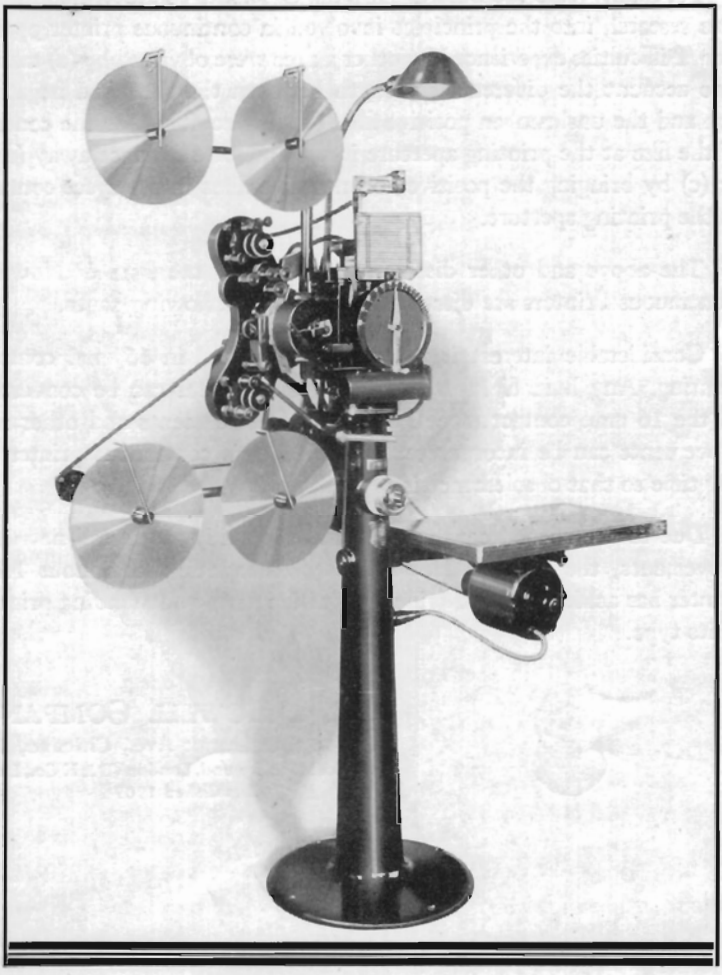
BELL & HOWELL

model "D" semi-automatic

continuous

FILM PRINTERS



PREFACE

THE continuous film printer construction has always been recognized as a valuable aid to increased production. Since the inception of sound, the continuous printer represents the only satisfactory method of printing the sound track. For this reason, the BELL & HOWELL Continuous Printer has become even more popular than before.

For many years the BELL & HOWELL COMPANY conducted considerable research into the principles involved in continuous printer operation. Difficulties experienced by other makes were obviated by (a) taking into account the difference in length between the shrunken negative film and the unshrunken positive film; (b) by providing for the control of the film at the printing aperture instead of some distance away from it; (c) by bringing the positive and negative films into perfect contact at the printing aperture.

The above and other distinctive features of the BELL & HOWELL Continuous Printers are discussed fully in the following pages.

Considerable interest is now being expressed in 16 mm. contact printing. Any BELL & HOWELL Continuous Printer can be converted to the 16 mm. contact model. The sound attachments and other improvements can be incorporated in the 35 mm. continuous printer at any time so that obsolescence is avoided.

Due to the rugged construction and the ability to install new improvements, the BELL & HOWELL Semi-Automatic Continuous Film Printer has achieved world-wide recognition as the outstanding printer of its type.

BELL & HOWELL COMPANY
1801-15 Larchmont Ave., Chicago, Ill.
New York, Hollywood, London (B & H Co., Ltd.)
Established 1907

The BELL & HOWELL Standard Continuous Film Printer—Model "D"

FOR many years this printer has met every requirement for quantity production of positive prints and its high efficiency in this production is unparalleled. The light control of this machine is semi-automatic; i. e., while the actual range of light volume at the film contact point is effected by an electrically operated device, these changes are pre-determined by the attendant. This affords an instantaneous, properly timed, light change to compensate for unequal density of consecutive scenes in the negative film.

