

Film-Tech

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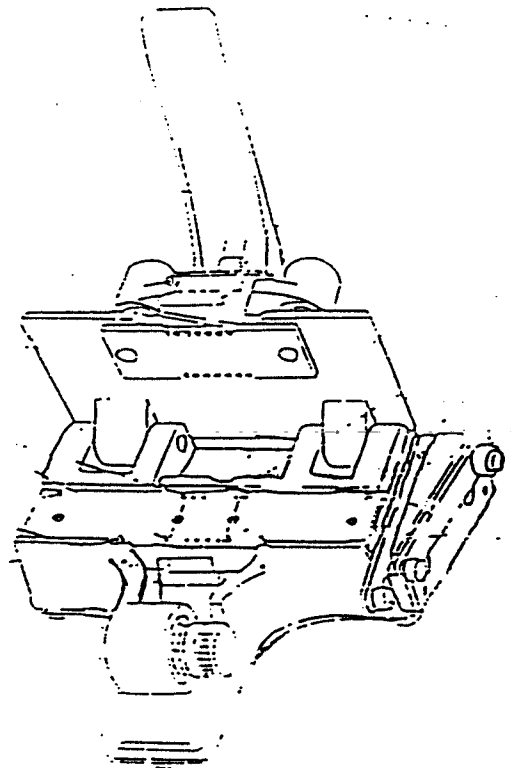
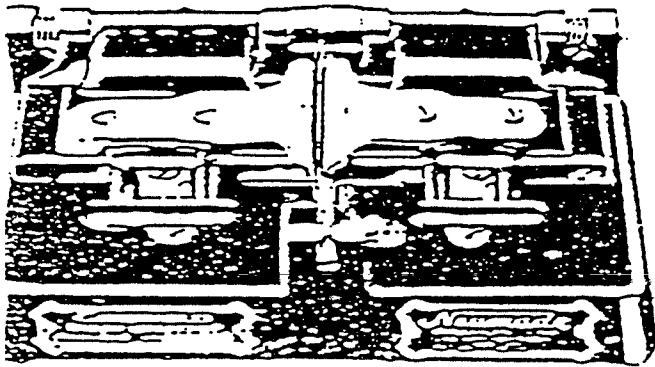
PROJECTIONIST STUDY MATERIAL

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FILM HANDLING

1. Name two types of film splicers that are used today?

Wet or cement splicer and Tape splicer.



5. What is "Rain Effect" and what causes it?

Rain effect is scratches on the emulsion side of the film which looks like rain on the screen. This may be caused by a worn or dirty film gate and/ or worn or dirty fire or pinch rollers. (likely on THE SCANNING DRUM GUIDE ROLLER)

6. What are the possible causes for emulsion build up in the film gate area?

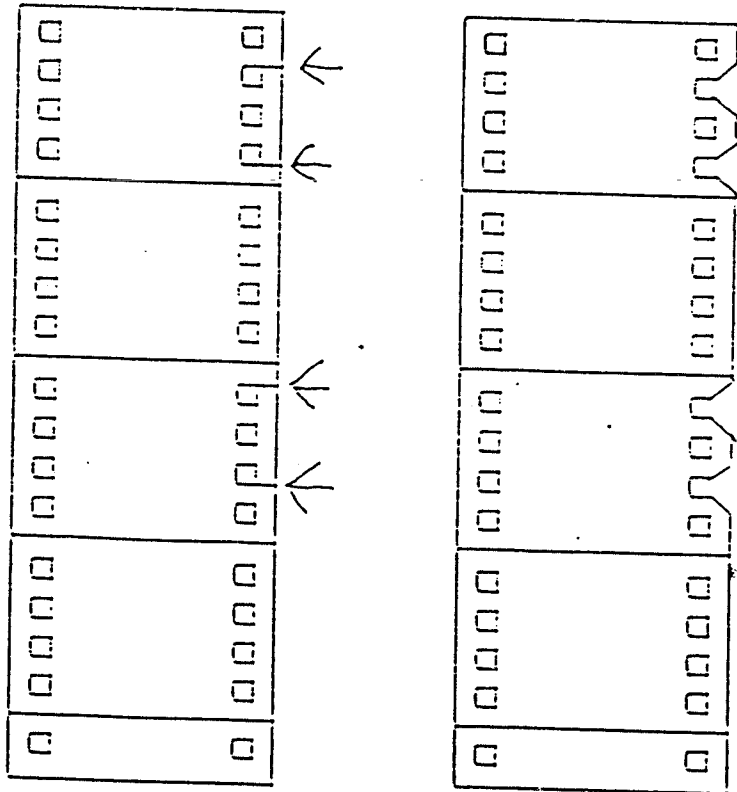
Excessive film gate tension, dirty film, burr or raised area in film gate or green film.

7. How could emulsion build up on the gate area affect the picture?

Picture unsteady, scratching of the film, picture going in and out of focus.

8. Explain notched perforation.

Notched perforation is when a single sprocket tooth perforation is split and is cut out by notching the film perforation.



DAMAGED FILM

FILM WITH NOTCHED PERFORATIONS

9. What problems are associated with notched perforations in an automated system?

Notched perforation in an automated system can cause film break because the notched film must travel around and over many rollers so the chance are high that the notched film perforation will catch and rip the film causing a film break. Also a notched perforation may catch on fail safe

10. What is "green film"?

A newly processed print on which the emulsion may still be a little soft.

11. What are some problems associated with "green film"?

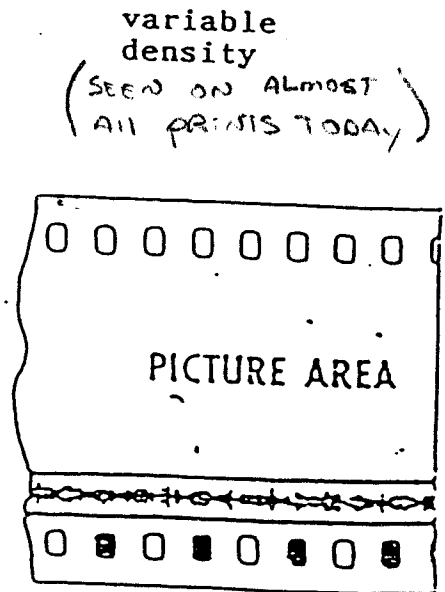
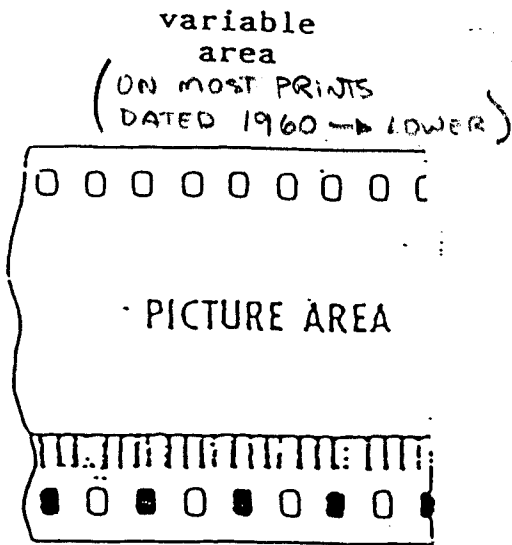
If projected without proper edge wax lubrication, perforation damage can result. Emulsion build up in the gate area causing projected picture to be unsteady, collection of dirt on the film and picture to go in and out of focus.

12. What type of film is permitted to be used in theatres?

Cellulose Acetate base or Safety film.

13. What two different methods are used to put the sound on an optical sound track of the film?

The two types of optical sound tracks are variable area sound track or variable density sound track.



14. What are some items to check when inspecting film before it is used?

Some items to be checked when inspecting film are bad splices and torn film edges.

15. There are Four perforation , or sprocket holes , to each side of each frame of 35mm film.

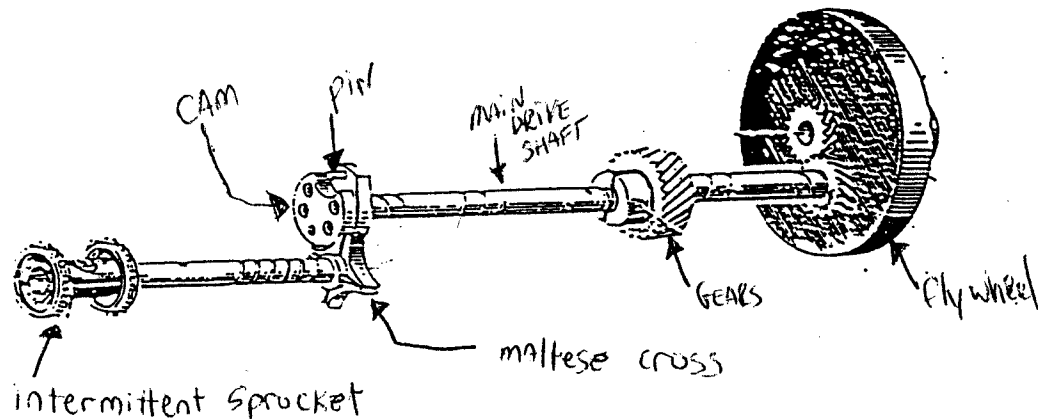
16. If leaders are removed from prints for use on large reels or platters, how should they be marked for future identification?

The leaders (heads and tail) when removed should have one printed frame to identify it with that reel.

