A typical installation is shown in Fig. 7. The rack on the left supports six filter-amplifier units. The filters are of the plug-in type, removable from the front. This permits filters of different band-widths to be quickly changed for certain effects.

The middle rack supports three preamplifiers and a control panel for selecting one of two special control consoles furnished with each installation. Fig. 8 depicts a standard control console which includes everything necessary for remote control of the system.

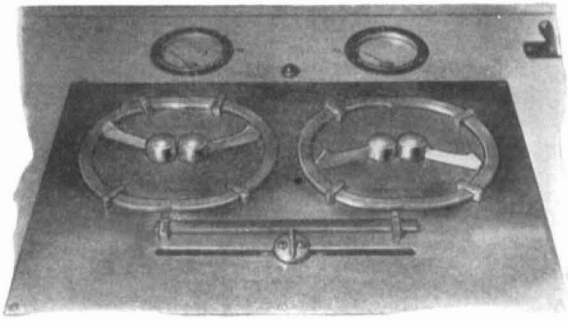

FIG. 8. Remote control console for adjustable reverberation control system.

The rack on the right (Fig. 7) supports three a-c operated power amplifiers which are connected to their respective loud speakers in the resonance chamber. These units have been designed to cover their particular frequency ranges with the utmost fidelity. Generous design precludes the possibility of distortion due to overload, and the hum level is considerably below the accepted level for normal reproduction. The loud speakers also are of special design. Each unit is capable of reproducing its corresponding band of frequencies with a minimum of distortion.

MGM PORTABLE DOLLY CHANNEL*

C. S. PRATT**

The original sound installations in most of the major studios were of the so-called central station type. At the time they were put in there was an entire absence of suitable portable equipment and, moreover, the number of stages to be supplied was generally quite small. Portable apparatus continued to be unavail-

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able for quite a period and during this time a large part of the stage expansion took place in the studio. Consequently, the expansion of the central plant became the economical and probably the only practical thing to do.

In the MGM studio the stage expansion took place in a direction on the lot to carry the stages farther and farther from the Sound Department. This meant an expensive and complicated set of comparatively long lines and trunks to provide proper service from the central plant to each of the stages. In addition, the maintenance of the old lines began to be a factor due to the natural deterioration of lead sheaths and other installation. An analysis of the various factors of installation, maintenance, and operation made four or five years ago indicated that

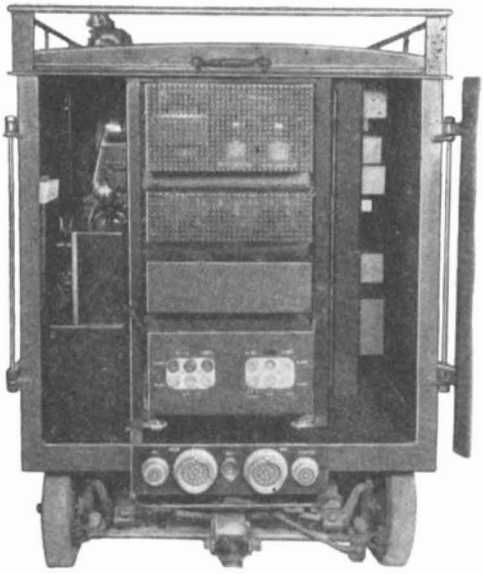

FIG. 1. Front view of portable dolly.

more economical and better service could be provided if the sound recording unit were of a mobile nature and complete in itself when established on the stage on which it was to work.

At first thought it might appear that one of the regular portable types of equipment would be desirable for the purpose. However, our conception of portable equipment has been that it should be primarily designed for location work where operation of the complete company unit is generally quite different from that of a unit operating on a stage. For location units some compromises are acceptable in operating facilities in order to secure proper portability just so long as the quality itself is not affected. For stage work within the studio such compromises are not permissible. The effort was made, therefore, to produce a more or less mobile channel which would have in it every element possessed by the central station

channel all completely self-contained so that it could be readily transferred from one spot to another. The result is the MGM dolly type of recording channel.

