheel while it is being fitted to the camera.

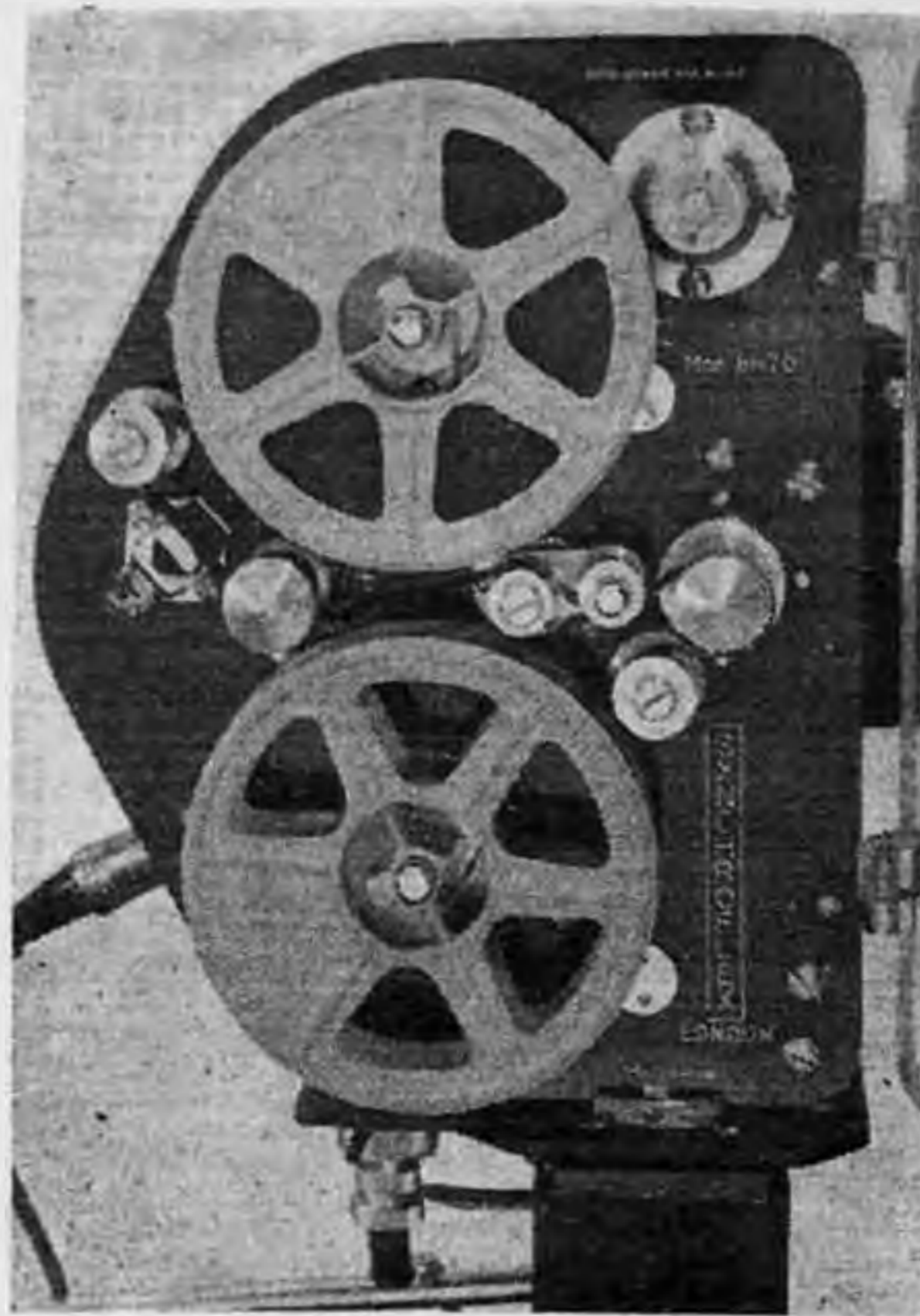
In earlier versions, a solid drive shaft was used, but it was split into two sections joined by a plastic sleeve. This sleeve provided the necessary flexibility, and also acted as a safety device, since it would shear if the camera jammed. It is perhaps rather a pity that it has disappeared from later models.