PROJECTOR

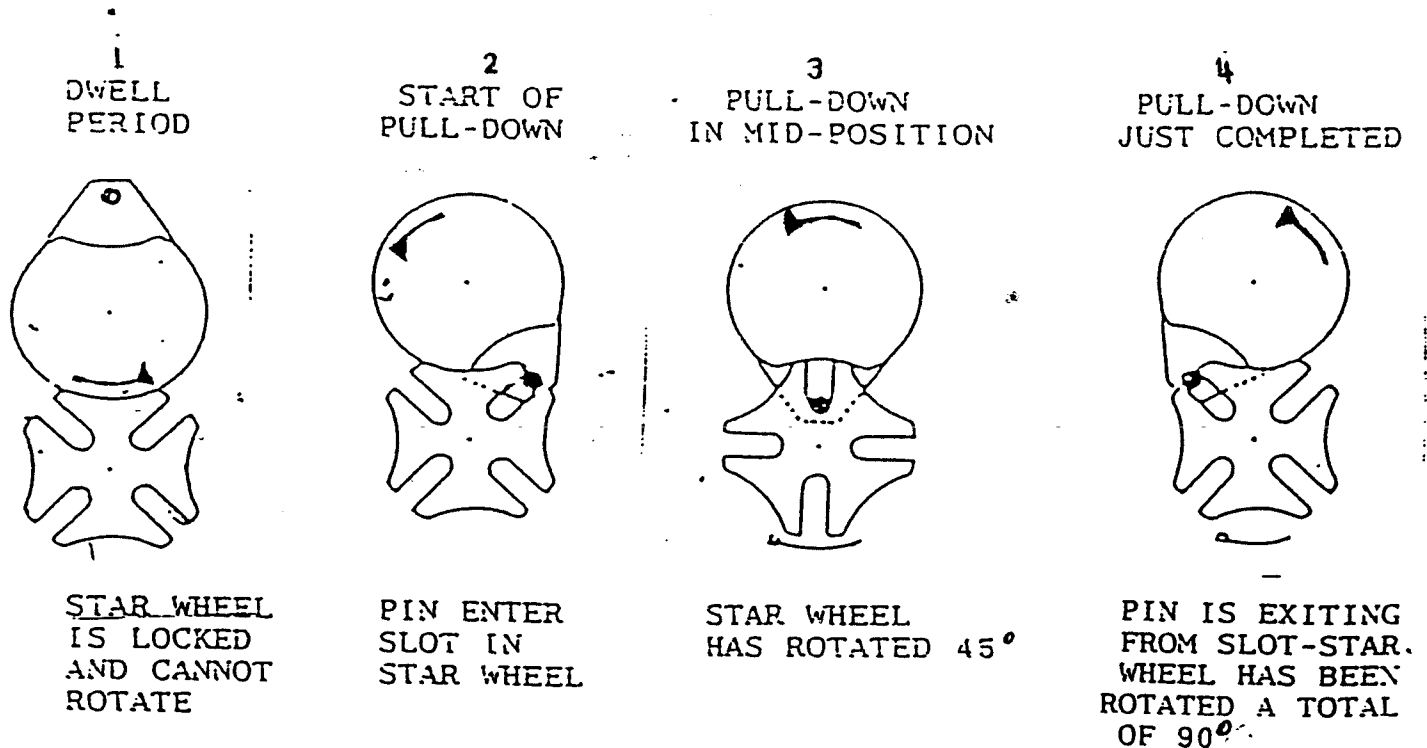
1. Name the main parts of the Geneva type intermittent?

Intermittent sprocket, cam, pin, star (maltese cross), main drive shaft and gears, flywheel.



2. Describe the action of the intermittent?

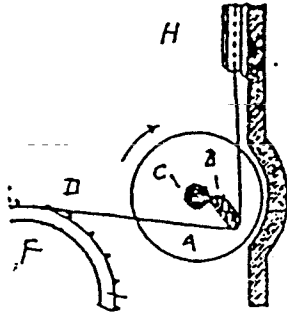
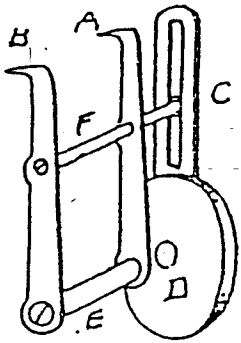
A mechanical movement that produces intermittent film movement in the projector. The principle of the movement involves a rotating cam and pin that intermittently engages in a four slotted star wheel. During the slot engagement, the star wheel shaft containing the intermittent sprocket rotates 90 degrees, or one frame. At normal projection speed this intermittent rotation occurs 24 times per second.



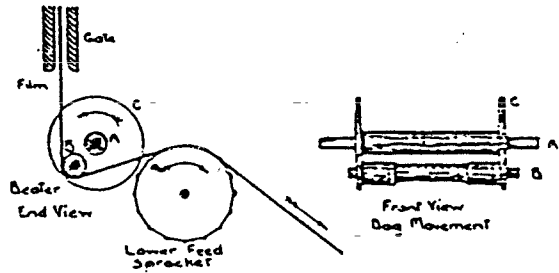
* WITH EACH FRAME PULLDOWN, THE INTERMITTENT MOVES FOUR TIMES.

3. Name other types of intermittents?

Claw type or Dog movement.



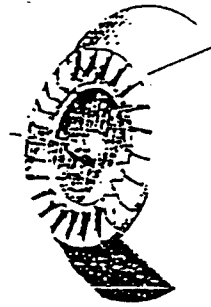
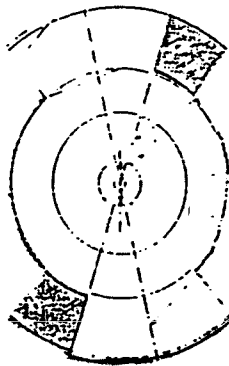
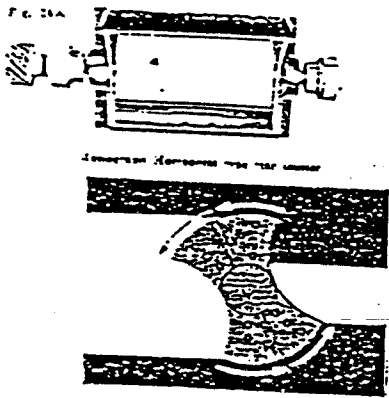
CLAW MOVEMENTS



"Dog" or "Beater" intermittent movement.

4. Name three different shapes of shutters?

Barrel. disc. dish.



5. Describe how you would time a shutter?

- Loosen the shutter hub of shutter shaft.
- Rotate the projector in its proper direction until the intermittent sprocket is in the lock position.
- Continue rotating until intermittent movement sprocket moves exactly "2" teeth or half way through of one frame.
- Maintaining that position, lock shutter hub on shutter shaft with midpoint of master blade exactly dead centre of the aperture area.
- Then thread the projector and test.

6. What is the purpose of a shutter?

A two bladed rotating device used to interrupt the light source while the film is being pulled down into the projector gate. IT ALSO SERVES (LIGHT PASSES THROUGH EACH FRAME TWICE) AS A COOLING FAN FOR THE FILM

7. Why do some projectors utilize a double rear shutter?

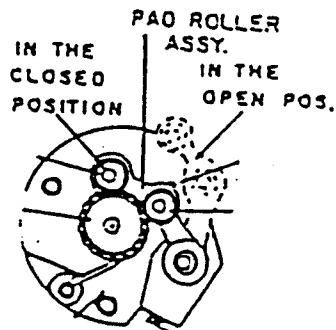
To increase the efficiency of the shutter system to cut off the light during the pull down of the film. (BETTER FILM COOLING)

8. In a double rear shutter, what direction are both shutters rotating?

The opposite direction of each other.

9. Describe the function of a pad roller?

A roller designed to hold the film against a sprocket.



10. What is the proper setting for a pad roller?

The proper setting for a pad roller is one and one half to two thicknesses of film. This is so that film splices can easily travel around the sprockets.

11. Describe the function of lateral guide rollers in a projector?

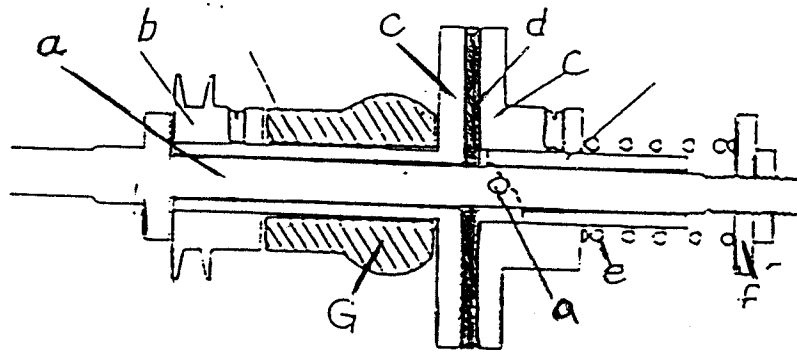
It is a roller with flanges that guides the position of the film as it enters the film gate area and keeps side to side movement of the film to a minimum.

12. What are some reasons for an unsteady picture?

- Improper film gate tension.
- Emulsion deposit or dirt build up in the film gate area.
- loss of upper or lower loops

13. What are the main parts of a friction disc take-up?

- a) Shaft with reel spindle b) Drive pulley c) Two metal discs d) Leather or felt friction disc e) spring f) Tension adjusting nut g) support arm



14. Describe how a friction disc take-up works?

Take-up clutch consists of two metal discs separated by a leather or felt disc on a shaft. They are held together by a spring pressure sufficient to provide friction to drive the take-up spindle, at the same time allowing slippage to compensate for the continuous change in speed.

15. What is the proper tension for the take-up reel?

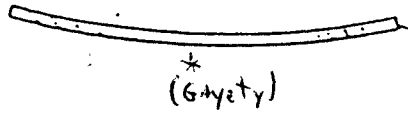
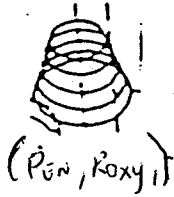
The proper tension for the take-up reel should be sufficient enough to keep the reel rotating until the reel is completely full but not too much as to put strain on the film or the hold back sprocket. Little or no back lash should occur.

16. What is the proper tension for the feed reel?

The proper tension for a pay-out reel should be sufficient enough to hold back the reel, but not so little that it free wheels.

1. What are some types of gate tension springs used in a projector?

Coil or leaf.



18. Define the following: a) Fire Shutter b) Stripper c) Fire rollers?

A) Fire shutter: Is shutter that operates by a centrifugal device that drops the fire shutter if the projector speed should drop below 60 feet per minute.

B) Stripper: Is designed to prevent the film from wrapping around the sprockets, forcing it off, and keeping it from becoming damaged by the sprocket teeth.