The MGM dolly channel is a sound recording system, operated entirely from alternating current, designed primarily for use on stages not wired to the central plant. However, by standardization of plug outlets it can readily be used on any stage, either singly or as an added channel to the centrally located machines. The carriage is an enclosed body 40 inches wide, 42 inches high, and 60 inches long with steel roof and floor, angle-iron-frame enclosed with metal-covered plywood and hinged doors on all four sides. This is attached to axles by means of cantilever type springs. The rear axle is fixed, while the front is a 37-inch-tread Ford model *T* axle complete with steering knuckles. Twelve-inch wheels are

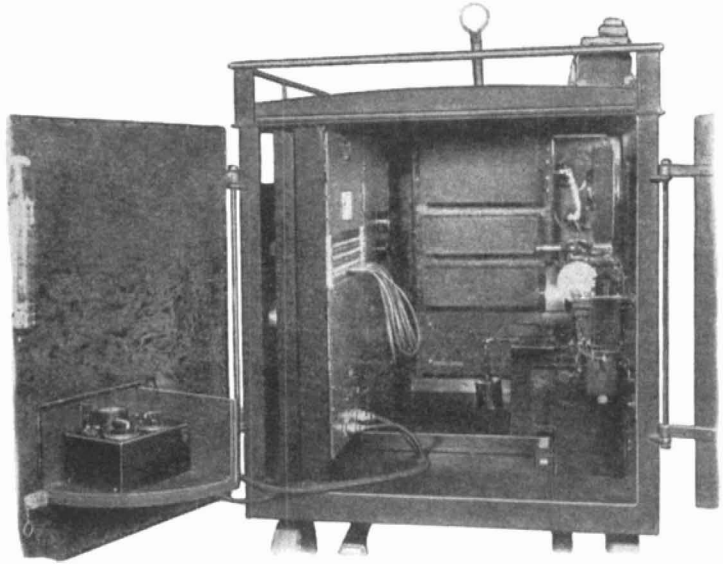

FIG. 2. Rear view of portable dolly.

used, equipped with 3-inch solid rubber tires. The steering tie bar is attached to a hollow tubing tow bar.

The channel amplifiers with associated power-supply filters and equalizers are mounted on standard amplifier racks with their backs against the right-side doors looking from the front of the dolly. Opposite these racks on the left side of the dolly is the Western Electric *D-86715* type film-recording machine; its door against the left-side door of the dolly. The a-c power supply, fuse panel, and rectifiers are mounted on a rack across the front of the dolly with their backs against the front door. This arrangement faces all equipment toward the operator and allows maximum accessibility to the rear of the apparatus for repair and maintenance. The recording machine is driven by a 48-cycle synchronous motor and modified to use standard 1000-ft Mitchell magazines. By thus

eliminating the use of a lower magazine and take-up, the machine is mounted on a metal can containing valve and lamp controls, the standard Western Electric *Q*-type noise-control unit, intercommunicating telephone, and automatic starting unit. In the rear door of the dolly is mounted a hinged shelf. The two-position mixer with volume-indicator extension and monitoring head-phone jacks is attached to this shelf by wing-nuts and may be used either in this position or extended out to the set. The top of the carriage is covered with rubber and surrounded by a luggage rack that accommodates a full complement of cables and auxiliary equipment.

At the front end, above the tow bar and below the end door, is mounted the panel carrying the plug receptacles which consist of: 120-volt, three-phase, 48-