The essential advantages of the model "D" Continuous Printer may be gathered by the fact that it is designed to operate at a speed of 60 ft. a minute (many laboratories run the printer faster than this, although we do not recommend it). Due to the efficient design and construction of this printer, perfect results are obtained even at these high speeds.

The machine is interlocked, to prevent operating the gate while the lamp is on, so there is no danger of fogging the film.

In brief, the principle of the operation of this machine is that the back shutter is set to a pre-determined opening for the first scene. Then the pointer is set to the next back shutter opening number on the index dial. As soon as the next scene reaches the aperture, a notch in the side of the film operates the circuit interrupter which, in turn, operates the magnets. One magnet releases the relay shutter operating gear and changes the opening of the back shutter instantaneously, so as to give the correct setting for the next scene. Another magnet lets the card indicating pointer drop one notch. The pointer then indicates the shutter setting for the next scene. This enables the operator to again set the dial pointer one step ahead of the printer operation—this is how the designation "Semi-Automatic" is justified.

Distinctive Features

1. New Improvements: The Model "D" Continuous Printer can be changed at the factory to make 16 mm. contact print from 16 mm. negatives, if desired. The BELL & HOWELL Printer is designed that new improvements, such as the sound printing attachments can be installed on old printers. Particular care is taken in designing new features to make them adaptable to old printers. The importance of this is obvious.

2. Sound Printing:

(a) TRIPLE ADJUSTMENT SOUND ATTACHMENT: This versatile development allows the three masks used to be set at any combination as shown in Figures 4, 5, 6, 7

and 8. Note particularly that by retracting all of the masks (Figure 4) regular (silent) negative can be printed at a moment's notice.

Consisting of two main assemblies, the sound attachment is accurately located in position, illustrated in Figures 1 and 2, the jaws of the sound attachment interlocking with the lower aperture jaw to prevent light leakage.

The three masks are made so that the aperture has a fixed standard opening of 5/16 of an inch. Therefore, the aperture opening cannot be altered for special work. This contingency can be taken care of by use of an external rheostat or possibly by alteration of the back shutter adjustment. Each mask operates in a milled slot in the casting and its travel is limited by two slots cut on its under side which the pawls P, Figure 3, engage. The distance between these slots is one-half inch, as is the stroke of the mask. This withdraws the mask sufficiently to avoid interference with the light.

The three masks are held in place by the triple tongue S, Figure 3, and a little care must be exercised to avoid slamming the gate. (See operation 7, page 7.) This should not be done at any time, but should be especially watched when the sound attachment is installed in position at the gate.

To avoid fringing due to the reflections from the sides of the masks, the mask B is recessed. Side masks A and C are milled with a slight rib on the sides adjacent to the middle mask B. When mask B is pulled back, it engages the side mask rib and moves it over sidewise a distance of .017". This causes a strip .017" wide between the sound and picture areas to be double exposed, making a black line as now standardized by the Society of Motion Picture Engineers. The sound negative can be printed from either end of the roll and either the sound or picture area can be printed as desired, without rewinding. (Figures 4, 5, 6, 7 and 8 show how this is done.)

(b) FIVE-WAY SOUND ATTACHMENT: We also make an alternative sound printing attachment which can be fitted to the Model "D" Continuous Printer. Instead of having markings in the aperture, the five-way attachment utilizes a 230° drum in which are cut five openings. See Figures 9 and 10, page 4. The five openings are arranged to take care of printing the sound and picture areas respectively of the negative, whether the negative is running forward or backward. In other words, instead of arranging the masks to give the various combinations of aperture openings, the five-way wheel is turned to the correct opening. These openings are indexed to facilitate the operator using them for sound and picture area printing, in correct sequence.