The Mk. III's, however, have an enormously valuable addition. The flexible shaft from the motor continues beyond the worm gear, and curves round through a bearing to drive an ingenious little eddy-current tachometer, which indicates, through a window, whether the camera is running at the correct speed. There are calibrations for 24 and 18 f.p.s. Earlier versions of the Synchroflex had no tachometer, and the camera governor had to be set by means of a strobe.

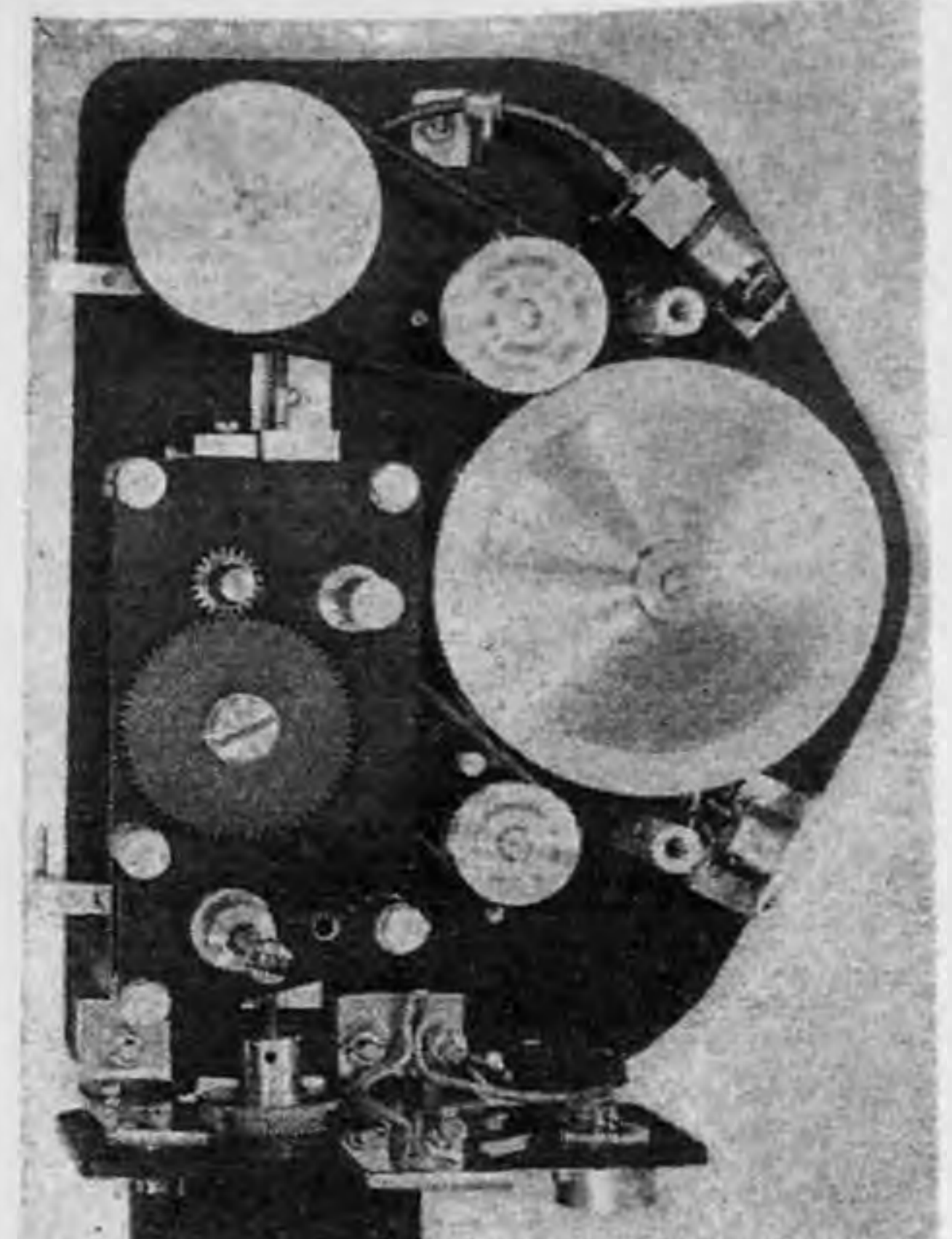
The Amplifier. This is quite separate from the mechanism, and can be strapped on to the tripod or placed in any other convenient position. It has three sockets, which are for the head lead, the microphone, and the output. This third socket is used either for headphones, or for feeding another amplifier when dubbing.

