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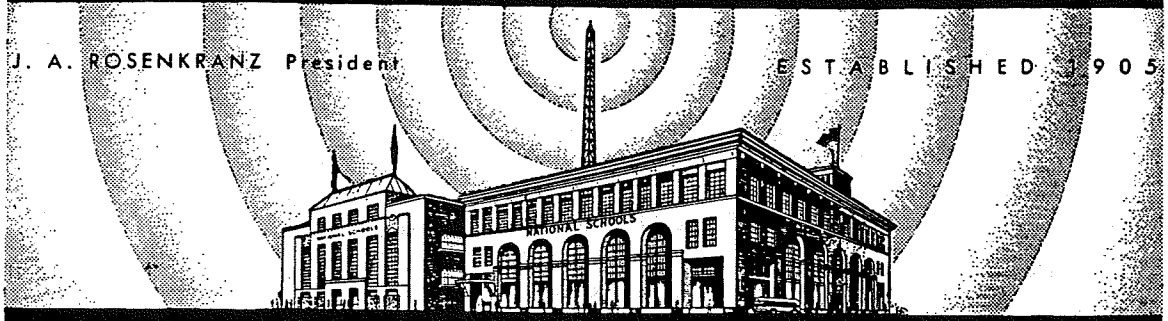

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SOUND PICTURES

LESSON NO. SP-3

INSTALLATION AND OPERATION OF PROJECTION EQUIPMENT

IN ORDER TO FAMILIARIZE YOU WITH THE EQUIPMENT USED IN THEATERS FOR THE PRESENTATION OF SOUND PICTURES, WE SHALL TREAT THIS SUBJECT FROM THE STANDPOINT OF INSTALLATION. THIS CAN BEST BE DONE BY DISCUSSING THE PROBLEMS WHICH ARISE AT THE TIME OF INSTALLING SOUND EQUIPMENT IN A THEATER WHICH WAS ORIGINALLY DESIGNED FOR THE PRESENTATION OF SILENT PICTURES ONLY. IN THIS WAY, YOU WILL BECOME ACQUAINTED WITH EACH UNIT OF THE EQUIPMENT AS REGARDS INSTALLATION, OPERATION, AND GENERAL MAINTENANCE.

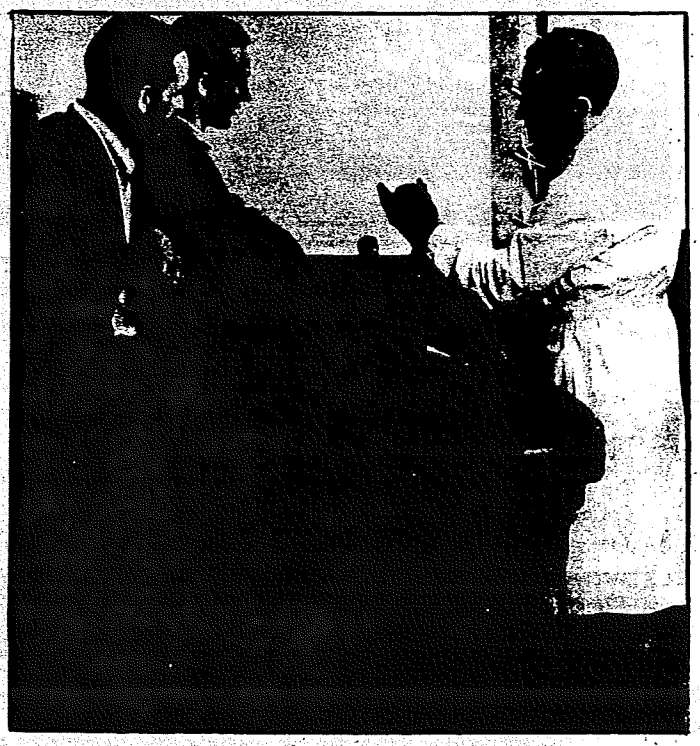

FIG. 1
STUDENTS INSPECTING SOUND PICTURE SCREEN

IT IS ALSO WELL TO MENTION AT THIS TIME THAT SOUND PICTURES ARE NOT ONLY BEING USED IN THEATERS ALONE, BUT EDUCATIONAL INSTITUTIONS ARE ALSO NOW UTILIZING SUCH EQUIPMENT AS A MEANS FOR IMPARTING INSTRUCTION TO THEIR STUDENTS.

BOTH LARGE AND SMALL SCHOOLS ARE AT PRESENT SHOWING EDUCATIONAL PICTURES, WITH SPEECH ACCOMPANIMENT. METHODS AS THIS OFFER A GOOD MEANS OF DEMONSTRAT-

ING THE ACTIVITY IN THE VARIOUS WALKS OF INDUSTRIAL AND COMMERCIAL LIFE, SO THAT STUDENTS ARE BROUGHT CLOSER IN CONTACT WITH THE PRACTICAL APPLICATION OF THE SUBJECTS ABOUT WHICH THEY ARE STUDYING. FOR EXAMPLE, CLASSES IN CHEMISTRY CAN THUS WITNESS INTERESTING EXPERIMENTS AS CARRIED OUT IN SOME LARGE LABORATORY, STUDENTS OF ENGINEERING CAN BE SHOWN HOW GREAT FACTORIES PRODUCE CERTAIN ARTICLES ETC.

SO CONSIDERING PICTURE EQUIPMENT INSTALLATION FROM ALL ANGLES, IT IS EVIDENT THAT THERE IS A GREATER DEMAND FOR COMPETENT MEN THAT ONE WOULD AT FIRST SUPPOSE. THIS TYPE OF WORK IS FASCINATING, WELL PAID FOR, AND OFFERS ANOTHER PROFITABLE OUTLET FOR THE WELL TRAINED RADIO STUDENT.

CONSIDERATION OF AUDITORIUM ACOUSTICS

BEFORE COMMENCING THE ACTUAL INSTALLATION WORK, IT IS ADVISABLE TO FIRST CONSIDER THE CONSTRUCTIONAL DETAILS OF THE INTERIOR OF THE AUDITORIUM AS THEY ALREADY ARE AND TO MAKE ANY NECESSARY ALTERATIONS BEFORE THE INSTALLATION WORK IS STARTED. IT MUST BE REMEMBERED THAT AN AUDITORIUM, WHICH IS IDEAL FOR THE SHOWING OF SILENT PICTURES, WILL NOT NECESSARILY PROVE TO BE UP TO THE STANDARD REQUIRED FOR BEST QUALITY SOUND PICTURE REPRODUCTION. IN OTHER WORDS, THE ACOUSTIC CHARACTERISTICS OF THE ROOM MUST BE CAREFULLY STUDIED IN THE MANNER AS ALREADY DESCRIBED IN ONE OF YOUR PREVIOUS LESSONS, WHERE WE DISCUSSED THE INSTALLATION OF SOUND AMPLIFIERS IN AUDITORIUMS.

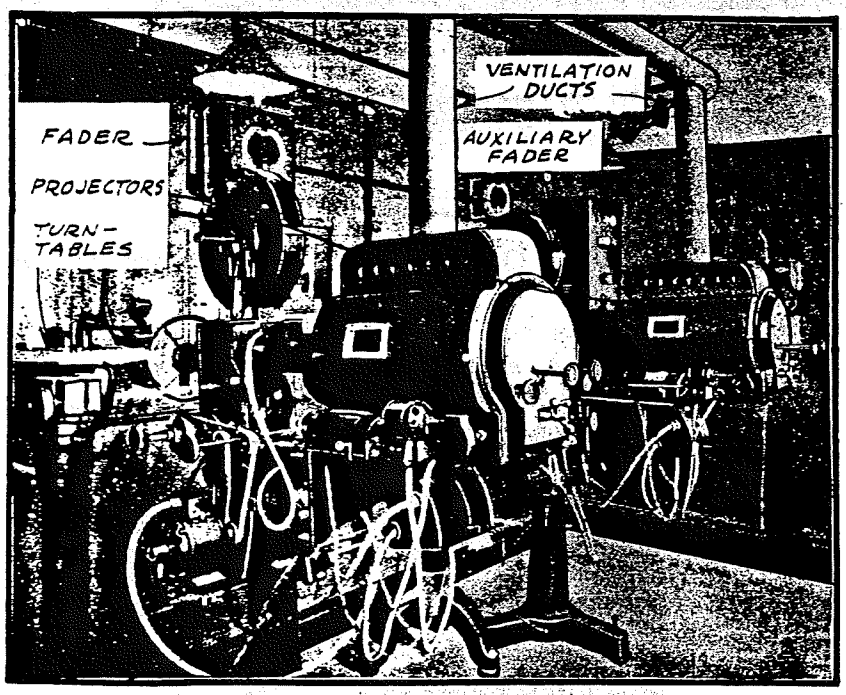

FIG. 2
A Projection Booth

EXCESSIVE REVERBERATION, AND CONSTRUCTIONAL DETAILS CAUSING HOLLOW ECHOING SOUNDS MUST BE ELIMINATED EITHER BY ALTERATION OF THE ROOM OR ELSE THROUGH THE PROPER USE OF WALL DRAPERIES, HEAVY CARPETS ETC. ONE SHOULD ALSO SEE TO IT THAT OUTSIDE NOISES DO NOT HAVE ACCESS INTO THE AUDITORIUM.

CONSIDERING THE CONSTRUCTION OF THE PROJECTION BOOTH

ANOTHER POINT TO CONSIDER WITH THE UTMOST CARE, BEFORE INSTALLING

SOUND PICTURE EQUIPMENT, IS THE PROJECTION BOOTH ITSELF. AS WAS MENTIONED BEFORE, TWO PICTURE PROJECTORS ARE REQUIRED TO SHOW A CONTINUOUS PICTURE WITHOUT INTERRUPTION BETWEEN REELS. THE PROJECTION BOOTH SHOULD THEREFORE BE LAID OUT SO THAT ADEQUATE SPACE IS ALLOTED FOR THE INSTALLATION OF THESE PROJECTORS, WITHOUT HAVING TO PLACE THEM SO CLOSE TOGETHER THAT THE OPERATOR HAS TO WORK IN CRAMPED QUARTERS.