3. Creepage or Slippage of Film Overcome: This problem prevented earlier attempts to make a satisfactory continuous printer. In the BELL & HOWELL printer, allowance is made for the difference in the length of the shrunken negative

BELL & HOWELL
Continuous Printer with Triple Adjustment Sound Attachment

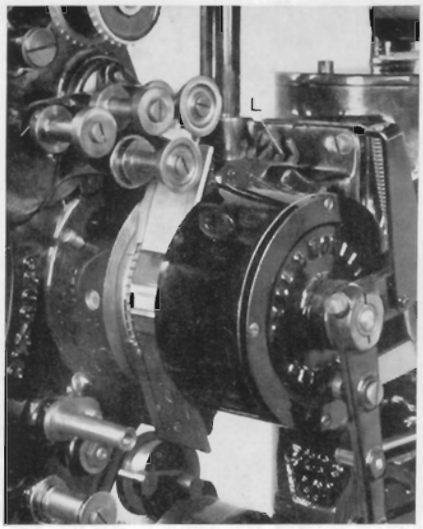


Fig. 1

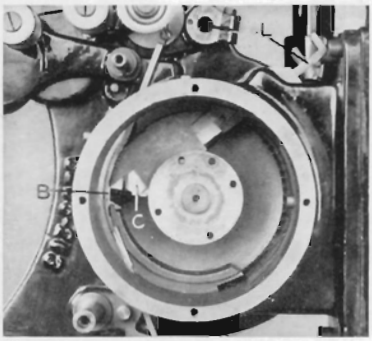


Fig. 2

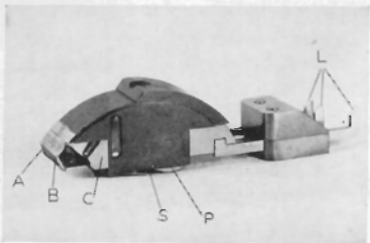


Fig. 3

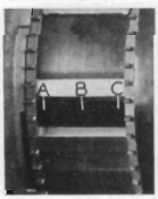


Fig. 4

Fig. 5

Fig. 6

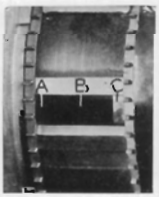


Fig. 7

Fig. 8

"A," "B" and "C"—*Shutters Masking Sound and Picture Areas.* "L"—*Shutter Operating Levers.* "S"—*Pawl Tension Spring.* "P"—*Shutter Lock Pawl.*

Fig. 1—Major detail of B. & H. Printer—with gate removed.
Fig. 2—The Triple Adjustment Sound Mask Attachment—installed.
Fig. 3—The Triple Adjustment Sound Mask Attachment.
Fig. 4—Shutters Retracted for full aperture printing.
Fig. 5—Shutter "A" set for masking the sound area—forward run.
Fig. 6—Shutters "B" and "C" set for masking picture area—forward run.
Fig. 7—Shutter "C" set for masking the sound area—reverse run.
Fig. 8—Shutters "A" and "B" set for masking picture area—reverse run.

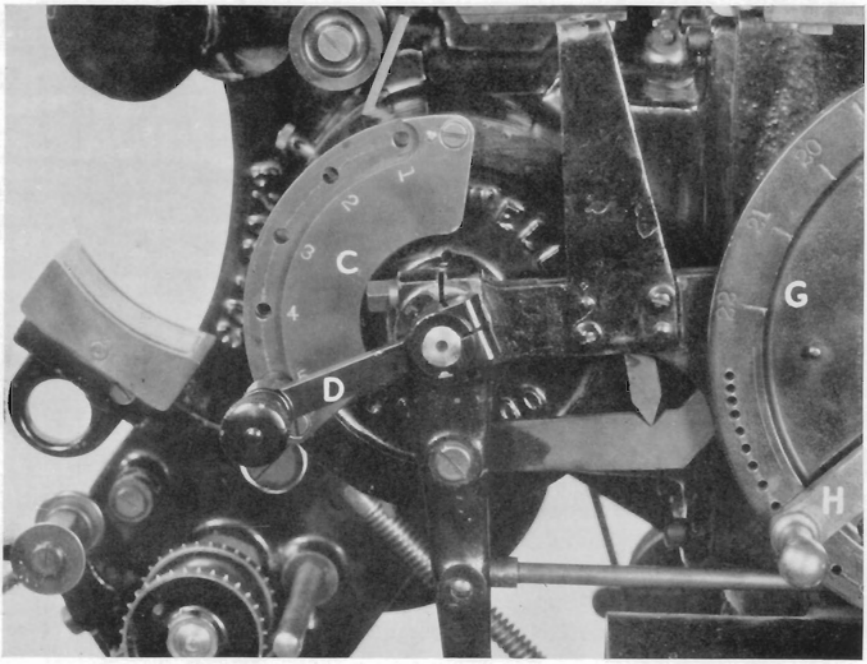


Fig. 9

Right and left sound and picture printing shutter for Bell & Howell Model "D" Continuous Film Printer. C—Shutter control dial. D—Shutter control lever. G—Light control dial. H—Light control lever.