C) Fire or pinch rollers: Are rollers between the upper film magazine and the projector head or between the sound head and the lower film magazine. These rollers were used to snuff out fire which might start in the projector. (THE TWO ROLLERS ARE NOW REPLACED WITH A SINGLE ROLLER)

19. What is an idler roller?

It is any undriven roller whose sole function is to support a film or change its direction.

20. What is persistence of vision?

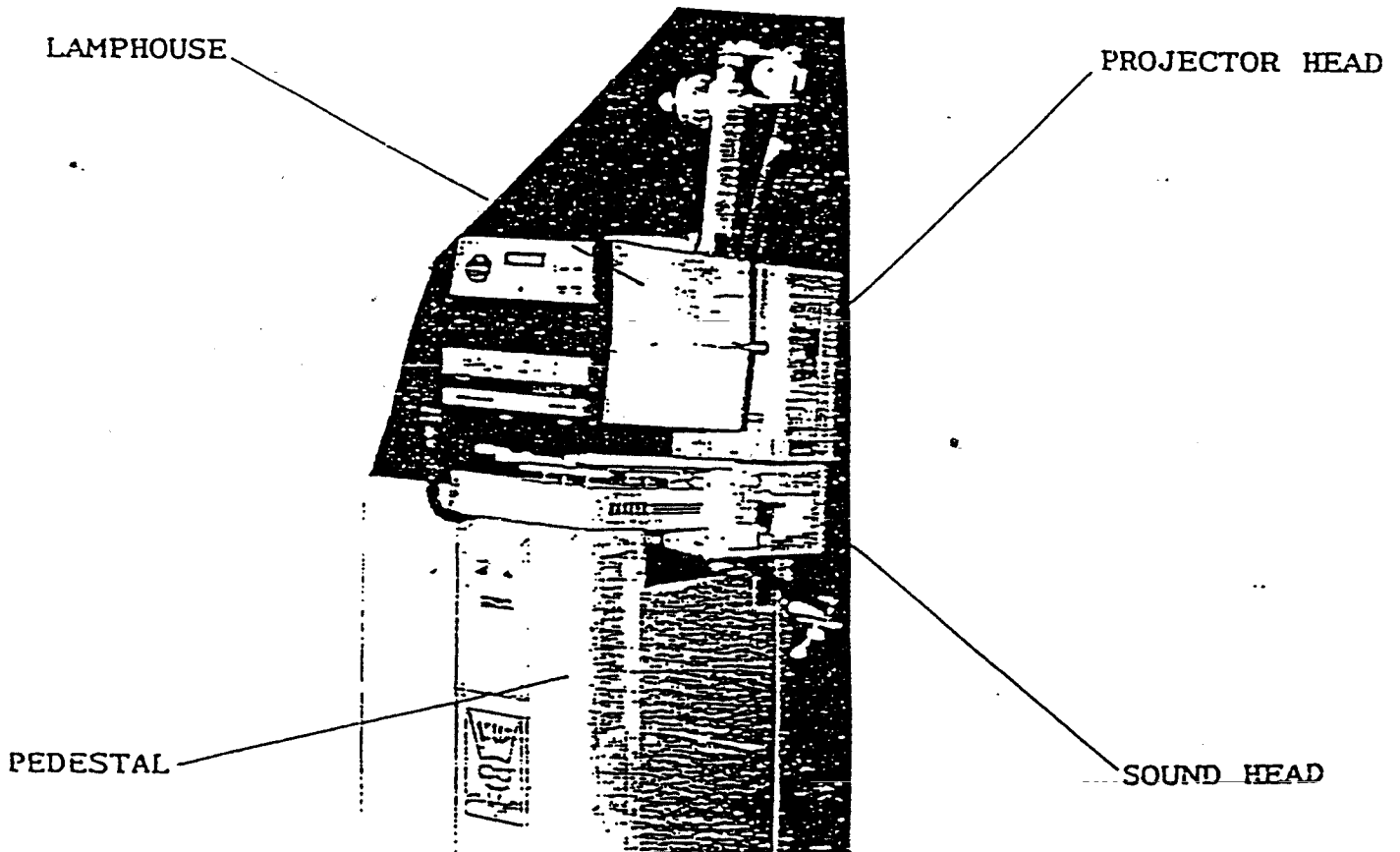
Is that ability of the eye to retain the image of an object for a short time after the object has been removed from sight.

21. What is a dual solenoid zipper change over?

--- It is a picture change over for a two projector system.

(EACH CHANGE OVER HAS AN ELECTROMAGNET. ONE SIDE OF THE ELECTROMAGNET WILL PULL THE AUTOMATIC SHUTTER OPEN. THE OTHER SIDE WILL PULL IT CLOSED ONCE THE CHANGE OVER BUTTON IS PRESSED TO SELECT THE DESIRED PROJECTOR NEEDED.)

22. What are the four basic components of a 35mm projector ?



23. At what speed does the film travel through a 35mm projector A) frames
B) feet ?
- A) 24 frames per second. B) 90 feet per minute.

24. How many frames are there in A) one foot B) in one second ?
- A) 16 frames. B) 24 frames.

25. How would you test for the correct adjustment between the cam and star in the intermittent movement?

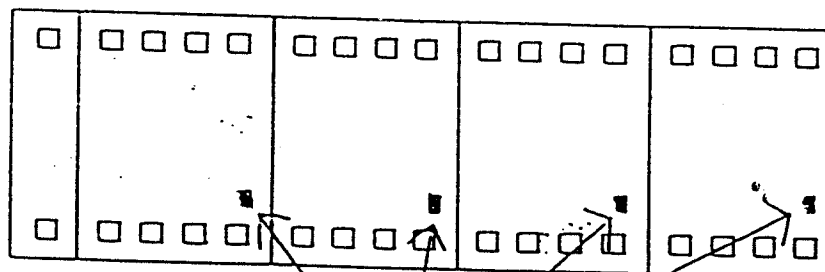
Rotate the flywheel until the intermittent is in the locked position. With your fingers on the intermittent sprocket, attempt to rock the sprocket back and forth. There should be no noticeable movement.

26. Why is it necessary to have a loop of film above and below the intermittent sprocket ?

There must be a loop of film above and below the intermittent sprocket large enough to absorb the stoppage of the film between the steadily moving sprockets. IT IS ALSO THERE TO GIVE A SUFFICIENT AMOUNT OF FILM IF NEEDED TO FRAME THE PROJECTED IMAGE ON THE SCREEN.

27. How and where are the motor and change over cues located on a standard release print?

Motor and change over cues consist of small circles or dots in the upper righthand corner of four consecutive frames. Motor Cues are located 12 feet, 6 frames from the end of the picture. Change over cues are located 22 frames from the end.



CUE MARKS

28. When threading a projector, in what position is the image on the film when the film is over the aperture?

The sound track will be on the right side and the image will be upside down over the aperture.

29. How MANY frames are there between the film gate and the optical sound head and how many frames are there between the magnetic sound head and the film gate

21 frames. (optical) → PEN, ROXY

28 frames. (Magnetic)

30. What two functions does the intermittent perform?

The two functions that the intermittent perform, 1. To pull the next frame into the aperture to be projected. 2. To hold that frame perfectly motionless to be projected.

31. The intermittent sprocket is at rest, with the film motionless over the aperture, Three times as long as it is in motion.

32. How are the rotating shutter and intermittent movement locked together to work in exact synchronism?

The rotating shutter and intermittent movement are locked together by a train of gears so that the shutter rotates in exact synchronism with the intermittent.

33. What is the effect of insufficient tension at the aperture?

With insufficient tension at the gate the picture will be unsteady.

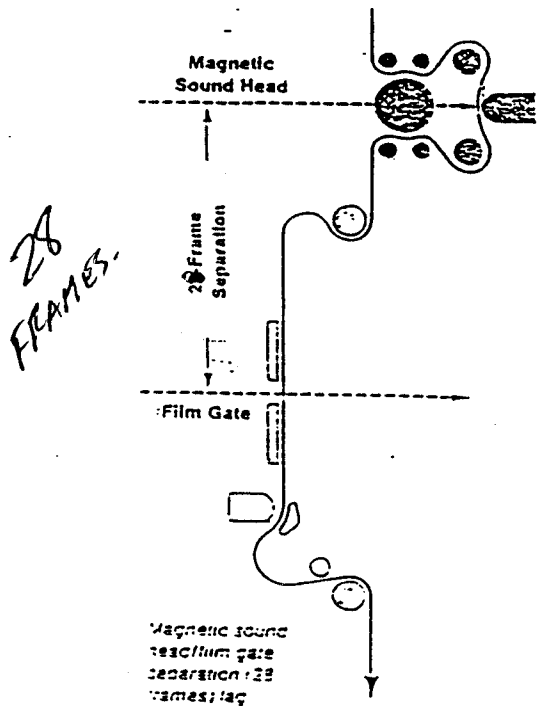
34. What is the effect of too much tension at the aperture?