NOT ONLY MUST THE PROJECTORS THEMSELVES BE HOUSED IN THIS BOOTH BUT ALL OF THE ACCESSORIES, SUCH AS TURN TABLES FOR DISC RECORDINGS, SPOT LIGHTS, AMPLIFIER CONTROLS ETC. MUST ALSO BE INCLUDED IN THE BOOTH. IT IS BEST TO SPEND SUFFICIENT TIME IN THE PLANNING OF THE BOOTH BEFOREHAND, THAN TO HAVE TO MAKE ALTERATIONS AFTER THE EQUIPMENT IS ALREADY INSTALLED AND ALTHOUGH THE EQUIPMENT SHOULD NOT ALL BE CROWDED TOGETHER, YET IT SHOULD NOT BE SEPARATED TO THE POINT WHERE THE OPERATOR LOOSES VALUABLE TIME IN MOVING FROM ONE UNIT TO ANOTHER

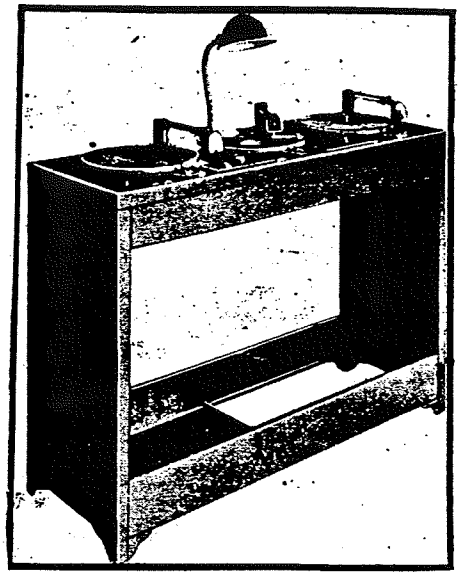

FIG. 3
A Turntable Rack.

A NEAT ARRANGEMENT OF TWO PROJECTORS WITH THEIR TURN-TABLES IS SHOWN IN FIG.2 AND HERE THE FADER AND AUXILIARY FADER ARE BOTH MOUNTED ON THE WALL IN FRONT OF THE PROJECTORS, SO THAT THE OPERATOR CAN COMFORTABLY REGULATE THE FADING OF THE AMPLIFIER EQUIPMENT FROM EITHER OF THE TWO PICTURE PROJECTORS. ALSO NOTICE THE VENTILATION DUCTS ABOVE THE LAMPHOUSE OF EACH OF THE PROJECTORS. THESE MUST NEVER BE OMITTED WHEN A CARBON ARC IS USED FOR THE ILLUMINATION OF THE PROJECTOR.

IF PLENTY OF SPACE IS AVAILABLE, THEN IT IS IDEAL TO PLAN ON PLACING THE AMPLIFIER AND ITS ASSOCIATED SOUND EQUIPMENT IN A SEPARATE ROOM. THIS ADDITIONAL ROOM NEED NOT BE LARGE BUT ONLY OF SUFFICIENT SIZE TO CONVENIENTLY HOUSE THE ACCESSORY APPARATUS. BY THIS MEANS, MORE OPERATING SPACE WILL BE PROVIDED IN THE PROJECTION BOOTH AND ONLY THE PROJECTORS, TURNTABLES, SPOT LIGHTS, SOUND CONTROLS AND EQUIPMENT OF THIS NATURE NEED BE INSTALLED IN THE BOOTH. IN OTHER WORDS, THE BOOTH WOULD NOW ONLY CONTAIN THAT EQUIPMENT WHICH MUST AT ALL TIMES BE AT THE FINGER TIPS OF THE OPERATOR DURING THE PERFORMANCE.

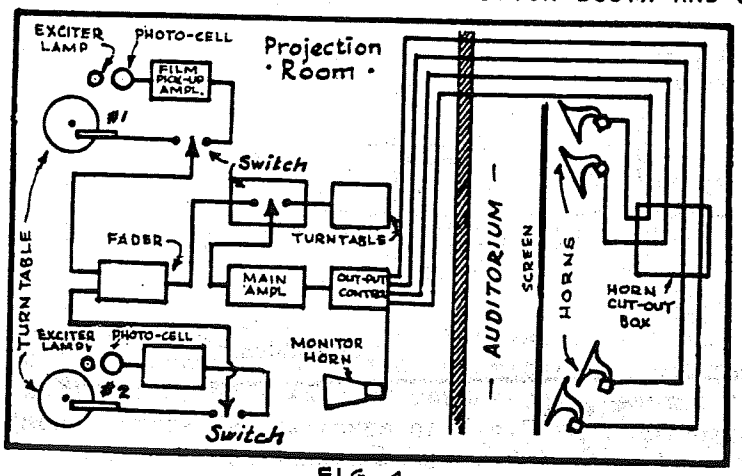

FIG. 4
Lay-out of Projection Equipment.

MISCELLANEOUS EQUIPMENT

IT IS NOT ALWAYS NECESSARY TO PURCHASE MOTION PICTURE PROJECTION EQUIP-

MENT BECAUSE COMPANIES NOW MAKE A PRACTICE OF LEASING THIS EQUIPMENT TO THEATERS ETC. IN THIS CASE, THE THEATER OWNER PAYS FOR THE INITIAL COST OF THE INSTALLATION AND FOR THE RENTAL, AND SERVICE CHARGES. THIS PRACTICE IS FOLLOWED ESPECIALLY WHERE VERY HIGH PRICED EQUIPMENT IS BEING USED.

VERY OFTEN, IT IS DESIRABLE TO HAVE NON-SYNCHRONOUS MUSICAL ACCOMPANIED TO SILENT PICTURES OR DURING INTERMISSIONS IN THE PROGRAM ETC. FOR THESE OCCASSIONS, A TURN-TABLE, SUCH AS SHOWN IN FIG. 3, WILL PROVE OF GREAT VALUE. HERE YOU WILL SEE HOW THREE INDIVIDUAL TURN-TABLES ARE MOUNTED ON A RACK, EACH OF THEM BEING PROVIDED WITH A PICK-UP UNIT. A "GOOSE-NECK" LAMP ILLUMINATES THE UNIT.

IN THIS WAY, CONVENTIONAL PHONOGRAPH RECORDS CAN BE PLAYED AND THE ENDING OF ONE CAN BE WOVEN RIGHT INTO THE BEGINNING OF THE OTHER THRU THE PROPER OPERATION OF THE FADER.

AT THE PRESENT TIME, IT IS ALSO ADVISABLE TO INSTALL EQUIPMENT, WHICH CAN BE USED FOR THE SHOWING OF TALKING PICTURES WITH DISC RECORDING, AS WELL AS WITH FILM RECORDING BECAUSE BOTH OF THESE METHODS ARE BEING USED BY PROMINENT MOTION PICTURE PRODUCING COMPANIES.

LAYING OUT THE PROJECTION BOOTH

THE PROJECTION BOOTH SHOULD BE WELL VENTILATED AND SUITABLY ILLUMINATED FOR THE CONVENIENCE AND HEALTH OF THE OPERATOR BECAUSE CONSIDERABLE HEAT IS GENERATED BY THE EQUIPMENT WHEN IN OPERATION AND HARDLY ANYTHING IS MORE NERVE-RACKING THAN TRYING TO READ SOME NOTATION OR MAKE AN ADJUSTMENT WHEN SURROUNDED BY DARKNESS.

SINCE CONSIDERABLE POWER WIRING IS INVOLVED IN THE INSTALLATION OF

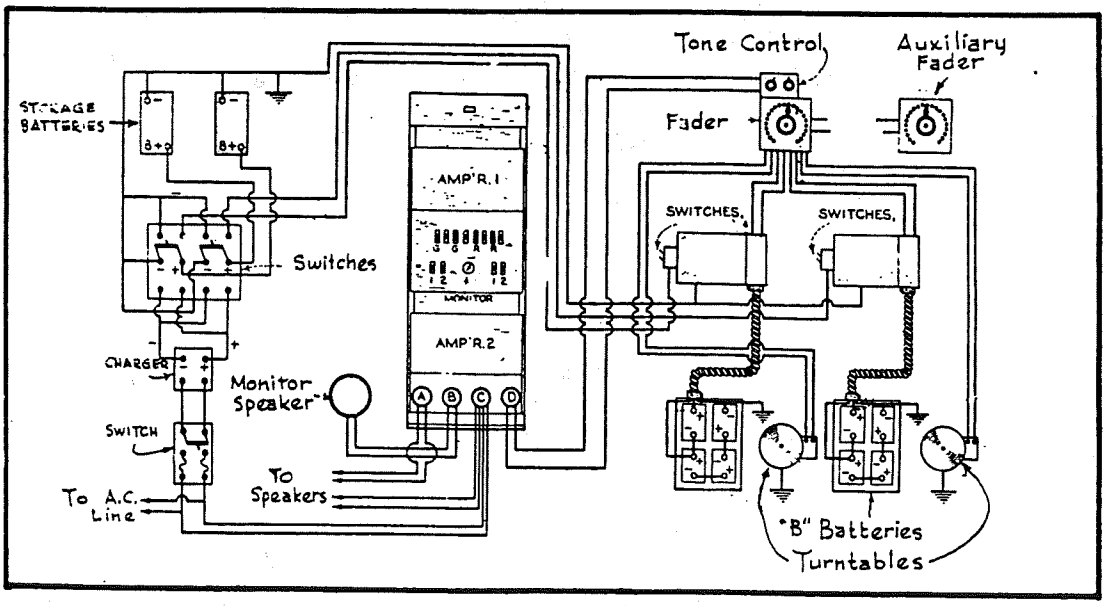

FIG. 5

Schematic Layout of the Sound Equipment.