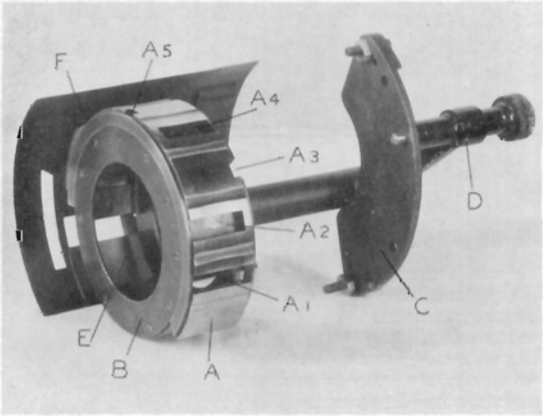


Fig. 10

The right and left sound and picture shutter attachment alone.

A—Right and left sound and picture printing shutter wheel

A1—Standard full printing aperture

A2—Reverse picture record printing aperture

A3—Reverse sound record printing aperture

A4—Forward picture record printing aperture

A5—Forward sound record printing aperture

B—Light trap drum

C—Control dial

D—Control lever

E—Back Shutter light control

F—Back shutter—light mask

and the unshrunken positive films. The films pass a convex aperture plate, the radius of which is such that this difference in the length of the films is automatically compensated for.

4. Control at Printing Aperture: This prevents trouble due to shrinkage between control point (if elsewhere) and aperture plate. It is obtained by using at the aperture, a sprocket of the same radius as the aperture plate, which brings the film to register just before reaching the printing aperture.

Lateral shrinkage is taken care of by making narrower the teeth on one side of the printing sprocket. The teeth on the other side are very carefully made to the exact size of the perforation. The film is thus registered by the perforation itself, a basic BELL & HOWELL patent, and the registration is such that perfect prints are obtained at speeds of 60, or even more, feet per minute.

5. Film Contact: To further insure registration, and especially to obtain good contact at the aperture, rollers mounted on weighted levers, are inserted between the feed and printing sprockets. This insures there being just enough tension on the film to keep it taut. Particular attention is directed to the fact that there are no sliding surfaces; the use of rolling, instead of sliding motion against the films, greatly improves their life and quality.

Additional control is obtained by the special manner in which the printer gate is machined. In addition to being concaved to properly match the curve of the aperture plate, it is machined with a slightly raised portion immediately opposite the aperture. This allows perfectly free movement of the film, but still further insures perfect contact at the instant of exposure.

6. Printing Mechanism: The index dial allows for 22 light graduations. Each step gives 10% more light than the previous one. In printing, the operator works one step ahead of the machine.

The dial is set to the first setting and the magnetic clutch released by hand. This sets the back shutter light control. Then the dial is set to the next printing number marked on the index card. At the scene change, a notch in the edge of the film operates the circuit interrupter, which, in turn, operates the clutch and indicator magnets. The clutch magnet sets the back shutter at the new adjustment, and the indicator drops to the next number on the index card with an audible click. The operator then sets the dial to the next setting, and so on. In practice, this permits of properly handling a number of quick light changes without difficulty.

7. Light Control: Note that instead of changing the light intensity by a rheostat with its attendant inaccuracies, we control mechanically the volume of light allowed to reach the printing aperture. This insures instantaneous light changes that can always be duplicated exactly on all prints.

8. Safety Features: Foolproof starting handle interlocks with aperture gate and brake; prevents any possibility of starting machine with gate open, and thereby prevents any film being accidentally fogged.

A ruby glass window shows whether lamp is lit, thereby preventing loss of time and film. A brake is provided for quickly stopping the machine, and all circuits are adequately fused.