Too much tension imposes a great strain on many parts of the intermittent mechanism such as: Film edge, Drive motor, Bearings and gears of the drive train. *VERY DAMAGING TO THE FILM

35. Describe a practical method of adjusting tension at the aperture.

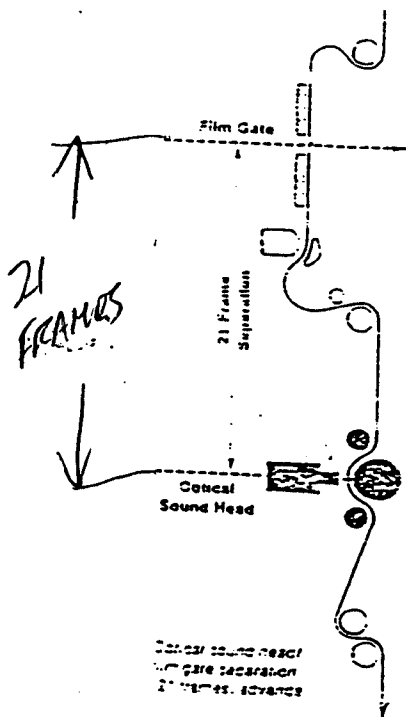
One method of adjusting the aperture tension is to reduce tension spring pressure until the screen image is barely started to become unsteady, followed by gradual pressure increase until the unsteadiness disappears. (THE TENSION SPRINGS ARE LOCATED ON THE GATE. TO REDUCE TENSION, LOOSEN OFF THE SCREWS)

36. THE SOUND LEADS THE PICTURE IN A MAGNETIC SOUND HEAD.

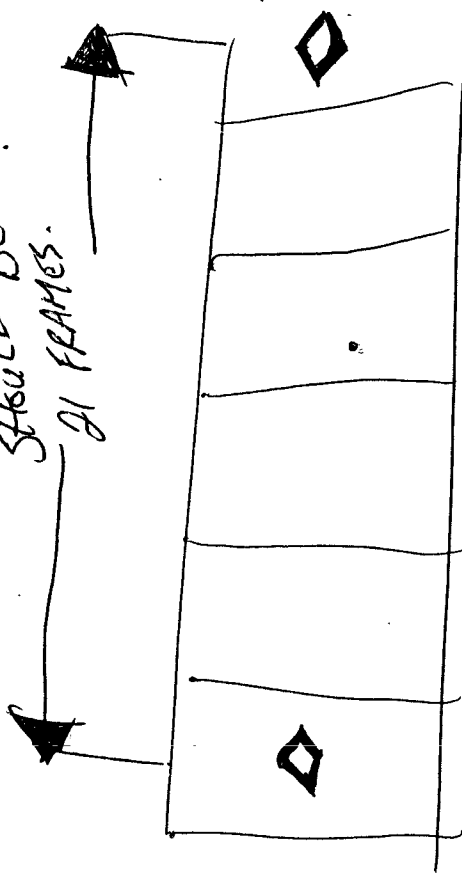


37. THE SOUND LAGS THE PICTURE IN A OPTICAL SOUND HEAD

(FOUND ON ALL PROJECTORS AT ROXY, PEN & DRIVE IN)



SHOULD BE 21 FRAMES.



Xenon Arc Lamphouse

1. Describe how the igniter circuit works in an xenon lamphouse? *

The igniter takes either 110 volt or 220 volts AC input and converts it into 40,000 volt D.C. RF pulse, which breaks down the arc or space between the anode and cathode electrodes. This is accomplished by the means of a transformer taking the input voltage of 110 or 220 volts AC and stepping it up to approximately 5000 volts; A spark gap which breaks down and passes current at approximately 5000 volts; a capacitor and an RF transformer (Tesla coil) which takes that 5000 volts and steps it up to approximately 40,000-50,000 volts and induces it into the DC line going to the bulb. See diagram

2. What are some of the safety precautions that should be observed when working with Xenon lamps?

The bulbs should never be handled when they are hot or the lamphouse is opened or hot. Before handling any bulb, put on a protective face mask and protective gloves and clothing. The heavy plastic cover or shield should always be on the bulb when you are cleaning or working in the lamphouse.

3. Why do some Xenon lamps utilize stand-by current?

Stand-by current is utilized in some xenon lamphouses so that the bulb is pre-warmed before show time to allow to minimize light flicker when the bulb is first ignited.

4. Describe how you would focus a new xenon bulb?

- Remove the projection lens from the projector.
- Start projector motor and open lamphouse dower.
- NEVER operate the lamphouse without the projector motor running.
- Three adjustments available 1) forwards/backwards 2) left/right 3) top/bottom.
- Adjust forwards/backwards until the small black spot is obtainable on screen.
- close lamphouse dower and replace projection lens.
- Open dower and adjust left/right and top/bottom until you obtain even brightness on the screen.
- ensure the white light is not projected through the projection lens for more than a few minutes.

5. What is a Tesla Coil?

High voltage RF Transformer.
↳ RADIO FREQUENCY

6. How is a tesla coil used in a Xenon Lamphouse?

It is used to step-up the voltage in the igniter to create a 40,000-50,000 volt RF pulses to draw the arc in the lamp. (ONCE YOU PRESS DOWN THE IGNITER SWITCH, IT RELEASES THE STORED CHARGE. ONCE THE SWITCH IS DEPRESSED, THE COIL RESTORES ITS CHARGE PROMPTLY FOR ITS NEXT USE)

7. What are some types of arc stabilizers?

Magnet or Electromagnet.

8. Why are arc stabilizers used?

They are used to stabilize the arc. Xenon arc has a tendency to rise upwards, this may cause the bulb to breakdown because of the high temp. xenon arc reaching the upper quartz wall. xenon arc may be extinguished.

9. What are some causes for a xenon lamp not to ignite?

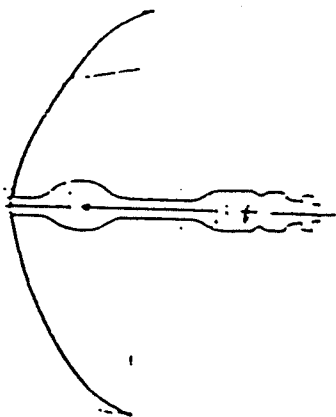
- Exhaust fan is not on or not working.
- Rectifier is not on or not working
- Anode and cathode lead are not tight.
- Auto igniter circuit not working, try manual start.
- Defective or blown Xenon bulb.

10. How does the igniter function and what causes it to cut out once the xenon bulb is ignited?

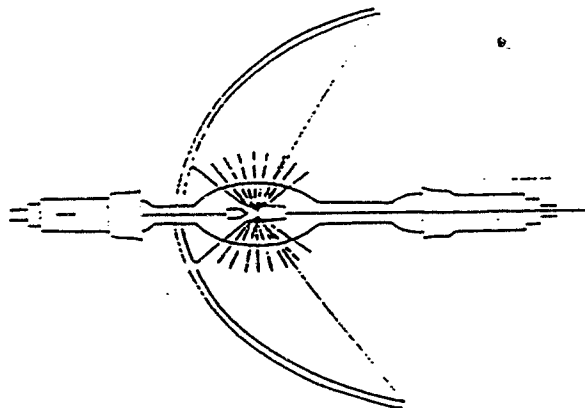
The igniter function is to take either 110 or 220 volt AC input and convert it into 40,000-50,000 volt RF, which is used to breakdown the arc gap or the space between the anode and the cathode. After the arc gap is broken down the power supply takes over in two steps. First there are large capacitors that discharge across the arc gap directly following breakdown of the arc gap, this is call boost current and is typically 3-4 times the operating current. This step lasts NO more than 1/4 of a second. The second step is the running DC voltage from the rectifier is supplied and along with the boost current is to sustain the arc.

11. What are some of the type of reflectors used?

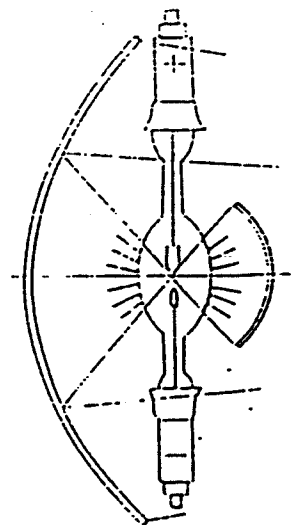
Elliptical, Parabolic, Spherical



Elliptical.



Spherical



Parabolic.

12. How should you clean the xenon bulb and the reflector?

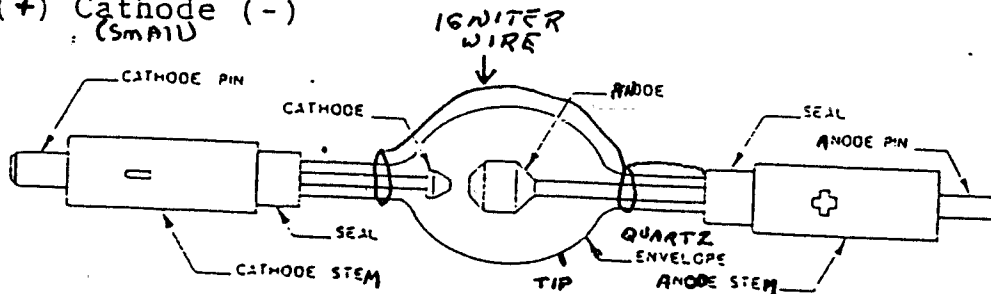
Carefully wipe the xenon bulb with a clean and dust free cloth. If the bulb is oily, denatured alcohol should be used. Care should be taken not to get fingerprints on the bulb during cleaning.

13. What is the xenon envelope made of and why?

It is made of quartz because of the high operating temperature of Xenon bulb.

14. Name the electrodes in a xenon bulb and the polarity?

Anode (+) Cathode (-)
(Big) (Small)



15. What are the electrodes in a xenon bulb made of and why?

Tungsten - Because of the high operating temperature of the electrode

16. What is the function of the projector lamphouse?

The function of the lamphouse is to provide the proper environment for the light source, collect the light from the source, and direct the light rays through the film aperture and into the projection lens.