TALKING PICTURE EQUIPMENT, CERTAIN CITY OR COUNTY LAWS AND SPECIFICATIONS MUST BE FULFILLED WITH RESPECT TO THE WIRING ETC. THIS IS NATURALLY DUE TO THE FIRE-HAZARD OF SUCH EQUIPMENT AND SO BEFORE PROGRESSING WITH THE WORK, IT IS ADVISABLE TO FIRST CONSULT YOUR LOCAL REGULATIONS RELATIVE TO THE INSTALLATION. IN THE LARGER CITIES, FOR EXAMPLE, THE LAW REQUIRES THAT ALL WIRING BE CONCEALED WITHIN RIGID CONDUIT (IRON PIPE) OR ELSE IN FLEXIBLE METAL TUBING. IT MIGHT ALSO BE WELL TO ADD AT THIS TIME THAT NO PROJECTION BOOTH SHOULD BE WITHOUT A GOOD FIRE EXTINGUISHER, WHICH CAN BE PUT INTO IMMEDIATE USE, SHOULD AN EMERGENCY ARISE.

A GENERAL LAY-OUT OF THE SOUND PICTURE PROJECTION EQUIPMENT IS SHOWN IN FIG.4. FOR THE SAKE OF CLEARNESS, WE ARE ILLUSTRATING THE PROJECTION ROOM RATHER LARGE AS COMPARED TO THE AUDITORIUM BUT FOR THE PRESENT, THE SOUND EQUIPMENT ITSELF IS MORE IMPORTANT TO US THAN THE AUDITORIUM.

NOTICE THAT THE PROJECTION ROOM IN THIS CASE MUST ACCOMMODATE TWO COMPLETE PROJECTOR UNITS, WHICH WE ARE DESIGNATING AS MACHINE #1 AND MACHINE #2. EACH OF THESE MACHINES HAS BOTH A DISC PICK-UP UNIT AND A FILM PICK-UP UNIT. ONE SWITCH AT MACHINE #1 AND ANOTHER AT MACHINE #2 PERMIT EITHER OF THE SOUND PICK-UP UNITS TO BE CONNECTED TO ITS RESPECTIVE MACHINE.

THE PICK-UPS FROM BOTH MACHINES FEED INTO THE SAME FADER AND BY THROWING THE SWITCH OF THE SWITCH PANEL TOWARD THE LEFT, THE FADER BECOMES CONNECTED TO THE MAIN AMPLIFIER. THE SOUND CURRENTS CAN THEN BE PASSED THROUGH THE OUTPUT CONTROL, MONITOR HORN AND TO THE MAIN SPEAKER UNITS, WHICH ARE LOCATED ON THE STAGE BEHIND THE SCREEN. IN CASE THAT NON-SYNCHRONOUS MUSIC IS DESIRED, THEN THE SWITCH ON THE SWITCH PANEL CAN BE THROWN TOWARDS THE RIGHT AND THIS WILL CONNECT THE NON-SYNCHRONOUS TURN-TABLE TO THE AMPLIFYING SYSTEM.

IN FIG.5, YOU WILL SEE A MORE DETAILED SCHEMATIC DIAGRAM OF THE SOUND EQUIPMENT FOR A TWO-MACHINE INSTALLATION. HERE THE SYSTEM IS FURNISHED WITH A 110 VOLT A.C. SUPPLY FROM THE LIGHTING LINES AND THE MAIN AMPLIFIER IS CONNECTED DIRECTLY TO THIS A.C. LINE. IT IS OF COURSE UNDERSTOOD THAT THE AMPLIFIER IS PROVIDED WITH ITS OWN POWER PACK, WHICH CONVERTS THE A.C. INPUT INTO D.C. VOLTAGES AND A.C. VOLTAGES OF THE PROPER VALUES, THE SAME AS IS DONE IN ANY AUDIO AMPLIFIER FOR PUBLIC ADDRESS WORK ETC.

SINCE STORAGE BATTERIES ARE USED FOR THE FILAMENT SUPPLY OF THE EXCITER LAMP IN THE FILM PICK-UP AND FOR THE TUBE FILAMENTS OF THE PHOTO-CELL AMPLIFIER, PROVISIONS MUST BE MADE SO THAT THESE BATTERIES CAN BE KEPT IN A FULLY CHARGED CONDITION. FOR THIS REASON, A BATTERY CHARGING CIRCUIT IS INCORPORATED IN THE HOOK-UP.

THE BATTERY CHARGER CAN BE OF THE CONVENTIONAL TUNGAR TYPE, BEING CONNECTED TO THE A.C. LINE BY MEANS OF A SINGLE THROW, DOUBLE POLE SWITCH. THE CHARGER IS IN TURN CONNECTED TO THE TWO 8 VOLT STORAGE BATTERIES BY MEANS OF A PAIR OF DOUBLE-POLE, DOUBLE THROW SWITCHES. BY CLOSING THESE LATTER TWO SWITCHES OF FIG.5 IN A DOWNWARD DIRECTION, THE CHARGER IS CONNECTED TO THE BATTERIES AND BY CLOSING THESE SAME TWO SWITCHES IN THE UPWARD DIRECTION, THE STORAGE BATTERIES ARE CONNECTED TO THE EXCITER

LAMP AND FILAMENT CIRCUITS OF THE PHOTO - CELL AMPLIFIER. WITH THESE SWITCHES IN THE OPEN POSITION, THE BATTERIES ARE DISCONNECTED FROM ALL OF THE CIRCUITS.

THE CHARGER IS NOT KEPT IN OPERATION DURING THE TIME A PICTURE IS BEING SHOWN AND THE BATTERIES ARE PUT ON THE CHARGING CIRCUIT ONLY DURING THOSE PERIODS WHEN THE PROJECTION EQUIPMENT IS NOT IN USE.

FOUR, SERIES CONNECTED, 45 VOLT "B" BATTERIES ARE USED TO SUPPLY THE ANODE POTENTIAL TO EACH OF THE TWO PHOTO-ELECTRIC CELLS AND TO THE PLATES OF THE PHOTO-CELL AMPLIFIER. IN PROJECTION WORK, THE FILM PICK-UP, CONSISTING OF THE EXCITER LAMP, PHOTO-CELL, AND THE PHOTO-CELL AMPLIFIER IS GENERALLY REFERRED TO AS THE "SOUND HEAD" OF THE PROJECTOR AND WE HAVE NAMED THIS UNIT AS SUCH IN FIG.5.

NOTICE IN FIG.5 HOW THE "B" LEADS TO THE HEAD AMPLIFIERS ARE ENCLOSED IN GREENFIELD ARMOR CABLE AND THAT THE OUTPUT OF THE DISC PICK-UPS AND HEAD AMPLIFIERS ALL LEAD INTO A SINGLE FADER. THE AUXILIARY FADER IS CONNECTED TO THE MAIN FADER BY MEANS OF AN EXTENSION SHAFT AND SUITABLE GEARS, SO THAT EITHER CONTROL OPERATES THE SAME FADER.

THE TERMINALS ENCIRCLED AT "A" OF FIG.5 ARE THE AUDIO OUTPUT TERMINALS LEADING TO THE VOICE COILS OF THE DYNAMIC SPEAKERS. THE MONITOR HORN IS CONNECTED TO THE TERMINALS AT "B" AND THE FIELDS OF THE DYNAMIC SPEAKERS ARE CONNECTED TO THE TERMINALS ENCIRCLED AT "C". IN THIS WAY, THE FIELD CURRENT TO THE SPEAKERS WILL BE AN A.C. SUPPLY BUT THIS IS RECTIFIED AT THE LOCATION OF THE SPEAKERS, SO THAT A DIRECT CURRENT WILL BE FURNISHED TO THE FIELDS. THE INPUT TERMINALS FROM THE FADER INTO THE AMPLIFIER ARE MARKED "D" AND THE TONE CONTROL PERMITS THE OPERATOR TO AD-

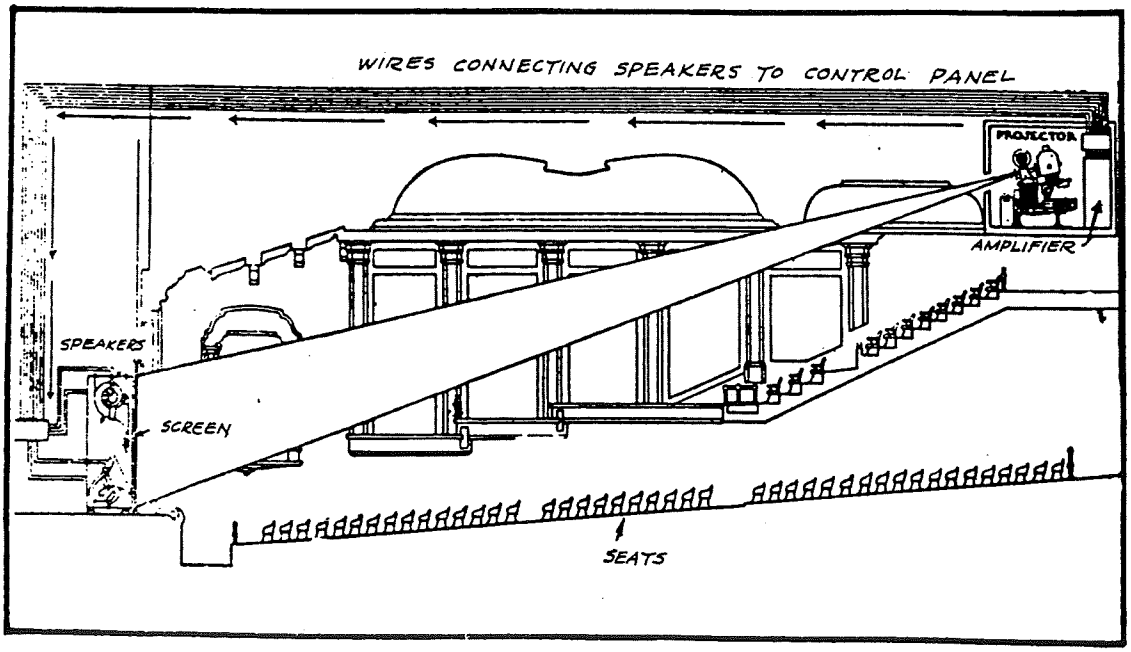

FIG. 6

Speaker Placement for Sound Pictures.