The amplifier has a two-position control to select RECORD or PLAYBACK, and there is a combined ON-OFF switch and GAIN control knob. A meter on the front of the case enables the signal level to be checked, and can also be used for testing the internal PP9 battery.

An extremely good point of design is that the circuitry of the amplifier is so arranged that when the head is disconnected, the battery is cut off also,



Left: Film path on the Synchroflex. Magnetic film from the top reel comes around a roller, over the magnetic head, past more rollers including the sprung snubber roller, and round the sprocket which keeps the sound film in perfect sync. with the picture film in the camera. Right: Internal parts of the Synchroflex; note the flywheel (extreme right) for smoothing the motion of the film over the magnetic head.



irrespective of the position of the ON/OFF switch. This makes it impossible to waste the battery by storing the amplifier with it accidentally left ON; nor can the battery be tested until the head has been plugged in.

A useful accessory to the amplifier is the mixer unit, which has inputs for two microphones, and can, if desired, be attached by screws to the case of the amplifier, thus making the two into a single unit. We found the mixer more or less indispensable, not because we often wanted to use two microphones, but because the unit gives considerable extra gain, which one simply cannot afford to be without if the microphone is to be kept out of the picture. Without the extra gain, the Mic has to be so close to the speaker that it can only be kept out of frame when shooting C.U's. Another useful point about the mixer is the Bass Cut switch which can be used (at some sacrifice of gain) to prevent "plumminess" in the recording.

Fitting. The Synchroflex mechanism can be fitted to, or removed from, any particular camera in a moment or two. This applies to both versions, although of the two, the Bell & Howell is the easier to manage. With the Bolex, the fitting is a little finicky, and there is the additional point that when the Synchro-

flex is to be fitted to an H.16 for the first time, it will take rather longer, because although the camera does not have to be modified in any way, the recorder itself must be adjusted. This is because cameras in the H.16 range are not consistent in their dimensions. The necessary adjustment is made by adding or removing washers so as to alter the length of the three spacing posts which govern the exact distance between the camera and the recorder when the two are fixed side by side.

As regards quality of performance, there is nothing to choose between the two versions of the Synchroflex, which are, in any case, basically identical. But for ease of operation, the Bell & Howell definitely has the edge on the Bolex version, because it so happens that the design of the D.70's is such that none of the controls is obscured when the recorder mechanism is in place. With the Bolex, the footage counter and the speed governor are inaccessible once the Synchroflex has been bolted on, and this makes it rather more difficult to adjust the speed and to check the lengths of shots.

Tripod Mounting. Although the double unit can in fact be hand held, it would be unwise to attempt this at first, so having got the camera and recorder

the scale. (The meter scale is not calibrated in figures.)

Sound Tests. Without exposing photographic film we first tested the Synchronflex (using Lustraphone LFV/H59 microphones) on a range of voices from treble to bass, and once we had found the best microphone positions we produced good results at both 16 and 24 f.p.s.

Because of the low gain of the basic amplifier, we did not at first find it easy to position the microphone so that it produced good results, yet remained out of sight. The mixer, with its extra gain, is a help here, but the microphone still has to be positioned very carefully, and the job is never one which should be dealt with in a casual, last-minute, manner.

As well as using the mixer to enable us to place the microphone further away we also tried out a scheme recommended to us by the manufacturers, which was to conceal a microphone behind the pullover or waistcoat of the person speaking. This has obvious limitations, but produced good results in stationary shots, provided the bass cut was used.