17. The LAMPHOUSE and PROJECTOR HEAD constitute a single optical system and must be in proper alignment.

18. What are the three types of light sources used in motion picture projection?

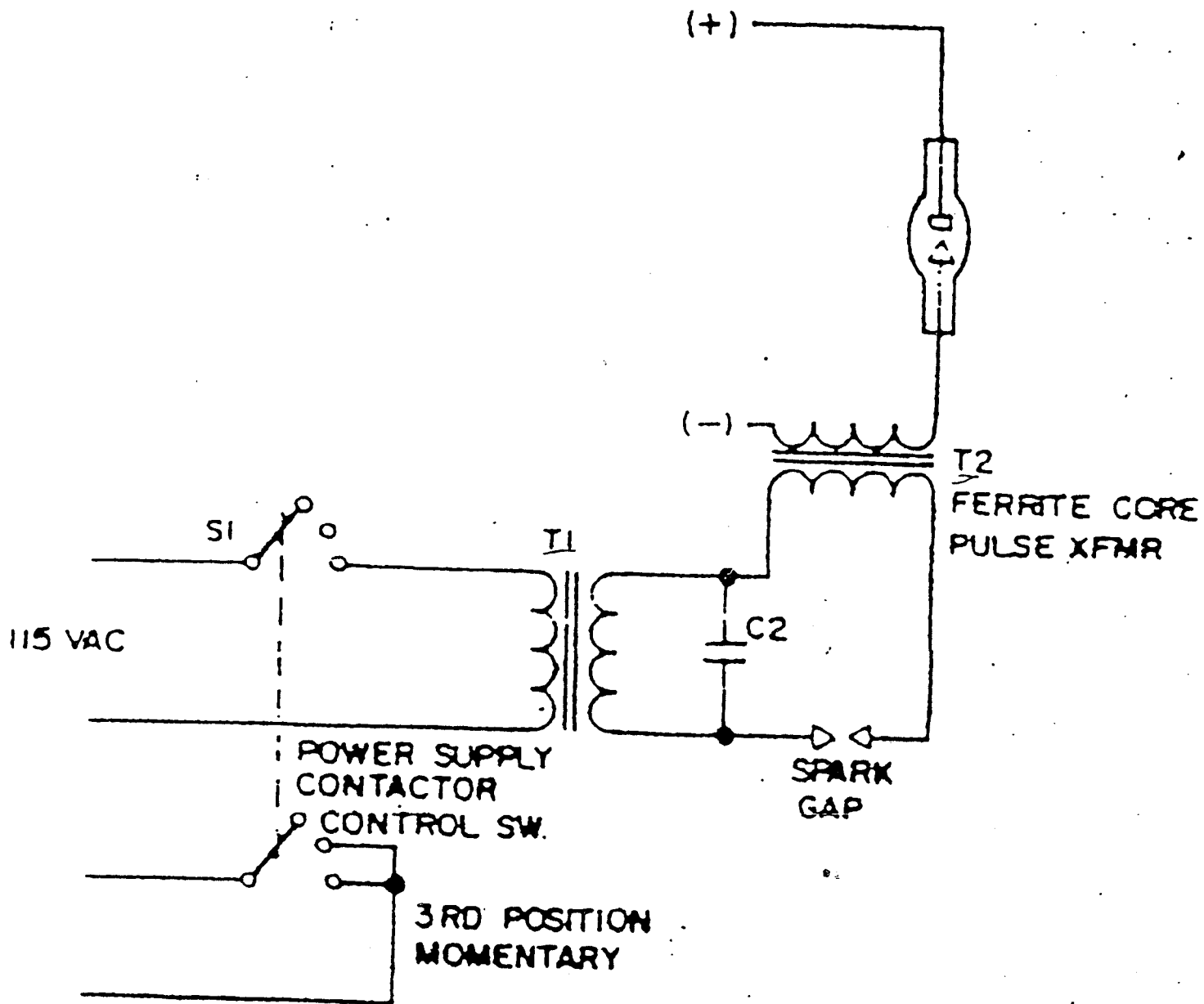
Carbon arc, Xenon, Tungsten Filament or incandescent.

19. What are the advantages of a xenon lamp over the carbon arc?

The advantages of xenon lamps are

- very little, if any adjustments are necessary.
- They are very efficient (no wasted electricity)
- Hardly any maintenance required.
- Full output seconds after the lamp is turned on.
- Excellent colour balance of light.
- XENON LAMPS HAVE A LONGER RUNNING TIME PER FEATURE WITHOUT THE NEED OF ADJUSTING (AS IN CARBON ARC)

XENON IGNITER CIRCUIT



C CAPACITOR
T TRANSFORMER

Carbon Arc Lamphouse

1. What is the function of the dowser on the lamphouse?

It is a device that interrupts the light source. It is used to protect the film and shutter from the severe heat from the light source when they are not moving.

2. Of what material are carbon rods used in lamphouse?

Very fine carbon powder mixed thoroughly with a binder of pitch and compressed into a rod. Some carbon rods are copper coated.

3. What harmful effect will moisture cause in carbon rods?

Moisture in carbon rods cause sputtering of the arc. Carbons should be stored in a warm dry place.

4. What is spindling and what could cause it?

The carbon tip burns to an abnormally long slim point. This can be caused by current being too high, improper trim for lamp or poor contact in the holders.

5. What causes carbons to mushroom?

Carbon rods mushrooming can be caused by the negative and positive carbon rods being too close.

6. How do you strike the arc?

TOWARDS

- Bring the negative carbon [^]to strike the positive carbon.
- Then remove.

7. How do you trim the Carbons?

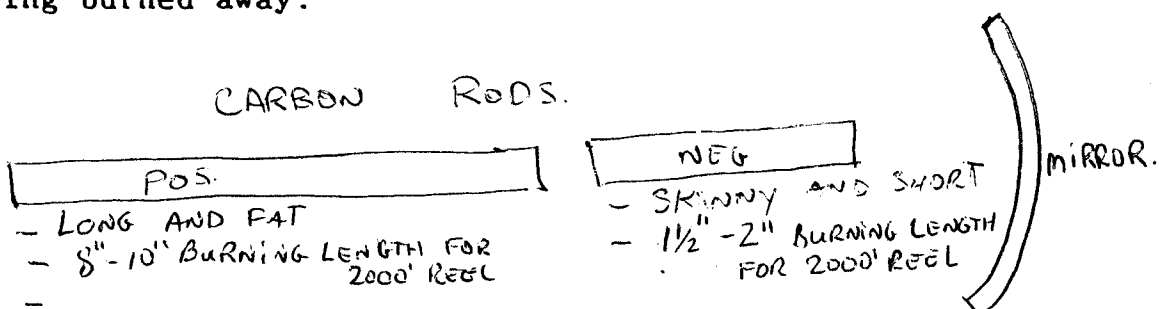
- Adjust the distance between the Neg. and Pos. carbon.
- Adjust the horizontal and vertical adjustments to align flame.

8. How do you change carbons?

- using pliers
- open carbon clamps and remove short carbon pieces.
- replace with new carbons and lock carbon clamps.
- close lamphouse door and strike lamp.

9. Why are carbon feeding mechanisms necessary?

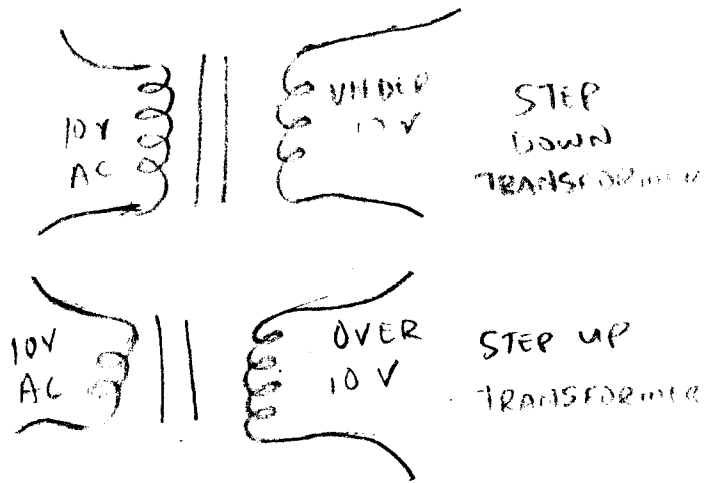
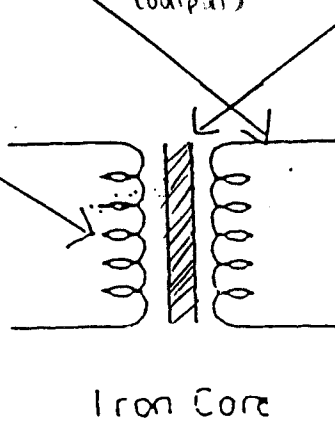
Carbon feeding mechanisms are necessary to keep the crater of the positive carbon at the correct point of focus while both carbons are being burned away.



Electricity

1. Name the parts of a transformer?

Primary winding. Secondary winding. metal core.
(INPUT) (OUTPUT)



2. Describe how a transformer works?

A transformer is made up of two coils of wire around a metal core. The two coils are insulated from each other. When an AC voltage is induced in one coil a voltage will be induced in the second coil. This is called induction. The voltage **PRODUCED IS** in proportion to the turn ratio (i.e. # OF WINDINGS AROUND THE COIL)

3. Name three types of transformers?

step-up. step-down. isolation.

4. How do you test for grounds?

- use a v.o.m.
- set meter on the ohms scale
- place the (-) lead usually black on the metal case of the device you are checking.
- place the (+) lead usually red on the spot you wish to check for ground
- If grounded the meter point should read zero.

5. How do you test for shorts?

- use a vom meter in the ohms scale.
- place one lead at one end of the component and the other lead at the other end of the component.
- If it is shorted the meter point should read zero.

6. How do you test for opens?

- use a vom meter in the ohms scale.
- place one lead at one end of the component and the other lead at the other end of the component.
- if the component is open the meter point should read infinite or very high resistance.

7. How do you test blown fuses?

Use a vom meter on the ohms RX1 scale. Place a lead at each end of the fuse. If the fuse is blown the meter point will show infinite resistance.

8. How do you test for single phasing in a three phase system?

It is when one of the three wires ^{may} no longer ^{be} carrying current. To test you must measure voltage across pair of wires. There should be a voltage present in every pair. *(THREE PHASE CARRIES A MUCH HIGHER CURRENT)*

9. What is a series circuit?

It is a circuit that has one or more components but current has only one path.

10. What is a parallel circuit?

It is a circuit that has two or more components and current has more than one path flow.