JUST THE TONE QUALITY, SO THAT THE MOST NATURAL TONE CAN BE PRODUCED.

THE WIRES LEADING FROM THE AMPLIFIER OUTPUT TO THE SPEAKERS SHOULD BE RUN IN TWISTED PAIRS, CAREFULLY SHIELDED SO AS TO PREVENT PICK-UP OF DISTURBING NOISES. THE SPEAKERS SHOULD BE MOUNTED IN BACK OF THE PICTURE SCREEN IN SUCH POSITIONS AS WILL AFFORD THE BEST SOUND DISTRIBUTION AND THE NUMBER OF SPEAKERS REQUIRED WILL OF COURSE DEPEND UPON THE VOLUME AND SEATING CAPACITY OF THE AUDITORIUM.

MOUNTING THE SPEAKERS

THE GENERAL PRACTICE IS TO FIRST MOUNT THE SPEAKERS ON A TEMPORARY SET UP, SO THAT THEY CAN BE SHIFTED ABOUT AND AIMED IN DIFFERENT DIRECTIONS WHEN THE AMPLIFIER IS IN OPERATION DURING THE TESTS. HAVING THUS DETERMINED THE BEST SPEAKER POSITIONS, THEY CAN BE PERMANENTLY MOUNTED AND IN ONE OF OUR LESSONS ON SOUND AMPLIFIER EQUIPMENT, WE ALREADY CONSIDERED THE PROPER METHODS OF SPEAKER INSTALLATION FOR AUDITORIUM USE. HOWEVER, IN FIG. 6, WE ARE SHOWING YOU ANOTHER EXAMPLE OF SPEAKER PLACEMENT.

A VERY IMPORTANT POINT, WHICH SHOULD BY NO MEANS BE OVERLOOKED, IS THE MATTER OF SELECTING A SCREEN SUITABLE FOR SOUND PICTURE PURPOSES. THE SCREEN SHOULD BE "TRANSVOCENT", THAT IS, SPECIALLY WOVEN SO THAT SOUND WAVES CAN PENETRATE THROUGH IT WITH EASE. ORDINARY TYPES OF SCREENS, AS USED FOR SILENT PICTURES, ARE TOO HEAVY AND CLOSELY WOVEN FOR FAITHFUL SOUND PROJECTION AND THEY HAVE A TENDENCY TO DEADEN OR MUFFLE THE SOUNDS, WHICH ARE EMITTED FROM THE SPEAKERS.

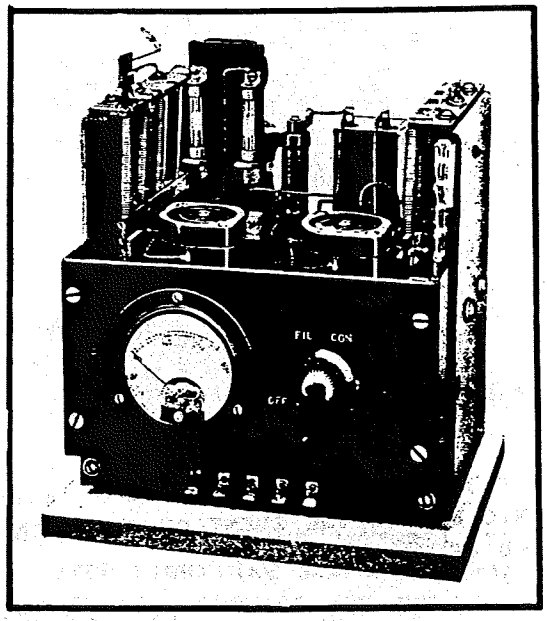

FIG. 7
A Photo-cell Amplifier.

THE STAGE IN BACK OF THE SPEAKERS SHOULD ALSO BE ACOUSTICALLY TREATED SO THAT REVERBERATION IS KEPT DOWN TO A MINIMUM. IF THIS IS NOT DONE, ANNOYING ECHOES WILL BE SET UP BACK-STAGE AND THUS PREVENT FAITHFUL SOUND REPRODUCTION. THE REPRODUCED SOUNDS SHOULD BE SUCH THAT THEY APPEAR JUST AS THOUGH THEY ORIGINATED ON THE SCREEN ITSELF AND A GOOD DEAL OF PRACTICE IS REQUIRED TO ARRIVE AT SUCH A CONDITION IN A REASONABLY SHORT TIME.

ONE STANDARD PRACTICE IS TO COVER THE HORNS, AND THE BACK OF THE SCREEN, EXCEPT THE AREAS OCCUPIED BY THE HORNS, WITH ABSORBENT DRAPES.

CALIBRATING THE AMPLIFIER

AFTER THE INSTALLATION IS COMPLETE, THE NEXT STEP IS TO "CALIBRATE" THE AMPLIFIER, THAT IS TO SAY, IT IS NOW ADJUSTED TO GIVE THE BEST POSSIBLE RESULTS FOR THE PARTICULAR THEATER. THIS IS DONE BY MEANS OF "TEST

RECORDS", BOTH OF THE FILM AND DISC TYPE. THESE TEST RECORDS MAKE AVAILABLE A WIDE VARIETY OF THE TYPES OF ENTERTAINMENTS TO BE GIVEN AND EACH IS ALREADY MARKED WITH THE FADER SETTING FOR THE EQUIPMENT BEING USED. (THIS IS IN THE CASE OF STANDARD SOUND EQUIPMENT, SUCH AS WESTERN ELECTRIC ETC.). THE FADER SETTING FOR THIS APPARATUS HAS ALREADY BEEN DETERMINED IN A THEATER, WHICH HAS BEEN CHOSEN AS A "STANDARD".

BY PLAYING THESE RECORDS WITH THE FADER SET AT THE RECOMMENDED POSITION, THE MAIN AMPLIFIER POTENTIOMETER (VOLUME CONTROL) IS ADJUSTED UNTIL THE PROPER SOUND EFFECTS ARE OBTAINED. THE POTENTIOMETER IS THUS SET AT A PRESUMABLY PERMANENT ADJUSTMENT, IN KEEPING WITH THE SIZE OF THE THEATER, SO THAT IN THE FUTURE, THE OPERATOR CAN SECURE GOOD RESULTS FROM ANY RECORDS BY ADJUSTMENT OF THE FADER ONLY.

GUARDING AGAINST VIBRATION

VIBRATION MUST BE CAREFULLY GUARDED AGAINST IN THE AMPLIFIER EQUIPMENT, SO THAT NONE OF THE TUBES WILL BECOME MICROPHONIC. THIS IS ESPECIALLY TRUE IN THE CASE OF THE SOUND HEAD AMPLIFIER OPERATING OFF THE ENERGY OF THE PHOTO-CELL AND WHICH IS MOUNTED DIRECTLY ON THE PROJECTION MACHINE ONE OF THESE AMPLIFIERS IS SHOWN IN FIG.7, WITH THE TUBES REMOVED, AND HERE YOU WILL SEE HOW SPRING SUSPENSIONS ARE RESORTED TO, IN ORDER TO PREVENT MECHANICAL VIBRATION FROM BEING TRANSMITTED TO THE TUBES OF THIS AMPLIFIER.

A MICROPHONIC TUBE IN THIS FILM PICK-UP AMPLIFIER WOULD CAUSE A TERRIBLY ANNOYING HOWL IN THE SPEAKERS BECAUSE IT WOULD BE AMPLIFIED TREMENDOUSLY BY THE SUCCESSIVE STAGES OF AMPLIFICATION. QUITE OFTEN, IT IS NECESSARY TO PLACE A $\frac{1}{2}$" RUBBER PAD UNDER EACH FOOT OF THE PROJECTOR, PARTICULARLY IF THE FLOOR IS NOT FREE FROM VIBRATION.

IN CASES WHERE THE SERVICE DEMANDS ARE QUITE HEAVY UPON THE MAIN AMPLIFIER, IT IS ADVISABLE TO HAVE AN EXTRA AMPLIFIER, WHICH CAN BE PUT INTO USE IN THE EVENT OF THE MAIN AMPLIFIER'S FAILURE DURING THE SHOWING OF THE PICTURE.

GETTING READY FOR OPERATION

HAVING CONSIDERED THE INSTALLATION OF SOUND PICTURE EQUIPMENT, LET US NEXT TURN OUR ATTENTION TO THE PROPER OPERATION AND MAINTENANCE OF THESE UNITS. THE MOST LOGICAL WAY TO APPROACH THIS SUBJECT IS TO CONSIDER THE STEPS JUST AS THEY SHOULD BE MADE WHEN ENGAGED IN THIS WORK.

THE OPERATOR SHOULD ALLOW HIMSELF SUFFICIENT TIME BEFORE THE "SHOW" TO ARRANGE ALL OF HIS EQUIPMENT AND TO GET HIS MACHINES READY FOR OPERATION. HE SHOULD HAVE ALL OF THE REQUIRED FILM RECORDINGS ETC. CLOSE AT HAND, SO THAT EVERYTHING IS READILY ACCESSIBLE, AS A DELAY OF BUT A FEW SECONDS CAN BE SUFFICIENT TO SPOIL A PERFORMANCE.