During our early tests, we were very disturbed to hear a loud whine through the headphones, both on Rec and Play, whenever the electric motor was running. However, this whine is not recorded on the film, and so does not matter much.

What *does* matter, of course, is mechanical noise picked up by the microphone and recorded on the film. The combined unit is fairly noisy (particularly the Bell & Howell version) and this business of avoiding noise pick-up is rather a problem—although we must emphasise that it is not one which is exclusive to the Synchronflex. It besets any sound-shooting scheme, amateur or professional, and is notoriously difficult to cope with. Until you have tried using one, you will talk blithely of blimps. But after five minutes' practical experience of one—however good it is—you will wish it to Kingdom Come. We got so fed up with ours that we soon abandoned it, and decided to rely on filming from as far away as possible, using a long-focus lens. Out of doors, the difficulty is less, since there isn't the trouble from reflected sound.

When we felt sufficiently familiar with the recorder, and had solved, so far as possible, the noise problem, we next tried out some full sound and picture takes, using a clapper board to make

synchronisation marks on the two films.

Altogether, we shot several hundred feet of film, and when the camera films were developed, we ran picture and sound double-headed on a G.B.-Bell & Howell 640 magnetic projector.

The result was most satisfactory, so we then had the picture film striped, and dubbed the sound from the original magnetic film on to the stripe. The result was a high quality magnetic sound film, in perfect lip-sync.

Transfer to Stripe. Our method of transferring was as follows. The Synchronflex, with its motor out of gear, was mounted above the 640 in such a way that the top projector sprocket could transport the magnetic as well as the picture film. The Synchronflex output was connected to the disc input of the 640.

With the magnetic film already round the top sprocket, the striped picture film was threaded up in the normal way. The two films were then juggled so as to position the sync marks correctly over the Synchronflex sound head, and the projector gate, and after that, sync was automatic since the projector was transporting both films. We did not have the projector lamp on during the dubbing, since the heat might have damaged the Synchronflex, which was mounted over the lamp vent.

This method of transfer is not convenient, however, for long lengths of film, or for films which have been much spliced. So we were interested to learn that Synchronflex are contemplating the production of a stand for the recorder which will enable 800 ft. reels of magnetic film to be used. The stand will also include the necessary gears to allow the recorder to be driven from the projector.

Accessories. As well as the mechanism, amplifier and mixer, one can also obtain a number of accessories, but not all of them are made by the same firm. One range is produced by Synchronflex Ltd., and another by Edric Films of Gerrard's Cross, who were at one time the sole agents for the Synchronflex. The two ranges quite often overlap and wherever possible we tried both rival products. The principal accessories are:

Battery (2 versions). The 18v. rechargeable battery enables the Synchronflex to be used away from the Mains, and it is in an attractive, easy-to-carry case. Next to the actual cells is a knob, with a dial calibrated from 0 to 10. The



The Synchronflex on a Bell & Howell 70 camera—a very simple fitting job though slightly more noisy in operation than with the Bolex.

fastened together, the next step is to mount them on a tripod. The motor housing extends well below the camera base, so it may be necessary to use an extension column to lift the apparatus high enough above the tripod platform to prevent the motor fouling the tripod legs. Suitable supports are sold as accessories, but could easily be improvised.

Preparing to Shoot. With the gear safely on the tripod, the camera can be loaded, and the leader run off. Then the magnetic film can be threaded up also. There is no erase on the Synchronflex, so it is essential to use "clean" magnetic film, and used film must be independently erased (e.g. on a bulk eraser) before re-use.

When threading up the Bolex, the leader will have to be run off by timing it, since the footage counter is hidden by the Synchronflex. During actual shooting one can manage without the counter by seeing how much magnetic film has been used, for the door of the mechanism is of transparent Perspex, vacuum moulded.