11. What is a V.O.M. ?

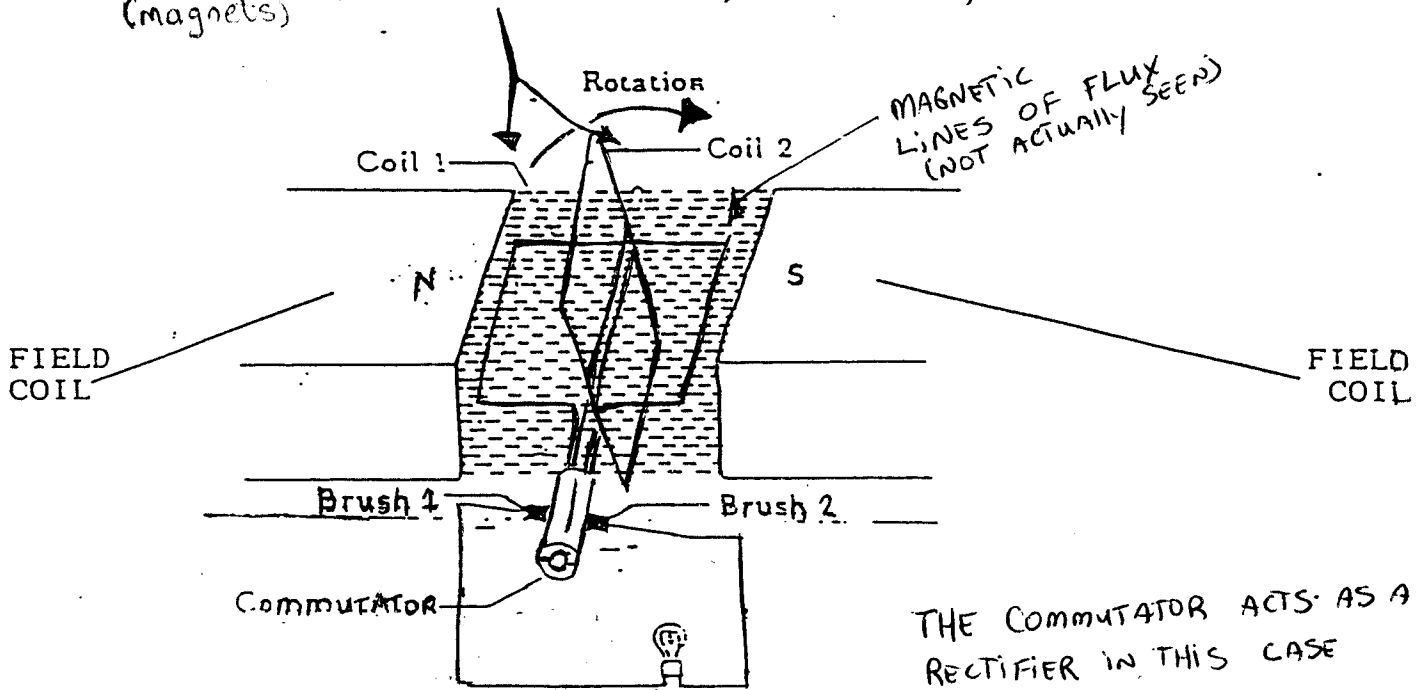
Volt-Ohms Meter.

12. What is a V.O.M. use for?

It is used to measure voltage and resistance.

1. What are the main parts of a generator and how it operates?

Frame, field coils, armature or coils, commutator, and brushes.
(magnets)



The armature is rotated between the soft iron poles pieces, around which the field coils are wound. Residual magnetism in the soft iron poles cause a current to be induced into the armature. A small amount of this induced current is fed back to the field coils thus increasing the magnetic field. therefore increasing the output from the armature. The winding on the armature are connected to the segments of the commutator upon which carbon brushes ride.

14. What are some of the problems associated with generators and what preventative maintenance should be followed?

Short in the field windings, worn brushes, shorts in the armature windings, pitted or dirty commutator, commutator but of round, misaligned brushes, worn bearings, loose brushes.

The generator should be cleaned once a week. The dirt and dust should be blown out of the unit. The commutator should also be cleaned. Worn and damaged brushes should be changed as soon as possible.

15. What is a Ballast resistor?

It is a resistor in the generator used to absorb the difference between the generator and the arc voltage.

16. What is a Field rheostat?

It is a variable resistor used to regulate the flow of current to a generator by increasing or decreasing the resistance to the field coils

17. What is a wire gauge?

A wire gauge is a tool used to determine the size of a wire.

18. What determines the current capacity of a wire?

The material and the size of the wire determine its current capacity.

19. Which size of wire is physically larger # 20 or # 6 wire?

SMALLER \leftrightarrow LARGER

#6

* THE LARGER THE SIZE OF WIRE (DIAMETER) THE LARGER THE AMOUNT OF CURRENT IT CAN CARRY.

20. What is a circuit breaker?

A switch that automatically stops the flow of electrical current in an overloaded circuit without destroying it self.

21. What are the advantages of a circuit breaker?

Safety device to protect equipment.
Can be used many times.

22. How does a circuit breaker work?

Circuit breaker is made of a current sensitive material that when the current flowing through the circuit breaker exceeds the rating of the circuit breaker, the contacts breaks opening the circuit.

23. What are some types of rectifiers utilized in projection for lamphouse?

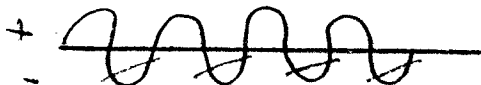
Full wave rectifier and half wave rectifier.
(PULSATING D.C.)

24. What is the function of a diode?

It is a component which allows current to flow in one direction only.

25. Define the following: (i) A.C. (ii) D.C. (iii) resistance (iv) voltage (v) current (vi) Hertz (vii) Watt (viii) ground (ix) induction

- (i) A.C. - Alternating current: A current which alternates in direction.
- (ii) D.C. - Direct current, current flows in one direction only.
- (iii) Resistance- the ability to resist the flow of current.
- (iv) Voltage- The force of electrical current, expressed in volts.
- (v) Current- The magnitude or volume of electron flow, usually measured in amperes.
- (vi) Hertz -- in the SI measurement for frequency, one hertz equals one cycle per second.
- (vii) Watt - a measurement for power.
- (viii) ground-A safety feature to ground all components together.
- (ix) induction-Is the transfer of electrical energy from one coil of wire to another coil of wire.



HALF WAVE

— CREATES A PULSATING D.C. CURRENT —



Full WAVE

— CREATES A MORE SMOOTHER FLOWING D.C. CURRENTS —

26. What is the current in a circuit with a supply voltage of 120 volts and a resistance of 1000 ohms?

$$I = E/R = 120/1000 = .12 \text{ amperes}$$

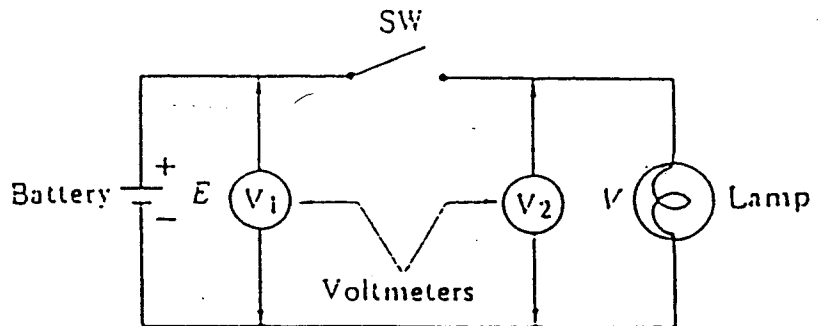
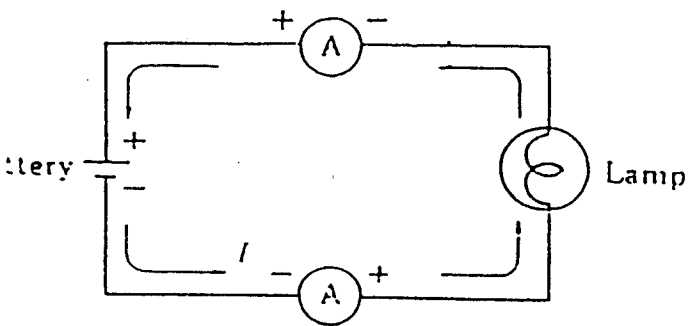
27. What formulae would you use to find the following: (i) Resistance (ii) current (iii) voltage?

- (i) Resistance = voltage divide by current.
 (ii) Current = voltage divide by resistance.
 (iii) Voltage = Current times resistance.



$$100 \text{ WATTS} = 1 \text{ AMPERE}$$

28. Show by drawing where an ammeter and voltmeter are located in a circuit?



29. does the generation of electricity consist of the creation of electrons?
 YES OR NO

30. The strength of an electrical charge or force is measured in VOLTS.

31. The strength of a current (rate of flow) is measured in AMPS.

32. List three good conductors of electricity.

* SILVER, COPPER, ALUMINUM

33. List five materials used as insulators.

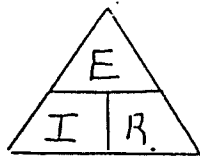
* RUBBER, GLASS, OIL, AIR, SULPHUR, BAKELITE, COTTON, PAPER, CERAMIC.
(HIGH TEMPERATURE PLASTIC)

34. What two factors must be taken into account in calculating current flow?

The two factors that must taken into account are Volts and Resistance.

35. In ohm's law what do the following stand for: E, I, R.

E-Volts I-current R-Resistance



OHMS LAW: THE NUMBER OF AMPS
FLOWING THROUGH A CIRCUIT IS
EQUAL TO THE PRESSURE IN VOLTS
DIVIDED BY THE RESISTANCE IN
OHMS

36. How can an electric current be used to magnetize pieces of iron or steel?

To magnetize pieces of iron or steel you would wrap a piece of insulated wire around the iron or steel and carrying a D.C. current.

37. At what frequency does the A.C. power enter the theatre?

60 cycles

38. What is the formula for resistors connected in parallel?

$$\frac{1}{\frac{1}{R-1} + \frac{1}{R-2} + \frac{1}{R-3}} = R t$$

39. If several resistors are wired in series, what is their total effective resistance?

$$R-1 + R-2 + R-3 + \dots = R t$$

40. Fuses are rated in volts and amps.

41. Of what material is a fuse made?

Fuses are made of metal alloy which will melt at low temperatures

42. What type of fuses might you find in a theatre?

The types of fuses you might find in a theatre are plug and cartridge and breaker. (ALSO KNIFE BLADE)

44. What type of current, applied to one coil of a transformer, will generate a voltage in the other coil?

A.C. or Pulsating D.C.

45. Why is grounding important?

Grounding is safety feature to prevent the operator from electrocution.