THE PROJECTOR SHOULD BE CHECKED CAREFULLY BEFORE EACH SHOWING. THIS UNIT REQUIRES REGULAR OILING, CLEANING, AND INSPECTION FOR WORN OR LOOSE PARTS AND THE OPERATOR SHOULD MAKE IT HIS JOB TO STUDY THE FACTORY LITERATURE SENT WITH THE MACHINE, SO THAT HE IS THOROUGHLY FAMILIAR WITH

EVERY OIL HOLE ON THAT PARTICULAR UNIT.

ALTHOUGH OIL IS ABSOLUTELY NECESSARY, YET IT MUST BE USED WITH DISCRETION, SO THAT NO SURPLUS OIL COLLECTS ON THE FILM SPROCKETS OR GATES. OIL ON THE FILM FOR SILENT PICTURES IS BAD ENOUGH BUT WHEN SUCH ACCUMULATIONS DEVELOPE ON SOUND FILM IT PRACTICALLY RUINS PROJECTION. FOR THIS REASON, IT IS CLEAR THAT ALL SURPLUS OIL SHOULD BE WIPED OFF THE WORKING PARTS AND THE BEST WAY TO DO THIS IS TO FIRST OIL THE MACHINE WHEN NOT LOADED WITH FILM AND THEN TO RUN THE PROJECTOR FOR A FEW MOMENTS WITHOUT FILM. AFTER THIS IS DONE, THEN THE SURPLUS OIL CAN BE WIPED OFF CAREFULLY WITH A CLEAN "LINT-FREE" RAG.

STRAY BITS OF FILM AND EMULSION ARE FREQUENTLY DEPOSITED IN THE INTERIOR OF THE MACHINE AND THESE CAN BE REMOVED WITH A BRUSH AND CLEANER. ALWAYS WATCH FOR DEPOSITS OF EMULSION IN THE SLIT OF THE SOUND GATE, ESPECIALLY WHEN RUNNING NEW FILM BECAUSE SUCH DEPOSITS WILL SCRATCH THE SOUND TRACK AND THUS DESTROY THE FILM. THE MACHINE, AND ESPECIALLY THE SOUND GATE, SHOULD BE WIPED OUT AFTER EACH REEL

CHECKING THE PROJECTOR LIGHT BEAM ON THE SCREEN

THE NEXT STEP IS TO CHECK THE DISTRIBUTION OF THE PROJECTOR'S LIGHT BEAM UPON THE SCREEN. THE LIGHT SOURCE FOR THE PICTURE SHOULD BE PROPERLY FOCUSED TO GIVE THE MAXIMUM UNIFORM ILLUMINATION UPON THE SCREEN AND THE LAMPHOUSE OF THE PROJECTOR IS PROVIDED WITH CONTROLS FOR DOING THIS. WHEN PROPERLY ADJUSTED, THE LIGHT SHOULD BE CONCENTRATED ON THE BACK OF THE APERTURE PLATE (OPENING FOR FRAMING PICTURE) SO AS TO JUST COVER IT WITH UNIFORMLY DISTRIBUTED LIGHT. THE SCREEN ILLUMINATION CAN THEN BE CHECKED BY OPENING THE AUTOMATIC SHUTTER AND THE DOWSER AND THEN TURNING THE PROJECTOR UNTIL THE REVOLVING SHUTTER ALLOWS THE LIGHT TO SHINE THROUGH ON THE SCREEN.

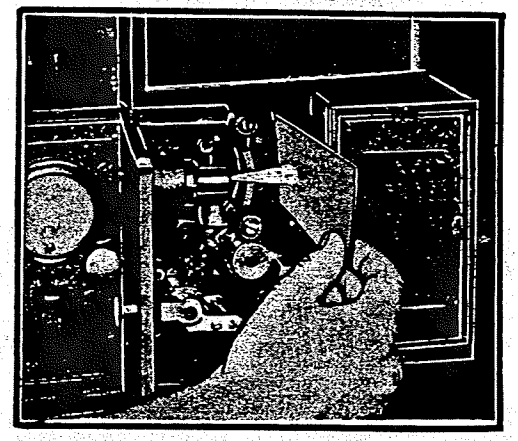

FIG. 8
Checking the Exciter Lamp.

THE IMAGE OF THE APERTURE SHOULD NOW BE CENTERED ON THE SCREEN AND IF IT IS OUT OF CENTER, THE PROJECTOR MAY BE SHIFTED SLIGHTLY TO THE RIGHT OR LEFT AND RAISED OR LOWERED UNTIL IT IS PROPERLY CENTERED. CARE MUST BE EXERCISED, HOWEVER, SO AS NOT TO DISTURB THE ALIGNMENT WITH THE DISC TURN-TABLE, IF THE LATTER IS ON A SEPARATE STAND.

CHECKING THE FOCUS ADJUSTMENT OF THE EXCITER LAMP

THE SOUND HEAD ON THE PROJECTOR IS ALREADY ADJUSTED AT THE TIME OF ITS ASSEMBLY AND UNDER NORMAL OPERATION, ITS OPTICAL SYSTEM SHOULD NOT GET OUT OF ADJUSTMENT. HOWEVER, UPON REPLACEMENT OF THE EXCITER LAMP, IT WILL BE NECESSARY TO REFOCUS IT. THE METHOD OF DOING THIS IS ILLUSTRATED IN FIG.8. TO CHECK THE EXCITER LAMP ADJUSTMENT, THE TENSION PAD ASSEMBLY IS REMOVED AND AN INDEX CARD IS INSERTED OVER THE PHOTO-CELL WIN

DOW AND THE EXCITER LAMP IS THEN ADJUSTED FOR MAXIMUM LUMINOSITY. A SMOOTH OVAL SPOT OF UNIFORM INTENSITY INDICATES A PROPER ADJUSTMENT.

THERE IS GENERALLY ALSO SOME PROVISION MADE ON THE MACHINE FOR THE ALIGNMENT OF THE SOUND TRACK WITH THE SLIT AND THIS ADJUSTMENT SHOULD BE CHECKED FOR EACH FILM BECAUSE THERE IS SOMETIMES A SLIGHT VARIATION BETWEEN PRINTS.

ALL OF THE BATTERIES SHOULD BE CHECKED TO SEE THAT THEIR VOLTAGES ARE NORMAL AND THAT THE CONNECTIONS OF THE STORAGE BATTERIES ARE TIGHT AND FREE FROM CORROSION, AND ALSO THAT THE SPECIFIC GRAVITY OF EACH OF THE STORAGE CELLS IS UP TO THE CORRECT VALUE.

CHECKING THE OPERATION OF THE SOUND HEAD

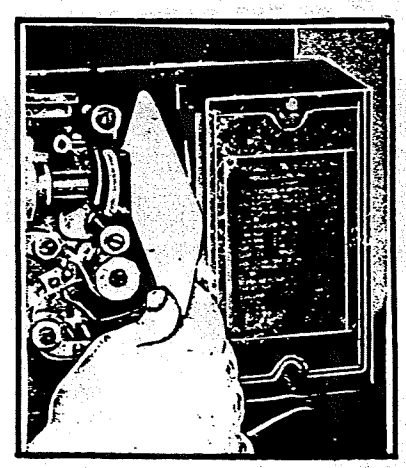

FIG. 9
Checking the Operation of the Sound Head.

THE OPERATION OF THE SOUND HEAD CAN BE CHECKED IN THE FOLLOWING MANNER: FIRST, TURN ON THE HEAD AMPLIFIER AND THE EXCITER LAMP. THEN TURN THE FADER UP TO THE SETTING NORMALLY REQUIRED FOR A SHOW AND FOLLOW THIS BY OPENING THE SOUND GATE AND INTERRUPT THE EXCITER LAMP BEAM BY MOVING A PIECE OF PAPER ON AN INDEX CARD IN FRONT OF IT AS ILLUSTRATED IN FIG. 9. IF THE SYSTEM IS IN PROPER WORKING ORDER, THEN THE SUCCESSIVE INTERRUPTION OF THE EXCITER LAMP BEAM SHOULD CAUSE A SERIES OF SHARP REPORTS TO BE EMITTED FROM THE LOUD SPEAKERS.

SHOULD A SIGNAL OF THE PROPER INTENSITY BE OBTAINED BY THE INTERRUPTION OF THIS LIGHT BEAM, THEN THE APPARATUS CAN NEXT BE TESTED WITH A SAMPLE FILM. FOR FILM RECORDING, TEST FILMS ARE AVAILABLE, CONSISTING OF STANDARD FREQUENCIES OVER THE RANGE OF 60 TO 8000 CYCLES, IN ADDITION TO SOME SILENT SOUND TRACK AND VARIOUS SAMPLES OF SPEECH AND MUSIC. BY THIS MEANS, THE OPERATOR CAN BE ASSURED OF THE FACT AS TO WHETHER OR NOT THE SYSTEM IS GIVING FAITHFUL SOUND REPRODUCTION.

THE REHEARSAL

AFTER THIS PRELIMINARY TEST, IT IS ADVISABLE TO RUN AT LEAST ONE REEL OF THE PICTURE TO BE SHOWN, OR BETTER YET, TO REHEARSE THE WHOLE SHOW. BY DOING THIS, THE OPERATOR CAN CHECK THE QUALITY AND LEVEL OF THE RECORDING AND THUS DETERMINE THE PROPER SETTING OF THE FADER AND TONE CONTROL.

AT TIMES, ESPECIALLY IN THE CASE OF FILM RECORDING OF THE VARIABLE AREA TYPE, IT WILL BE NECESSARY TO SLIGHTLY SHIFT THE ALIGNMENT OF THE FILM WITH RESPECT TO THE SOUND GATE, IN ORDER TO OBTAIN GOOD QUALITY SOUND REPRODUCTION.