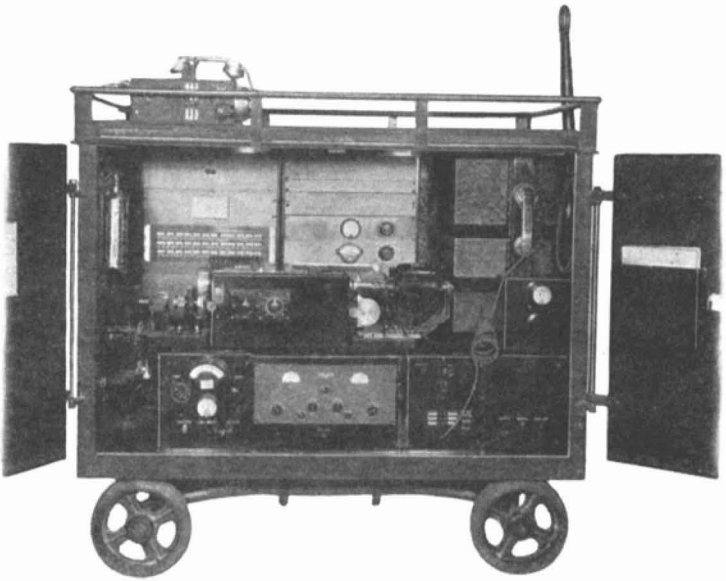

FIG. 3. Operator's side view of dolly.

cycle camera and recording machine drive supply; 110-volt, single-phase, 50-cycle rectifier supply; 120-volt, three-phase, 48-cycle supply outlet; and 23 pin-receptacles for signal telephone circuits in and out.

This allows all cables except the microphone cables to be connected to the dolly at the end away from the mixer, and all doors may be locked without disconnecting.

The amplifier channel consists of mixer, voltage and power amplifiers (totalling 86 decibels gain), low-pass and high-pass filters, volume equalizer and attenuator, volume limiter and volume indicator, noise-reduction unit, and monitoring circuit. The voltage amplifier is Western Electric *81-A* with slight modifications and a gain of 54 decibels. This feeds 500 ohms out into an MGM two-section 7500-

cycle cut-off low-pass which in turn feeds into a 50-cycle MGM high-pass. The output of the high-pass normals into a standard Western Electric *94-A* amplifier with a 500-ohm termination across the jack normals. These normals also carry a *94-A* in multiple jack. The Western Electric *94-A* amplifier is modified to approximately 17 decibels feed back and a gain of 31 decibels. The *94-A* amplifier output feeds into the MGM pre-equalizer. The pre-equalizer induces a loss of approximately 12 decibels at 100 cycles, 6 decibels at 1000 cycles, and zero decibels at 8000 cycles. Across the output of the pre-equalizer is a Western Electric 500–500-ohm film attenuator, the output of which feeds the value repeat coil and a standard *Q*-type Western Electric noise-control unit.

The frequency-response of the amplifier combination is uniform to ±1 decibel from 20 to 10,000 cycles. The noise level of the overall channel measures minus 53 decibels. Across the jack normals between the *94-A* amplifier is a 5000–50-ohm monitor repeat coil, the volume indicator, potentiometer, and standard Western Electric volume limiter. Across the output of the monitor repeat coil is a 50-to-50-ohm attenuator, the output of which is fed to the monitoring phone jack at the mixer. In the same manner, the output of the volume indicator potentiometer feeds to the volume indicator meter at the mixer panel. A test oscillator with a fixed frequency of 3000 cycles per second and variable output is installed in the unit and may be connected to any section of the circuit by use of patch cords. Western Electric type *705* ear-phones are used for monitoring. A full-wave rectifier using two Tungar tubes and operated from 110-volt, single-phase, a-c sources is used to supply 12 volts d-c to all system lamp and signal circuits. A rectifier using one Western Electric *274* type and two *874* type voltage-regulator tubes supplies *B* voltages to the microphones and *81-A* amplifier.

The recording machine and cameras are supplied power through a standard MGM automatic operating system. This consists fundamentally of a motor-driven cam unit equipped with a series of contacts and relays. A 23-conductor cable from dolly to microphone boom supplies the so-called signal-control box with full complement of telephone, signal, and operating controls. By the operation of a single switch in the signal-control box, the director's extension switch is paralleled across this circuit, and the automatic and operating system energizes the following circuits in the order given:

(*1*) "Take" light and warning signal occur at recorder.
(*2*) Take light and warning signal occur at exterior of stage door.
(*3*) Bell telephone is disconnected from incoming line.
(*4*) Recording machine and camera started.
(*5*) Recording machine shutter opens, camera fogging lamp is operated, and a single stroke of warning bell sounds at the set.

Communication is maintained between microphone boom, recording channel, and central sound plant with inter-phone system having individual ring and talk circuits.