46. What is a D.C. power supply?

A D.C. power supply converts A.C. current in to D.C. current to provide power to projection equipment such as exciter lamp, xenon lamp and amplifiers. (D.C. current is used to ensure a steady and even flowing current i.e. no fluctuation in sound or picture)

47. WHAT'S THE ADVANTAGES OF A RECTIFIER OVER A GENERATOR,

- NO MOVING PARTS IN A RECTIFIER (EXCEPT FOR A FAN)
- PRODUCES A SMOOTHER CURRENT.
- EASIER TO MAINTAIN.

48. What is the purpose of a resistor

A resistor is a conductor used to control voltage in an electric circuit.

49. WHAT IS A cycle

A cycle is A COMPLETE ALTERNATION OF A CURRENT, THAT CHANGES FROM POSITIVE TO NEGATIVE AND BACK AGAIN.

Sound

1. WHAT IS SOUND!?

Sound is created when the vibration of a physical object disturbs the particles of air.

2. What is the function of the photo electric or solar cell in the sound head?

The function of the photo electric or solar cell in the soundhead is to convert the film sound tracks variance in light to variance in electrical impulses.

3. Describe how optical sound is reproduced from the sound track to the speaker?

The light rays from the exciter lamp are focused on the film sound track through a slit lens. The film sound track creates variance in light which is converted to variance in electrical impulses by the solar cell. These impulses are then set to the audio amplifier to be amplified. From the amplifier the signal is sent to the stage speakers where the electrical impulses are converted to sound wave by the stage speaker in the theatre.

4. What is the difference between a solar cell and photo cell?

Photo cell converts variance in light to variance in current.
Solar cell converts variance in light to generate a variance in current flow.

5. Why is D.C. preferred for exciter lamp power supplies?

DC is preferred for the exciter lamp because its relatively ripple free. so there is very little or no fluctuation in the exciter lamp light output

6. How is the D.C. supplied for the exciter lamp?

120 volts AC is fed to the primary winding of the transformer. By induction the voltage is set down to 10 volts AC. This voltage is then fed to a diode pack and filter network that rectify the AC voltage to produce 10 volts DC.
↳ (CAPACITORS THAT HELP TO KEEP THE CURRENT RUNNING SMOOTHLY)
↳ RECTIFY THE CURRENT (CHANGE AC TO DC.)

7. Name the components of the D.C. exciter lamp power supply?

Transformer, filter network, diodes or diode pack.

8. How do you focus the excitor lamp?

Place a white card in front of the solar cell at the location where the sound track on the film would pass in front of the cell. Adjust the sound lens so that the slit of light on the card is sharp and as bright as possible. Another way is to use a sound test loop with a tone frequency of 7 khz or 9 khz. With the loop running adjust the exciter lamp voltage and sound lens slit for the maximum sound output. Ensure that the voltage and current rating for the exciter lamp is not exceeded.

9. What could be the cause if the sound was garbled.

Garbled sound could be caused by damage solar cell, dirt build up in front of slit lens, damage amplifier system or improper film tension around the sound drum.

10. Why does a sound head have a impedance or scanning drum?

So that the film sound track passes in front of the solar cell and excitor lamp beams correctly and at steady and even speed.

11. What is a cross-over network?

Cross-over network separates the amplified audio output signals into the proper frequency bands to match the speakers.

12. What is a transistor?

Transistor is a current controller device - a type of electronic valve or amplifier.

13. What is a heat sink?

Heat sink is a piece of metal used to dissipate the heat produced in a component.

14. What is motor-boating and what causes it?

Motor-boating is a steady tick,tick sound being heard from the speakers. It can be cause by sprocket runoff on the sound-track or by the sprocket perforation passing in the front of the solar cell.

15. What is a vacuum tube?

Is a sealed glass tube containing a anode, cathode and one or more grids in a vacuum. It is used in a electronic equipment, such as amps,rec.and automation..

16. What is a sound lens?

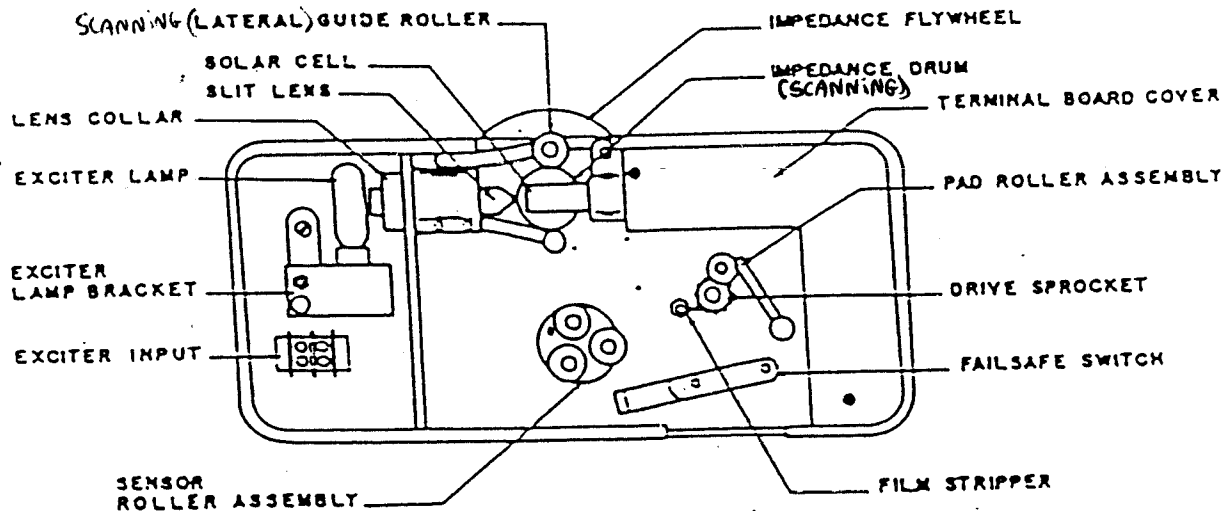
Is a compound lens used to focus the exciter lamp light beam through a slit to produce a .1 mm slit of light to scan the optical sound track.

Why is there a need for a stabilizing system in the sound head?

To reduce wow and flutter in the sound head.

18. What does the stabilizing system consist of?

Scanning drum and some form of a damping roller or device.



19. What could cause crackling sound?

Defective photo-electric cell, loose wire connections, dirt build-up in the sound optics.

20. What should be checked if loss of sound occurs?

All circuit breakers on, exciter lamp on, amplifier on, Non-sync sound on, all fuses.

21. What is considered the audible range of frequency of sound?

15 to 20,000 cycles per-second (hertz).

22. What is echo?

The sound that reflects back a short time after the original vibration

4. How can echo be controlled?

24. Echo can be controlled by covering hard surfaces with soft materials such as cloth draperies.

25. Would the number of patrons in a theatre have any effect on the sound level? YES OR NO

26. what could cause a clicks in the sound at about 120 times per min.
120 clicks per min. could be caused by dirt build up on the sound drum.

27. What is the difference between an exciter lamp and a photo cell?

Exciter lamp emits light and a photo cell collects light.

OPTICS

1. What is the working distance of a lens?

It is the distance from the surface of the film emulsion at the aperture to the first surface of the projection lens.

2. Define the following terms: (a) Spherical Aberration (b) Astigmatism (c) Chromatic Aberration (longitudinal).

(a) Spherical Aberration - A condition of an uncorrected lens that focuses light rays passing through its various zones at different distances from the optical centre of the lens. The further from the axis a ray passes through the closer to the lens it will be focused.

(b) Astigmatism - Different thickness of the lens between its centre and its edges cause the light passing to focus at different points.

(c) Chromatic Aberration - The condition of an uncorrected lens in that white light is broken down into its components of colour. These colours are focused at a different distance from the optical centre of the lens.

3. What does a flat lens do?

Is an optical device designed to magnified and invert an image on a screen at a ratio of 1 to 1.33, 1 to 1.66, 1 to 1.85

4. What does a scope lens do?

A lens having a different magnification in the horizontal and vertical dimensions of the image. A lens that inverts and spreads the screen image horizontally to provide a wide screen image with an aspect ratio of 1 to 2.35

5. Name the parts of a compound lens?

Is made up of several negative or positive lens elements, dust seals, barrel, and lenses are join together with Canadian balsam glue, focusing ring

6. How often should a lens be disassembled for cleaning?

Never, only the outer lens surfaces should be cleaned.

7. What is the formula for the focal length of a lens?

Focal length = $\frac{\text{aspect ratio} \times \text{projection distance}}{\text{screen width}}$

screen width

8. Define: a) Aspect Ratio b) Projection Distance c) Width ?

(a) Aspect ratio - the relationship between the film height and width.

(b) Projection distance - The distance from the projector aperture to the centre of the screen, measured in feet.

(c) Screen Width - measured in feet.

9. Describe how a lens should correctly be cleaned?

The most efficient manner to clean a lens is to first remove any dust or dirt from the lens using a camel's hair brush. Next a lens cleaning fluid should be used, by placing a few drops on lens cleaning tissue and gently wiping the lens clean.

10. What is Anamorphic?

Is a lens attachment that magnifies by a factor of 2 in the horizontal plane.

11. Why are there small perforations in a theatre screen?

To allow for the sound from the speakers behind the screen to reach the theatre with little interference

12. Name two types of screen surface (colour)?

Matte White, Silver.

13. What is the correct method to clean a screen?

To remove dust and dirt very carefully dust the entire screen surface with a very soft cloth or screen brush. Extreme care should be exercised!!

Stains may be removed by sponging the area with a soft cloth or tissue wet with warm water and mild soap. Dabbing sponging motion should be used to avert damaging the screen surface.

14. Does perforation in a screen have any effect on the picture brightness?

Yes there is an approximate loss of 9-10% of the light.

15. What is luminance a measure of?

The measured value of brightness.

16. Describe briefly the primary and secondary optical system of the projector?

Primary optical system consists of the light source and a collector which in most cases is the curved mirror which collects the light and focuses it on the aperture and film.

Secondary system consists of a projection lens, which picks up the light rays from the film, magnifies these light rays and focuses them on the screen.