AT THE TIME OF REWINDING THE REELS, THE OPERATOR SHOULD NOTE THE OVERLAPPING FRAMES OF THE SUCCESSIVE REELS, SO THAT THE VARIOUS REELS CAN BE RUN OFF IN CONTINUOUS SECTIONS. DURING THIS REWINDING PROCESS, THE OP-

ERATOR SHOULD ALSO NOTE WHETHER OR NOT THERE ARE ANY SCRATCHES, TEARS, OIL SPOTS ETC. ON THE FILM. BY NOTING ANY OF SUCH DEFECTS BEFOREHAND, TROUBLE CAN BE AVOIDED DURING THE SHOW.

THREADING THE PROJECTOR

FIG.10 SHOWS YOU HOW THE FILM IS THREADED INTO THE PROJECTOR. NOTICE HOW THE UPPER LOOP IS MADE AROUND THE INDEX FINGER OF THE LEFT HAND. THE INDEX FINGER OF THE RIGHT IS ALSO USED TO HOLD THE FILM IN PLACE, THUS LEAVING THE MIDDLE FINGER FREE TO PULL THE TRIGGER WHICH CLOSES THE TENSION PAD AGAINST THE APERTURE. SYNCHRONIZATION OF THE SOUND WITH FILM RECORDING CAUSES LITTLE DIFFICULTY BECAUSE INSTRUCTIONS FURNISHED WITH THE MACHINE SPECIFY HOW MANY OF THE SPROCKET HOLES IN THE FILM TO ALLOW BETWEEN THE APERTURE PLATE AND THE SOUND GATE. AT ANY RATE, THIS DISTANCE SHOULD BE ABOUT 14½" OR TWENTY FRAMES ON STANDARD 35 MM. FILM, AS YOU WERE ALREADY TOLD IN THE PREVIOUS LESSON. A SLIGHT VARIATION, SUCH AS ONE OR TWO FRAMES, CAUSES NO NOTICEABLE EFFECT.

IN THE CASE OF DISC RECORDINGS, YOU WILL FIND A FRAME IN THE LEADER OF THE FILM MARKED "START", THIS FRAME SHOULD BE LINED UP WITH THE APERTURE PLATE, AT THE SAME TIME THAT THE PICK-UP UNIT IS PLACED ON THE STARTING MARK OF THE DISC RECORD.

THE PICTURE SHOULD BE FRAMED UPON THE THE SCREEN BEFORE STARTING THE PROJECTOR, AND AFTER THE PROJECTOR IS FIRST THREADED, IT SHOULD BE RUN EITHER BY HAND OR MOTOR FOR ONLY A FEW FRAMES, SO AS TO MAKE SURE THAT THE FILM HAS SEATED PROPERLY AND THAT THE LOOPS ARE OF THE PROPER LENGTH, SO THAT THEY WILL NEITHER BIND NOR CATCH ON ANYTHING. THIS CAN BE DONE BEFORE THE PROJECTOR LAMP IS TURNED ON.

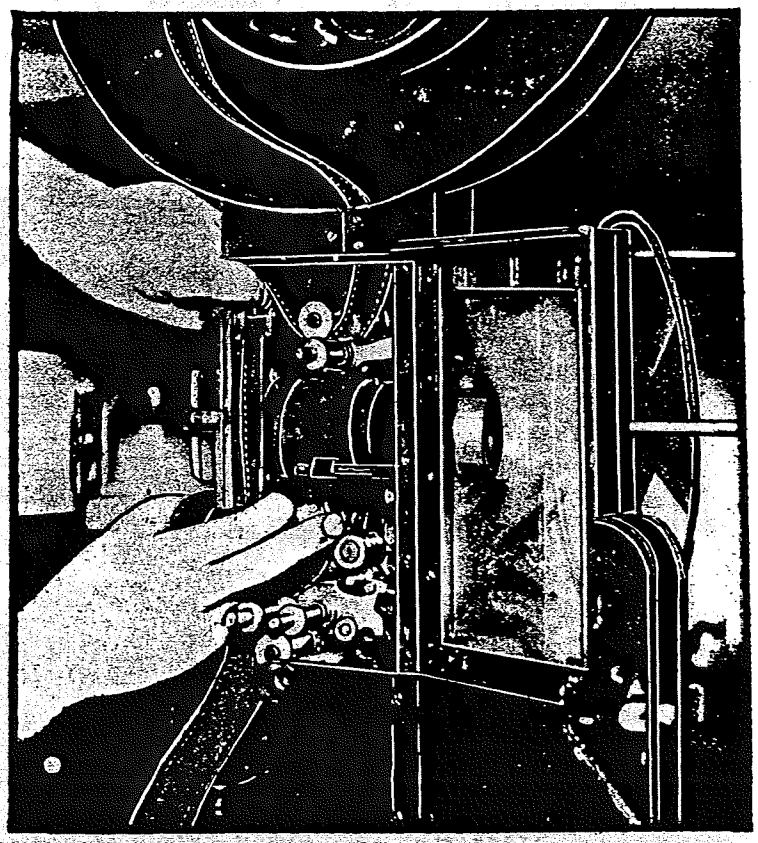

FIG. 10

Threading the Projector Head.

STARTING THE PROJECTOR

THE PROJECTOR LAMP OR ARC CAN NOW BE TURNED ON BUT FIRST MAKE SURE THAT THE DOWSER LEVER IS IN THE CLOSED POSITION, SO THAT THE PROJECTION LIGHT BEAM CANNOT PASS THROUGH THE PROJECTOR HEAD. THE DOW

SER CAN THEN BE OPENED FOR A SECOND, SO AS TO CHECK THE ILLUMINATION ON THE APERTURE.

SET THE FADER AT ITS ZERO POSITION AND BE SURE THAT THE DISC-FILM SWITCH IS IN THE PROPER POSITION. IN THE CASE OF SOUND ON FILM PROJECTION, THE HEAD AMPLIFIER AND EXCITER LAMP CAN NOW BE TURNED ON.

THIS DONE, TURN ON THE PROJECTOR MOTOR AND AS IT COMES UP TO SPEED OPEN THE DOWSER AS SHOWN IN FIG.11. NOTE THAT THE PICTURE IS PROPERLY PLACED UPON THE SCREEN AND THEN TURN UP THE FADER CONTROL TO THE POSITION PREVIOUSLY DETERMINED, WHERE THE SPEAKER VOLUME IS JUST RIGHT FOR THE AUDITORIUM. DURING THE SHOWING OF THE PICTURE, THE OPERATOR SHOULD KEEP A CLOSE WATCH UPON THE SCREEN, AS WELL AS UPON HIS EQUIPMENT AND IN THE EVENT THAT THE FILM SHOULD TEAR, HE SHOULD BE PREPARED TO STOP THE MACHINE IMMEDIATELY.

GUARDING AGAINST FILM BREAKAGE

THE BEST WAY TO STOP THE MACHINE UPON FILM BREAKAGE IS TO FIRST CLOSE THE DOWSER AND THEN STOP THE MOTOR, BRINGING THE FADER BACK TO ITS ZERO POSITION. THE PROJECTOR SHOULD THEN BE RETHREADED AND THE FILM SHOULD BE TEMPORARILY SPLICED ON THE "TAKE-UP" REEL WITH A PAPER CLIP.

ALWAYS BEAR IN MIND TO OBSERVE ALL FILM DEFECTS AT THE TIME OF RUNNING A FILM AT REHEARSAL AND WHEN REWINDING A REEL, AS THIS PRACTICE WILL CERTAINLY SAVE TIME AND EMBARRASMENT. IF PARTIAL TEARS EXIST ANYWHERES ALONG THE LENGTH OF THE FILM, THEY SHOULD BE CUT OUT AND THE FILM PERMANENTLY SPLICED WITH SPECIAL CEMENT AT THE NEAREST FRAME LINE, AS WILL BE SHOWN LATER.

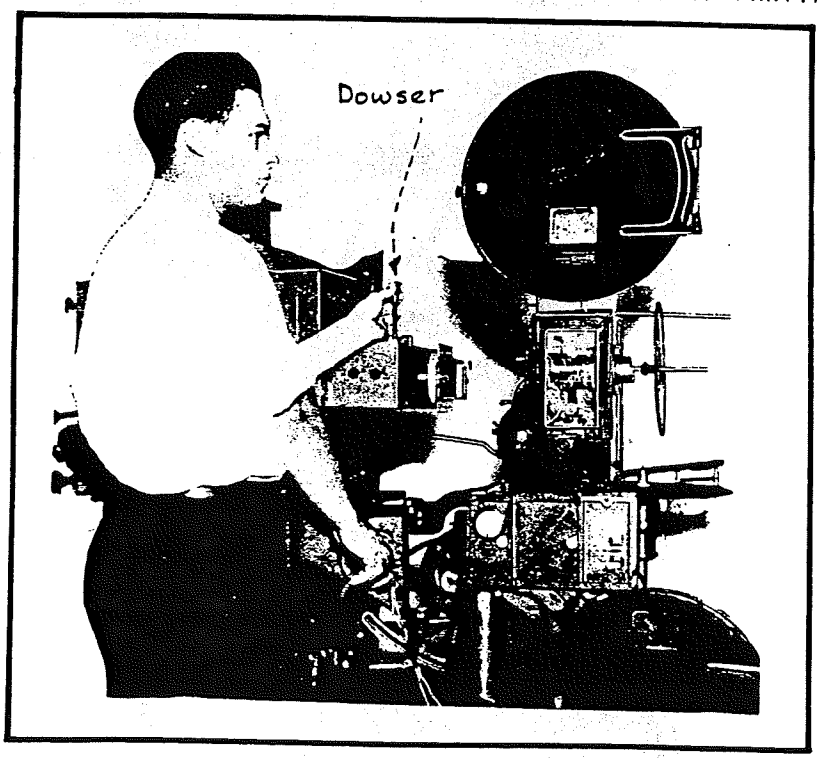

FIG. 11
Starting the Projection Machine.