Before shooting begins, the sound level must be checked, and the gain set so that the meter needle registers peak recording level somewhere near the right-hand end of the green section of

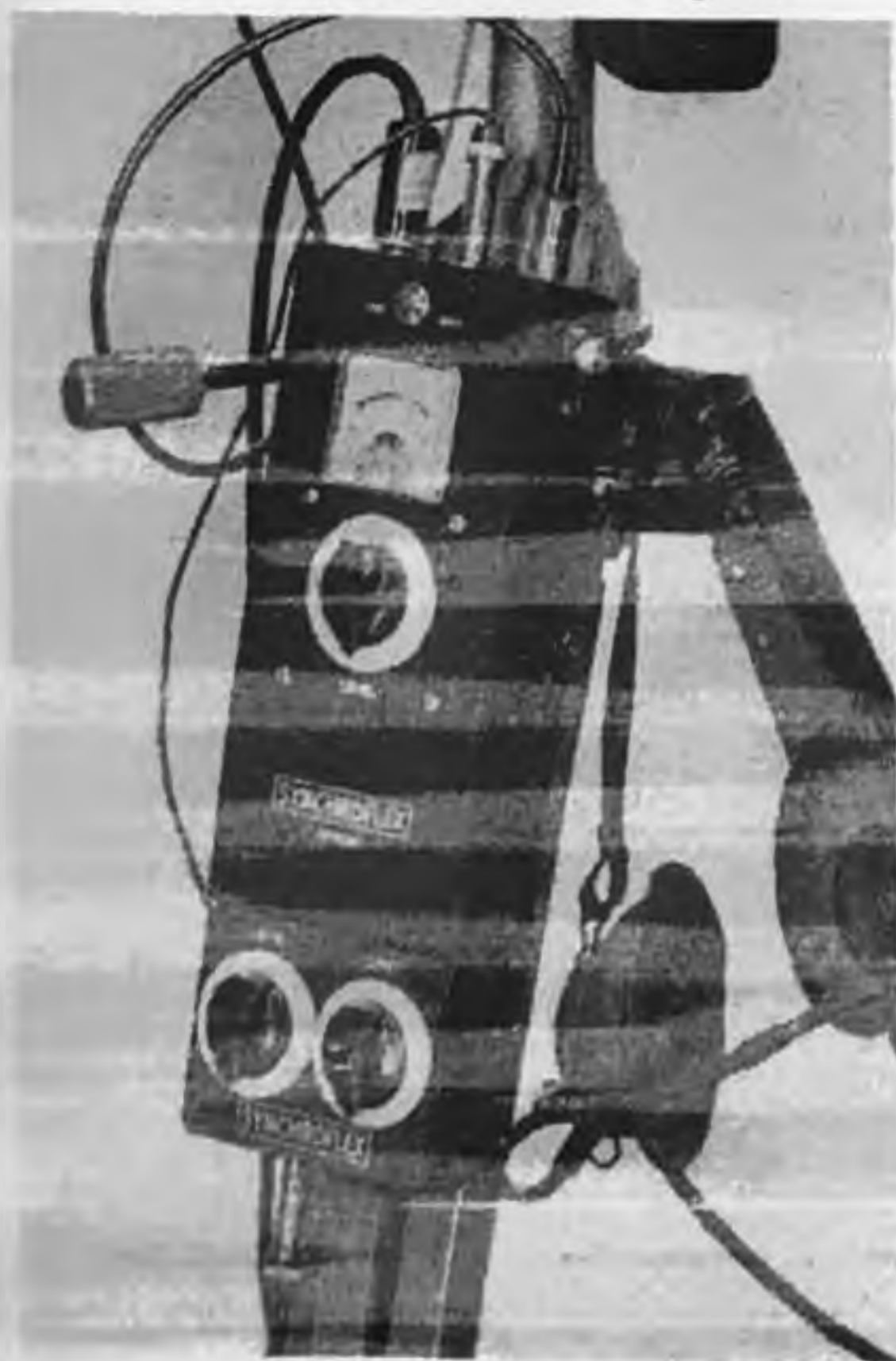
knob should be set at 10 for 24 f.p.s., but may be turned down to 8 for 16 f.p.s. This reduces the motor speed and prevents the camera governor being overloaded. Apart from this, however, the speed must be controlled by the camera governor, and not by altering the voltage.