9. Other Features: While the aperture opening is set at the factory, it can be altered for special work, such as printing badly shrunken film.

10. Printing Key Symbols: The main casting is cut away at the aperture to permit the printing of key numbers, symbols, etc., along the margin of the film. This is valuable where the negative has been marked with footage numbers, etc., along the edge of the film.

Current Supply

It is recommended that direct current be used for the printing light to avoid waviness due to synchronization of the frame lines with the current fluctuations. The motor and magnet circuits can be operated on alternating current, if desired. A special motor generator set is advised if direct current is not available for the printer lamp. (Be sure to furnish full electrical specifications when ordering.)

A special, fully automatic sound and picture production printer is now available. See inside back cover. Further details on request.

Guaranty

BELL & HOWELL Standard Continuous Film Printers are guaranteed against defects in material and workmanship for a period of one year. Repairs or replacements of defective parts will be made without charge, provided these are returned to us prepaid.

* * *

In conclusion, the BELL & HOWELL Standard Continuous Printer represents the utmost in printer efficiency and is accepted as the outstanding unit for printing the highest quality productions.

Dimensions, Weight, and Shipping Data on Model "D" Printer

Height of Printer	60 in.
Width (over service table)	42 in.
Depth (over service table)	17 in.
Weight, net, approximately	300 lbs.
Weight, gross, approximately	440 lbs.
Weight, packed for export, approximately	440 lbs.
Dimensions of shipping case—approximately—62″x30″x20″ or 21.5 cubic feet.	

Instructions Covering Operation and Care

THE BELL & HOWELL Standard Continuous Film Printers require less special attention than any film printer made. However, in the operation of any automatic high speed machine turning out the volume of first-class prints of which this machine is capable, extra precaution must be taken to the eliminating as far as possible the dust and dirt which arises in the handling of negatives and in the printing room proper.

The machine should be oiled once every day. Surplus oil should be removed before printing. One drop of oil in each bearing is sufficient. More will run out and accumulate dirt on parts. Belts should always be kept in good condition, taking care that joints are properly made and that correct tension is maintained. When the machine is not in use the Aperture Shutter Gate, and Upper and Lower Stripper Plates should be oiled to prevent rusting. See Operation No. 19 for care of the machine during operation.

Successive Stages of Operation

1. All negative must be first notched with the Film Notching Cutter as indicated in the descriptive matter outlined under the caption "Printing Mechanism" for the purpose of making the necessary changes in the printing light.

2. After negative has been properly notched and timed (see instructions under "Timing or Testing Negatives"), it should be thoroughly cleaned.

3. Place negative, wound emulsion side out on right hand Feed Reel Spool (7624) keeping same securely against Right Flange (7659) by means of the right Feed Reel Guard (01719).

4. Place positive, wound emulsion side in, on left hand Feed Reel Spool (7624), keeping same securely against left flange (7659) by means of the left Feed Reel Guard (01719).

5. Take ends of both negative and positive (the negative should have a leader approximately 2 feet long) and advance negative leader through threading operation about a foot ahead of positive by pulling same down to Left Takeup Reel. Then with both strips hanging loose take hold of film near Feed Sprocket (7509), raise Feed Sprocket Lever (7210) and pass both negative and positive under Film Guide Roller (7207) and Feed Sprocket Guide Roller (7209) locking film against Feed Sprocket (7509), with Lower Feed Sprocket Roller Lever (7210).

6. Place negative only under Negative Tension Guide Roller (7207) and over Negative Aperture Guide Roller (7643). Then place positive under Positive Tension Guide Roller (7207) and over Aperture Guide Roller (7642).

7. Open Film Aperture Gate (8105) drawing both negative and positive over printing sprocket until tension weights carrying rollers (7207) are in the intermediate position, avoiding the possibility of getting tension beyond or lower than that indicated by the limit pin provided for the tension weights. Note: The correct degree of tension is of the utmost importance as it is one of the means provided for eliminating creepage or slippings. Close Aperture Gate (8105). Important: Gate must NOT be allowed to slam shut.