IF SEVERAL SPROCKET HOLES ARE TORN OUT, THEN THE DEFECTIVE SECTION OF THE FILM SHOULD BE REMOVED AND THE FILM SPLICED ATTHE NEAREST FRAME-LINE. SHOULD THE FILM BE USED WITH DISC RECORDING, THEN IT MUST BE KEPT THE SAME LENGTH, SO AS NOT TO UPSET SYNCHRONIZATION AND TO MAKE THIS POSS-

IBLE, IT IS NECESSARY TO REPLACE THE REMOVED FILM SECTION WITH A BLANK PIECE OF FILM. SMALL GAPS AS THIS WILL PRODUCE NO SERIOUS EFFECT UPON PROJECTION BUT IF TOO MUCH BLANK SPACE IS ALLOWED, IT WILL BE NOTICEABLE TO THE AUDIENCE.

IN CASE THAT IT IS NECESSARY TO DISCARD ANY GREAT AMOUNT OF THE FILM, THEN THIS PORTION WILL EITHER HAVE TO BE REPLACED WITH NEW PRINT, OR ELSE AN ENTIRE NEW PRINT WILL HAVE TO BE PURCHASED. FOR THIS REASON, IT IS IMPERATIVE THAT THE MACHINE BE SHUT DOWN IMMEDIATELY, WHEN THE FILM TEARS, SO THAT AS LITTLE DAMAGE OR POSSIBLE WILL RESULT.

SPLICING FILM

FIG. 12 SHOWS YOU THE PROPER METHOD OF SPLICING SOUND FILM. IN THE UPPER ILLUSTRATION, YOU WILL OBSERVE HOW THE SPLICE IS MADE ALONG THE FRAME-LINE AND WHEN REMOVING A SECTION OF FILM, NEVER REMOVE LESS THAN ONE FRAME AND NOT MORE FRAMES THAN ARE ABSOLUTELY NECESSARY. THE TWO ENDS TO BE SPLICED SHOULD BE LINED UP ACCURATELY, SO THAT THE FILM CAN RUN THROUGH THE MACHINE IN PERFECT ALIGNMENT.

A GOOD SPLICE WILL PASS THROUGH THE SOUND GATE SATISFACTORILY BUT SINCE IT IS IMPOSSIBLE TO MATCH THE SOUND TRACK AS UNNOTICED AS THE PICTURE FRAMES, IT WILL-ALWAYS CREATE SOME DISTURBANCE IN THE SPEAKERS AS IT MOVES PAST THE SOUND GATE. THIS EFFECT, HOWEVER, CAN BE REDUCED MATERIALLY BY PAINTING A NON- TRANSPARANT TRIANGLE OVER THE SOUND TRACK AT THE POINT OF SPLICING. THIS AS SHOWN AT "A" OF FIG.12.

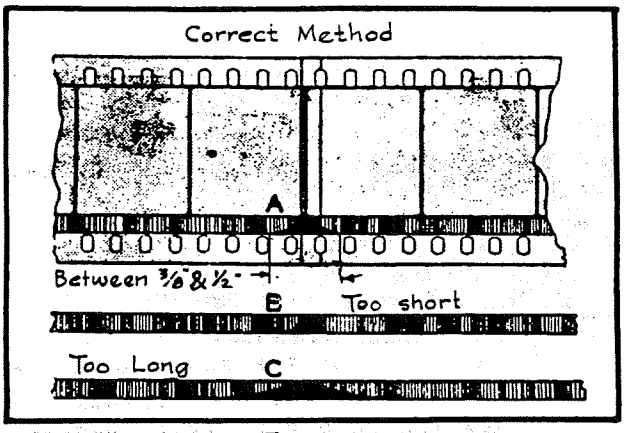

FIG. 12
Film Splicing.

THIS TRIANGLE SHOULD BE PAINTED ON THE SOUND TRACK CAREFULLY WITH "ZAPON" CONCENTRATED BLACK LACQUER #2002-2 AND IT IS VERY IMPORTANT THAT THE SIZE AND SHAPE OF THIS PAINTED TRIANGLE BE JUST EXACTLY AS ILLUSTRATED AT "A" OF FIG. 12. IF THIS PAINTED TRIANGLE IS MADE EITHER TOO LONG OR TO SHORT AS SHOWN IN "B" AND "C" OF FIG.12, THEN A VERY PRONOUNCED EFFECT WILL BE PRODUCED AS THE SPLICE PASSES THE SOUND GATE.

IN CASE THAT THE FILM HAS PREVIOUSLY BEEN DAMAGED TO SUCH AN EXTENT THAT THE EXACT AMOUNT REMOVED IS UNCERTAIN, THEN THIS CAN BE CHECKED BY THE NUMBERS ON THE FRAME. THAT IS, EACH SERIES OF 16 FRAMES ARE PROGRESSIVELY MARKED 1-2-3 ETC , BEGINNING WITH ZERO AT THE "START" FRAME. DO NOT CONFUSE THESE FRAME NUMBERS WITH THE SCENE NUMBERS, WHICH ARE ALSO PROVIDED HOWEVER, THESE TWO SERIES OF NUMBERS CAN BE READILY DISTINGUISHED FROM EACHOTHER DUE TO THE FACT THAT THE SCENE NUMBERS ARE PRECEDED AND ALSO FOLLOWED BY A DASH, SUCH AS -37-.

WHEN USING TWO MACHINES, AS IS THE GENERAL PRACTICE FOR COMPLETE

"SHOWS", THEN IT IS IMPORTANT TO DETERMINE BEFORE HAND, THE PROPER CUES NEAR THE END OF REEL #1 FOR THE VARIOUS STARTING OPERATIONS OF THE SECOND MACHINE IN WHICH REEL #2 IS INSTALLED. IT IS ALSO OF UTMOST IMPORTANCE THAT THE FADING BE PROPERLY HANDLED WHEN SWITCHING FROM ONE MACHINE TO THE OTHER, SO THAT THE PICTURES ON THE SCREEN AND THE SOUND ACCOMPANIMENT WILL BOTH CONTINUE WITHOUT INTERRUPTION.

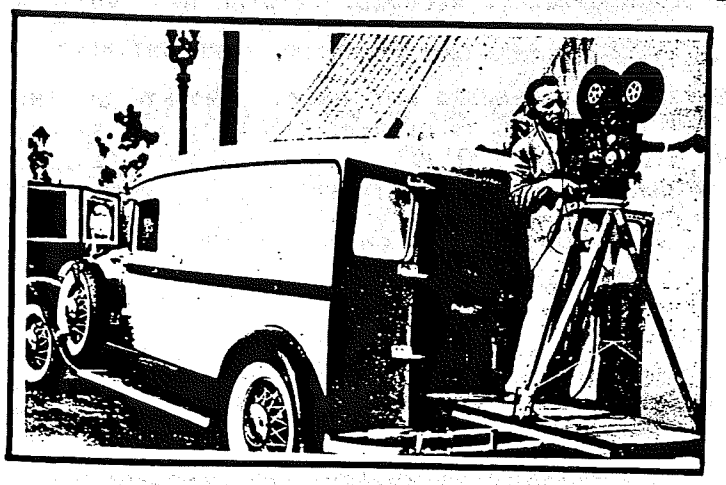

FIG. 13
A Typical Motion Picture Sound Truck.

PROTECTING THE FILM

FILM IS ALWAYS DELIVERED IN METAL CONTAINERS AND IN ORDER TO PRESERVE ITS QUALITIES, IT SHOULD ALWAYS BE KEPT IN THESE CONTAINERS. THE ONLY FILM WHICH SHOULD EVER BE LEFT OUT OF THESE CONTAINERS, IS THAT WHICH IS INSTALLED FOR USE IN THE MACHINES AND THAT ON THE REWINDING RACK AND EVEN THESE SHOULD NOT BE LEFT LYING AROUND EXPOSED FOR ANY GREATER LENGTH OF TIME THAN IS ABSOLUTELY NECESSARY. NOT ONLY IS THE QUALITY OF THE FILM PRESERVED BY KEEPING IT "BOXED" BUT THE FIRE-HAZARD IS ALSO REDUCED BECAUSE MOVING PICTURE FILM IS THE MOST INFLAMABLE SUBSTANCE PRESENT IN THE PROJECTION BOOTH.

PORTABLE SOUND EQUIPMENT

SO FAR, ALL OF THE SOUND RECORDING EQUIPMENT, WHICH HAS BEEN DESCRIBED TO YOU, IS ADAPTED PRIMARILY AS A PERMANENT INSTALLATION IN THE STUDIO. HOWEVER, TO PHOTOGRAPH SCENES ON "LOCATION" AT OUT-OF-THE-WAY PLACES, PROVISIONS MUSTBE MADE SO THAT SOUND EQUIPMENT OF PORTABLE DESIGN CAN BE TAKEN ALONG. THE SOUND EQUIPMENT FOR SUCH PURPOSES IS TRANSPORTED IN A $1\frac{1}{2}$ TO 2 TON TRUCK SIMILAR TO THAT SHOWN IN FIG. 14.

A LITERAL LABORATORY IS CONTAINED WITHIN SUCH A TRUCK BECAUSE IT IS IMPERATIVE TO HAUL PRACTICALLY ALL OF THE EQUIPMENT WHICH WOULD ORDINARILY BE REQUIRED IN THE STUDIO. IN FACT, THE RECORDING AMPLIFIER AND THE RECORDING UNIT ITSELF ARE NEARLY ALWAYS DUPLICATES TO THOSE USED IN THE STUDIO.