Both versions are attractively produced, and are generally satisfactory. The Synchronflex model is the one we preferred, since its cells have double the capacity of the Edric version, yet nevertheless take up less room so that the Synchronflex battery box is the more compact of the two.

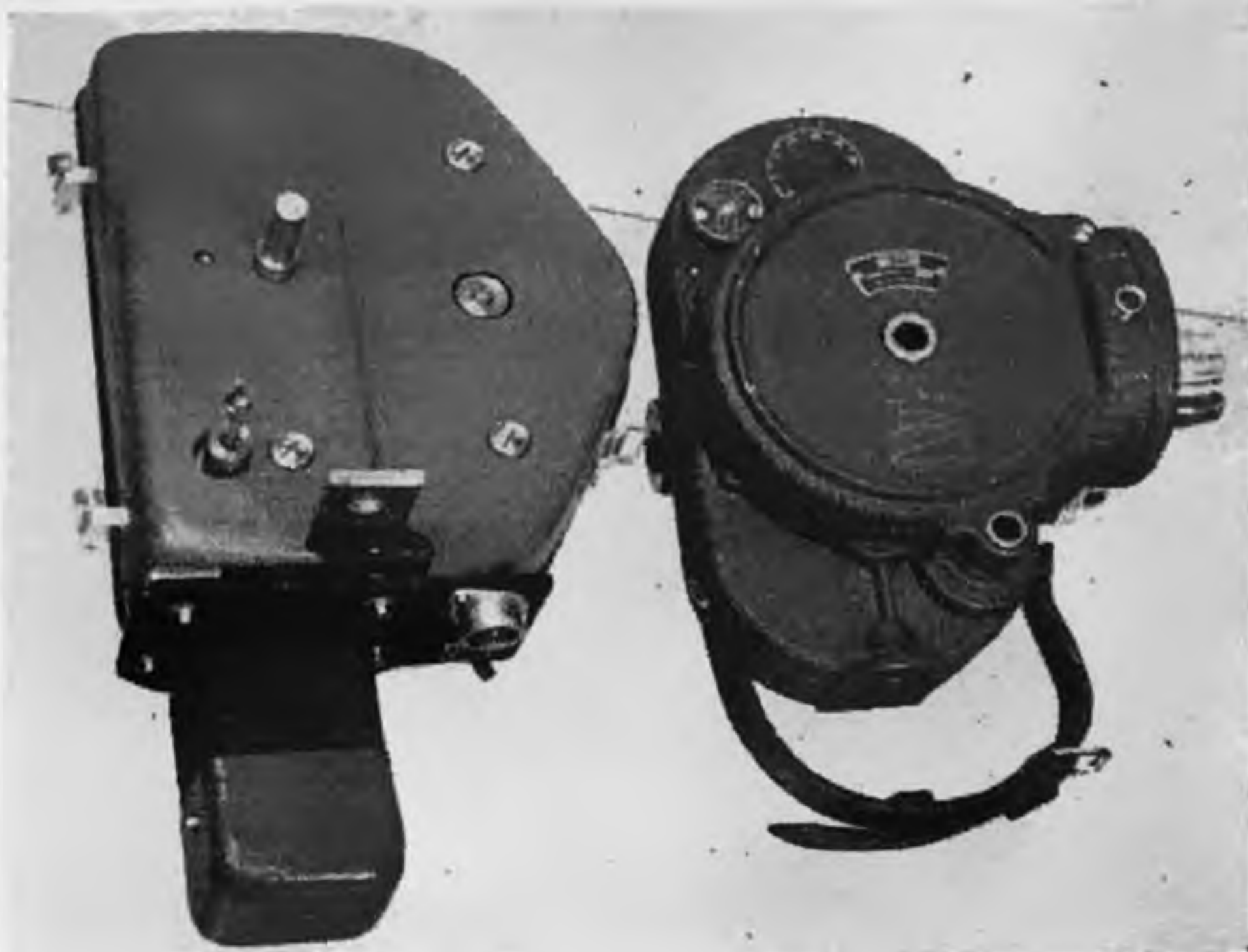
Battery Charger and Mains Unit (2 versions). Edric Films produce separate items to perform the two functions. The Synchronflex version is a combined Mains Unit and Battery Charger, which is handier.