17. What does Candela and Footlambert measure?

The Standard and Metric measurements for Luminance.

18. What is used to join different lens elements together?

Canadian Balsam Glue

1. Describe: A) Plano Concave B) Plano Convex C) Double Convex
D) Double Concave E) Meniscus.

A) Plano Concave - A lens flat on one side and concave on the other.



B) Plano Convex - A lens flat on one side and convex on the other.



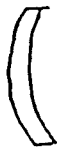
C) Double Convex - A lens which is convex on both sides.



D) Double Concave - A lens which is concave on both sides.



E) Meniscus - A lens having one side concave and the other convex.



20. Why is the lens not regarded as part of the projector mechanism?

Because the lens must be selected according to the need of the theatre with reference to size of the screen and projection distance.

21. What does the f number mean on the lens.

The f number on the lens, refers to the speed of the lens.
The "speed" refers to the angular size of the cone of light it can pass

22. What is a simple lens?

A simple lens is a lens that has only one lens in it.

23. What is a compound lens?

A compound lens is a lens that has two or more lenses in it.

Automation

1. What is a fail safe?

A device that senses damaged or broken film and stops the projector.

2. Why is there a need for a fail safe device in today's projection systems?

Fail safe devices are required in today's projection systems because with automation one projectionist is now required to operate three or more projection systems.

3. What is a proximity detector?

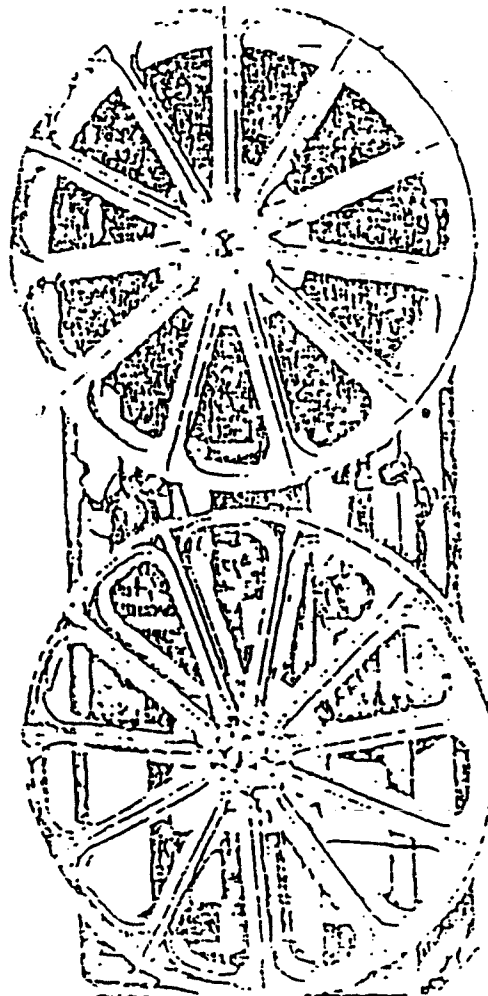
Is a detector in some automation systems that senses the metallic foil.

4. What is a matrix board?

Matrix board is an automation board where a series of events can be programmed to happen electrically and can be changed. i.e. House lights down, start projector, stage light down.

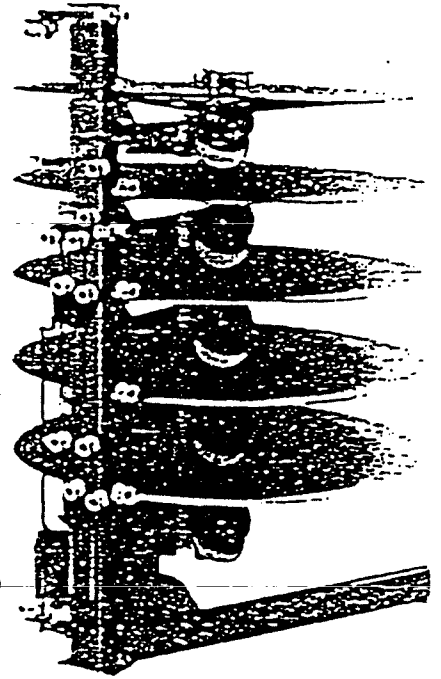
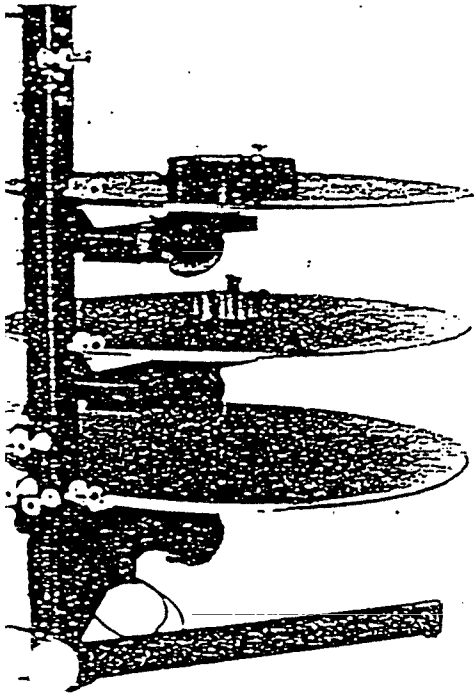
5. What is a tower?

Is a film transport system consisting of two vertical reels large enough to contain one feature. The film must be rewound at the completion of each performance.



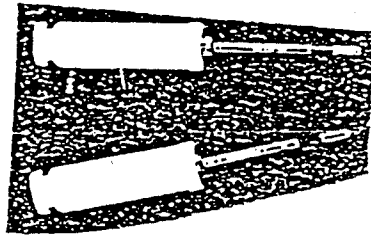
6. What is a platter system?

Is a film transport system consisting of 3 or 5 horizontal tables which can contain one complete feature for continuous projection.



7. What is a diode peg?

Is a peg used in a Matrix board automation to program the events to be performed.



8. What senses the foil tape in a automation system?

Proximity sensor.

9. What is a stepper relay?

A relay that ^{SENDS} electric pulses through each step or line in the matrix board.

10. What is the function of a stepper relay and how does it work?

The function of the stepper relay is to route the electric impulse to the correct relay to perform designated task. The proximity detector senses the metallic foil placed on the film. A electric pulse is sent to the coil in the stepper relay which pulls in the plunger and rotates a set of contacts. These contacts switch the supplied voltage to other relays that are intern energized to perform certain function.

11. How do you test a diode peg for: a) short b) open?

- used a volt/ohm meter and set it on the ohms scale.
- place one lead on one end of the diode peg and the other lead on the opposite end. Record the reading on the scale.
- Now switch leads to the other ends
- If both readings are zero the diode peg is shorted.
- If both readings are infinite the diode peg is open.

12. Describe how to make up a complete feature on a platter system?

To make up a complete feature you must remove heads and tails from each reel starting with #1 reel head-up and continue as follows, head #2 to tail #1, H3 to T2, H4 to T3, etc....

15. How is metallic tape placed in regards to the film running through the projector?

The metallic tape is placed on the base side of the film.

16. How does a proximity detector work?

The proximity detector is made of a coil of wire with a voltage apply. A magnetic field is produced around the coil. When the metallic foil pass by the proximity detector it interrupts the magnetic field and sends a pulse to the automation board.

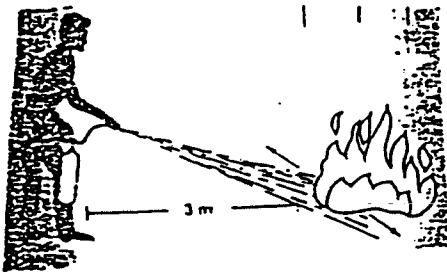
Miscellaneous

1. What are censor-bands?

A paper or cardboard band placed around the film reel by the Ontario government to show that the feature has been classified. ie. Family, PG, AA, or Restricted.

2. Describe how to operate a fire extinguisher?

- remove safety pin.
- point nozzle at base of flame
- stand about 10 feet or 3m from flame
- squeeze trigger



3. Name 5 safety devices found in a projection booth?

- | | |
|-----------------------|--------------------------|
| a) fire pinch rollers | -fail safe |
| b) fire links | -face shield |
| c) fire shutter | -leather work gloves |
| d) fire extinguisher | -safety film |
| e) circuit breakers | -leather chest protector |

4. How would you check the safety devices you listed in number 3 and how often?

Each safety device that should be checked on a daily basis are: face shield, leather work gloves, leather chest protector and fire extinguisher are present in the booth. Fire extinguishers should be checked yearly by professional and monthly by operator. fire links, fire pinch rollers and fire shutters are not always used today but if they are being used they should be checked regularly. all other devices should be checked as they are used.

5. Define (a) Heads up (b) tails up (c) Academy leader (d) Framing
(e) Keystoning (f) Nitrate film (g) Nonsync sound (h) Travel ghost

- A) Heads up - the beginning of a reel.
- B) Tails up - the ending of a reel.
- C) Academy leader - A nonprojected identification and timing countdown film leader, placed at the head end of a print reel.
- D) Framing - Aligning the film image on the projector gate aperture so that the projected image appears centred on the screen.
- E) Keystoning - Is when the projection angle is too great causing the picture to be wider at the top than bottom. (OR VISA VERSA eg: Roxy #1)
- F) Nitrate Film - A highly flammable motion picture film. (ILLEGAL FOR USE)
- G) Nonsync sound - The amplifier channel selector position used when playing record or tape music during openings and intermissions.
- H) Travel Ghost - A condition that occurs when the shutter is not timed properly. On the screen the light areas produce "ghosts" that extend above or below adjacent dark areas.

6. What is the minimum recommended size for a projection room with two projectors?

The minimum size recommended for a projection room with two projectors is 16'w X 12'd X 9'h

7. What materials should be used in the construction of the walls of the projection room?

The materials that should be used are Brick, concrete, and concrete or cinder blocks.

8. The openings for projecting the picture on the screen should be no larger than 18" by 18".

9. What are the requirements regarding ventilation in the projection room?

The Ventilation system must change the air in the projection room every five min.