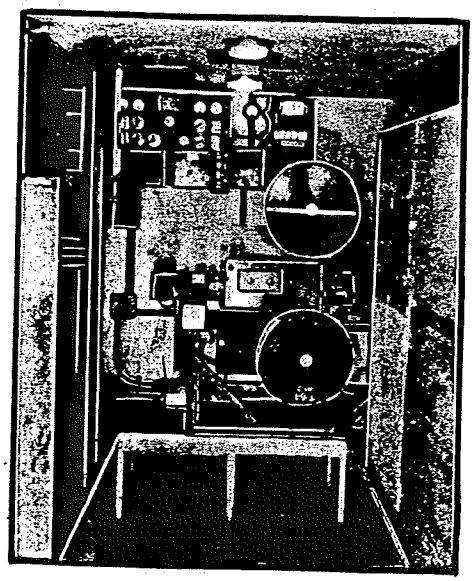

FIG. 14
Recording Unit in Sound Truck.

ALTHOUGH STUDIO TYPE AMPLIFIERS,

WHEN SUITABLY MOUNTED, CAN BE USED OUT IN THE FIELD, YET THE COMMON PRACTICE IS TO USE TUBES OF LOW POWER CONSUMPTION AND OFTEN, THE AMPLIFYING STAGES ARE SPLIT UP INTO MORE UNITS THAN USED IN THE STUDIO. FOR EXAMPLE, THE MICROPHONE AMPLIFIER, WHICH IS LOCATED CLOSE TO THE PICK UP, MAY BE MADE UP IN TWO STAGES. THIS THEN CAN BE FED INTO A PORTABLE, DRY BATTERY OPERATED AMPLIFIER OF THE BROADCAST TYPE, WHICH IS ALSO LOCATED NEAR THE PICK-UP POINT AND THIS IN TURN CAN BE FED INTO AN OUTPUT AMPLIFIER OF TWO STAGES, WHICH IS HOUSED WITHIN THE TRUCK CLOSE TO THE RECORDER.

TWO INTERNAL VIEWS OF THE SOUND TRUCK ARE SHOWN IN FIGS. 14 AND 15. IT IS OF SPECIAL INTEREST IN FIG. 15, TO NOTE THE LARGE CABLES AND CONNECTORS USED FOR CONNECTING THE MICROPHONE CIRCUITS TO THE MIXER PANEL. ALTHOUGH THE CURRENT CARRIED BY THESE LINES IS SMALL ENOUGH TO PERMIT THE USE OF MUCH SMALLER TERMINALS, YET WHERE NOISE-FREE CONNECTIONS ARE SO VITAL AS IN PICTURE RECORDING, IT IS ADVISABLE TO GO TO THE ADDED EXPENSE OF USING MASSIVE WATERPROOF TERMINALS. IN FACT, LARGE RINGS ARE SCREWED DOWN OVER THESE CONNECTIONS AFTER THE PLUGS HAVE BEEN INSERTED IN THE JACKS.

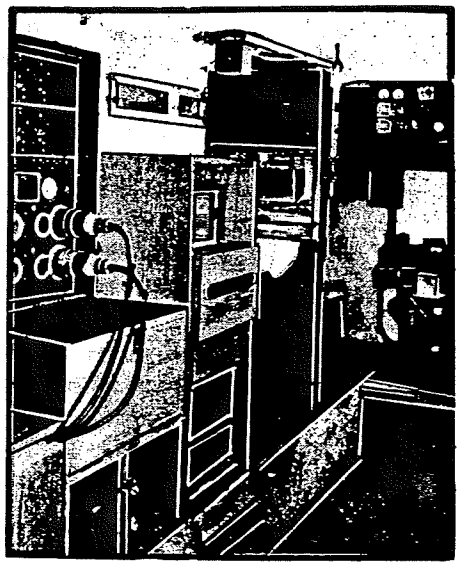

FIG. 15
Mixing Panel in Sound Truck

THE SOUND TRUCK, AS WELL AS THE CAMERA TRUCK, ARE PROVIDED WITH THE NECESSARY EQUIPMENT SO THAT TEST FILMS CAN BE DEVELOPED. THIS IS NECESSARY SO AS TO DETERMINE THE EXPOSURE CONDITIONS, POSITION AND DENSITY OF THE SOUND TRACK ETC. BECAUSE IF DEFECTS RELATIVE TO THESE POINTS ARE NOT DISCOVERED UNTIL BACK IN THE STUDIO, A TREMENDOUS EXPENSE WOULD BE ADDED TO THE COST OF PRODUCTION.

THE POWER SUPPLY FOR PORTABLE EQUIPMENT

ONE OF THE GREATEST PROBLEMS OF PORTABLE SOUND EQUIPMENT IS THAT OF THE POWER SUPPLY. THE ALTERNATING CURRENT SUPPLY FOR INTERLOCKING THE CAMERAS AND SOUND RECORDERS IS GENERALLY SUPPLIED BY A 110/220 VOLT, 3 PHASE, 50/60 CYCLE GENERATOR. BY USING THIS SOURCE OF ENERGY, IT IS POSSIBLE TO OPERATE THE SAME RECORDING EQUIPMENT AS THAT USED IN THE STUDIO WHERE THE MUNICIPAL POWER SUPPLY IS MOST GENERALLY OF THE 50/60 CYCLE TYPE.

AS A RULE, THIS A.C. GENERATOR IS NOT DRIVEN DIRECTLY FROM A GASOLINE ENGINE BECAUSE OF THE DIFFICULTY OF MAINTAINING THE CLOSE SPEED REGULATION WHICH IS NECESSARY. SO INSTEAD OF THIS, THE COMMON PRACTICE IS TO HAVE A GASOLINE ENGINE ON A SEPARATE POWER TRUCK DRIVE A D.C. GENERATOR, WHICH IN TURN SUPPLIES POWER TO A D.C.-A.C. MOTOR GENERATOR OR ELSE AN INVERTED ROTARY CONVERTER, WITH APPROPIATE VOLTAGE REGULATORS, SPEED REGULATING, CONTROLLING AND METERING EQUIPMENT.

EVEN THIS COMBINATION CAUSES DIFFICULTIES, DUE TO THE NOISES IT PRODUCES, AND WHICH MAY INTERFERE WITH THE RECORDING THAT IS GOING ON NEARBY. SO, TO OVERCOME THIS PROBLEM, A 32-VOLT STORAGE BATTERY IS FREQUENTLY USED TO DRIVE THE MOTOR-GENERATOR SET, THE MOTOR END OF WHICH IS A 32-VOLT D.C. MACHINE. THIS ARRANGEMENT IS COMPARATIVELY QUIET AND MAY BE USED WITHIN A FEW HUNDRED FEET OR LESS FROM THE PICK-UP POINT. THIS STORAGE BATTERY CAN BE KEPT IN A CHARGED CONDITION BY A GASOLINE-DRIVEN GENERATOR, WHICH IS OPERATED ONLY DURING THE NIGHT, OR AT OTHER TIMES WHEN NO RECORDING IS BEING DONE.

FOR THE FILAMENT SUPPLY OF THE AMPLIFIER TUBES, EXPOSURE LAMPS, ETC., A 6-12 VOLT STORAGE BATTERY OF THE 100-150 AMPERE-HOUR SIZE IS GENERALLY USED. THE PLATE VOLTAGES FOR AMPLIFYING EQUIPMENT WHEN ON LOCATION ARE GENERALLY OBTAINED FROM DRY "B" BATTERIES; ALTHOUGH SMALL STORAGE-TYPE "B" BATTERIES ARE SOMETIMES USED FOR THIS PURPOSE, IN WHICH CASE THEY CAN BE KEPT IN A CHARGED CONDITION BY A SMALL D.C. GENERATOR.

EXAMINATION QUESTIONS

LESSON NO. SP-3

1. - IS IT ADVISABLE TO INSTALL SOUND PICTURE EQUIPMENT IN A THEATER ORIGINALLY DESIGNED FOR SILENT PICTURE PROJECTION, WITHOUT MAKING ANY CHANGES IN THE AUDITORIUM?

2. - SHOULD THE SCREEN FOR SOUND PICTURES BE CLOSELY WOVEN OR LOOSELY WOVEN?

3. - IS HEAVY DRAPERY CLOTH GENERALLY PLACED OVER THE MOUTH OF THE SPEAKER HORN TO REDUCE EXCESSIVE REVERBERATION?

4. - IS IT A BETTER PRACTICE TO KEEP THE STORAGE BATTERIES IN THE PROJECTION BOOTH ON THE CHARGING LINE DURING THE SHOWING OF A PICTURE, OR DURING PERIODS WHILE NO SHOW IS IN PROGRESS?

5. - WHAT PRECAUTIONS SHOULD BE EXERCISED IN CLEANING AND OILING A PROJECTOR FOR SOUND-ON-FILM PROJECTIONS?

6. - DESCRIBE HOW YOU WOULD CHECK THE FOCUS ADJUSTMENT OF THE EXCITER LAMP IN A SOUND-ON-FILM PROJECTOR.

7. - DESCRIBE BRIEFLY HOW A FILM HAVING A SOUND TRACK SHOULD BE SPLICED.

8. - DOES A SOUND TRUCK, WHICH IS USED TO TRANSPORT SOUND EQUIPMENT TO "LOCATIONS", GENERALLY CONTAIN PRACTICALLY THE SAME EQUIPMENT AS THAT USED IN THE STUDIO?

9. - WHEN USING AN A.C. GENERATOR ON "LOCATION", IS IT COMMON PRACTICE TO DRIVE THIS GENERATOR DIRECTLY OFF A GASOLINE ENGINE?

10. - EXPLAIN HOW THE OPERATION OF THE SOUND HEAD MAY BE CHECKED.