Blimp (Edric only). This is of the soft barney or "tea-cosy" type, and is for Bolex H.16 Reflex cameras only. We found it a decidedly mixed blessing. Its sound-damping properties were just adequate, but we felt it was rather too small for the camera. We had to wrestle to get it on, and this led to the focus and aperture settings being accidentally altered. This was very tiresome, since once the blimp is on, the settings cannot be checked and readjusted because the lens is inaccessible with the blimp

The fully transistorised amplifier for the Synchronflex is self-contained for recording, and for headphone playback. Attached to the bottom of the amplifier is the two-input mixer unit which provides additional gain.



Simple fitting of the Synchronflex unit on to the Bell & Howell camera. The central (winding key) hole on the camera acts as a very convenient location for the spigot on the sound unit. The Synchronflex drives the camera via the hand-cranking shaft.



in place. We therefore had to stick the focus and aperture rings down with tape, and, of course, every time we wanted to change either, the blimp had to be removed, and then wrestled with to get it back on.

Another difficulty was that with the blimp on, it was impossible to use the viewfinder, because the eye could not be brought close enough to the eyepiece. With reflex cameras, this means a complete stalemate. An additional hazard is that the blimp prevents one from seeing how much film is left.

Summary. The Synchronflex is excellently designed and made, and we found it to be a thoroughly useful lip-sync apparatus. It is capable of giving excellent results on speech recording, if properly handled, and though its price puts it beyond the pocket of the ordinary amateur, small film units may find it a very well worth while investment.

The recorder is fully portable, and can be used anywhere, independent of mains supply; it is light in weight (if necessary it can be used for hand-held shots) and above all it is extremely easy to use. It fits on to the camera without difficulty, and without restricting its versatility in any serious way.

We feel that the Synchronflex will be chiefly useful for studio work, or for on-the-spot filmed interviews, since this is the type of work in which the actual recording made at the time of shooting is used for dubbing on to release prints.

The Synchronflex can also be used for takes in which the sound is pre-recorded. A track can be recorded on magnetic film, and then replayed by the Synchronflex over a loudspeaker during

shooting. Any music on the film would probably come out with a bit of wow, but this would not matter. This technique of shooting action in sync with pre-recorded sound is a lot easier than post-recording and is very useful when sound and picture cannot easily be recorded both at once.

Modifications. As we go to press, the manufacturers tell us they have modified the tachometer for better reliability, and have produced (as an optional extra) a transistorised speed control unit which runs the motor at constant speed without relying at all on the governor in the camera. With this unit, the control transistor is in series with the motor supply lead, and a *24v. (not 18v.) accumulator box is used.

Availability. The basic Synchronflex, and the accessories manufactured by the same firm, are now available from many dealers throughout the country. If you write to Synchronflex Ltd., they will tell you who your local agent is. The Edric accessories, of course, are available only from Edric's.

Prices. Basic Synchronflex (Mechanism and Amplifier), £172 0s. 0d.; Mixer, £11 5s. 0d.; 18v. Battery (Synchronflex), £23 0s. 0d.; 18v. Battery (Edric), £25 0s. 0d.; Mains Unit, £19 0s. 0d.; Battery Charger (Edric), £11 0s. 0d.; Combined Mains Unit and Battery Charger (Synchronflex), £12 18s. 9d.; Blimp (Edric), £21 0s. 0d. Microphones: as required.

(Equipment submitted by Synchronflex Ltd., 30 Priory Road, Kew, Richmond, Surrey, and Edric Films Ltd., 2-4 Oak End Way, Gerrards Cross, Bucks.)