8. Raise Takeup Sprocket Roller Lever (7210) and pass both negative and positive under Takeup Sprocket Guide Roller (7209) and over Takeup Sprocket Roller (7208) allowing loop of negative to be a trifle longer than loop of positive between the Printing Sprocket and the Takeup Sprocket (7509). Then lower Takeup Sprocket Roller Lever (7210) locking film against Takeup Sprocket (7509).

9. Take end of negative and insert in Right Takeup Reel Hub (7616) keeping same securely against Right Takeup Reel Stripping Flange (7660) by means of Right Takeup Reel Guard (01699). Turn stripping flange to the right taking up slack used in threading. Note: Positive film is not

(Continued on page 9)

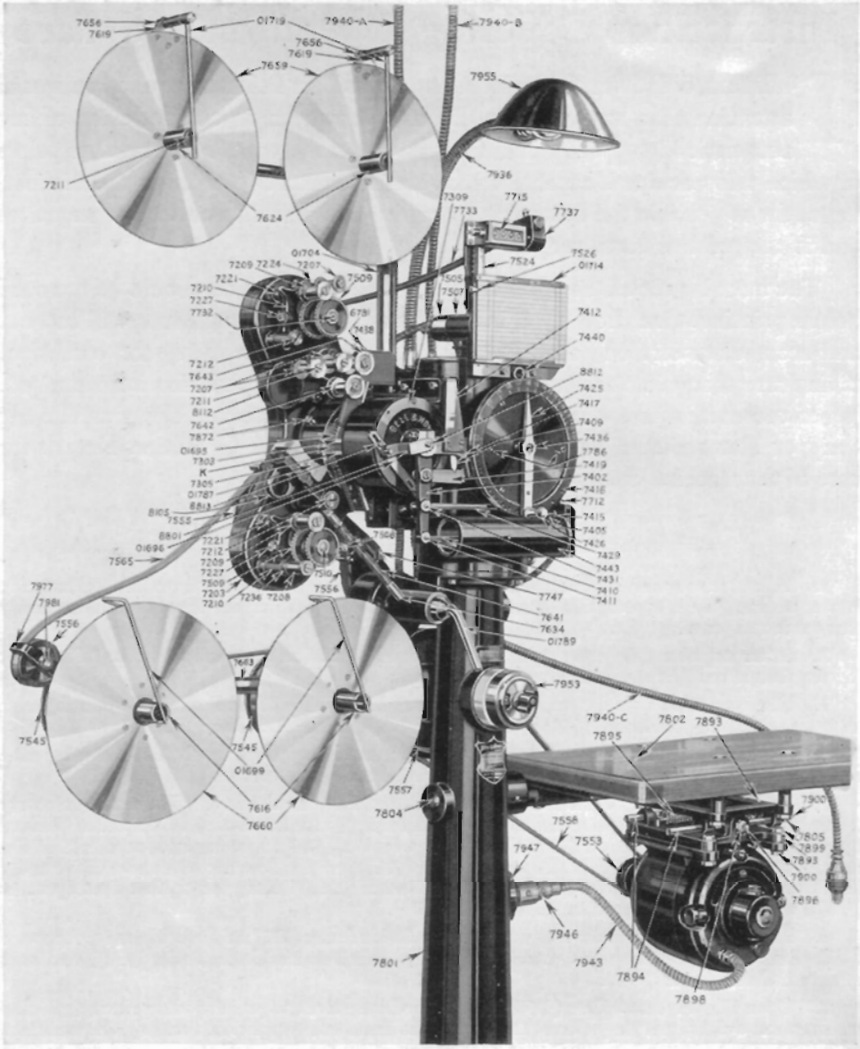


Fig. 11. Showing Principal Parts Numbered

01695 Aperture Sprocket
01696 Sector and Pin Assembly
01699 Takeup Reel Guard Shaft
01704 Feed Reel Arm Assembly
01714 Index Card Holder
01719 Feed Reel Film Guard Assembly
01787 Aperture Gate Assembly Complete
01789 Combination Switch Handle Assembly
Part 7203 Main Frame
7207 Film Tension and Guide Roller
7208 Takeup Sprocket Roller
7209 Feed and Takeup Sprocket Guide Roller
7210 Feed and Takeup Sprocket Roller Lever
7211 Roller Retaining Screw
7212 Guide Shoe and Roller Lever Screw
7221 Lever Latch Roller
7224 Top Guide Roller Stud

7227 Stop Screw for Sprocket Roller Lever
7236 Takeup Sprocket Roller Stud
7303 Upper Aperture Plate
7305 Lower Aperture Plate
7309 Shutter Bearing Flange
7402 Shutter Operating Lever
7405 Armature Return Spring
7409 Neutralizer Pawl Push Rod
7410 Shutter Lever Piston Link
7411 Lever Link Stud
7412 Push Rod Guide Bracket
7415 Armature Plunger
7416 Time Regulator Indicating Dial
7417 Quadrant
7419 Neutralizer Pawl
7425 Shutter Time Setting Lever
7426 Index Pin Knob
7429 Clutch, Rod
7431 Clutch Rod Connection Stud
7436 Regulator Pinion Screw
7438 Shutter Operating Lever Screw
7440 Ruby Glass
7443 Clutch Case
7505 Wire Receptacle
7507 Magnet and Register Bar Frame
7508 Feed and Takeup Sprocket Film Guard
7509 Feed and Takeup Sprocket
7510 Takeup Sprocket Shaft
7524 Register Bar
7526 Pointer
7545 Takeup Drive Pulley
7553 60 Cycle Motor Pulley
7555 Main Drive Pulley
7556 Tightener and Takeup Pulley
7557 Counter Transmission Sheave Wheel
7558 Motor Belt
7565 Driving Belt
7616 Takeup Reel Hub
7619 Film Guard Carrier Bracket
7624 Feed Reel Spool
7634 Lock Lever Guide
7641 Lock Lever Spring
7642 Positive Aperture Guide Roller
7643 Negative Aperture Guide Roller
7656 Screw for 7615 and 7610
7659 Feed Reel Flange
7660 Takeup Reel Stripping Flange
7663 Takeup Bracket Shaft
7712 Armature and Clutch Pivot
7715 Film Footage Recorder
7732 Feed Sprocket Shaft
7733 Flexible Shaft Casing
7737 Film Recorder Bracket
7747 Brake Lever
7755 Screw for 7443 and 7747
7786 Indicator Limit Pin
7802 Pedestal Table
7804 Table Bracket Shaft
7805 Motor Bolt
7872 Oil Hole Cover for Part 7203
7893 Motor Takeup Bracket
7894 Takeup Bracket Guide Rod
7895 Tension Spring
7896 Clamping Screw
7898 Clamping Screw Lock Nut
7899 Motor Assembly Bolt
7900 Motor Assembly Nut
7936 Pilot Light Armor
7940 Main Line Lead Armor (A, B, C)
7943 Motor Lead Armor (Motor to Pedestal)
7946 Terminal Holder (Female)
7947 Terminal Holder (Male)
7953 Main Switch
7955 Pilot Light Reflector
7977 Takeup Idler Arm
7981 Takeup Idler Stud
8105 Aperture Gate
8112 Positive Tension Roller Lever
8801 Shutter Carrier Lever
8812 Shutter Carrier Lever Screw
8813 Sector Clamp Screw
Des. 6781 Circuit Interrupter
K Key Printing Slot

Successive Stages of Operation—Continued

taken beyond this point until machine is started thereby saving approximately one foot of film in loop threading (See Par. 15).

10. Insert Printer Index Card in Index Card Holder (01714), raising Pointer (7526) to starting point. Note: First scene or density change is always indicated above pointer.

11. Set the Shutter Time Setting Lever (7425) to the first index number indicated on Index Card. Insert index finger of right hand in end opening of Clutch Case pushing Clutch so that Clutch Rod (7429) is released thus adjusting Aperture Shutter Opening to first density change.

12. Again take the Shutter Time Setting Lever (7425) and set for the next number indicated by the card. Note: This in effect causes the Aperture Shutter to be always set by the operator one scene in advance of its change.

13. Turn on Snap Switch (7953), starting motor.

14. With left hand take hold of end of positive, and with the right hand turn the Combination Starting Handle (01789) counter clockwise thus starting the Printing Mechanism, turning on the

(*Continued on page 11*)

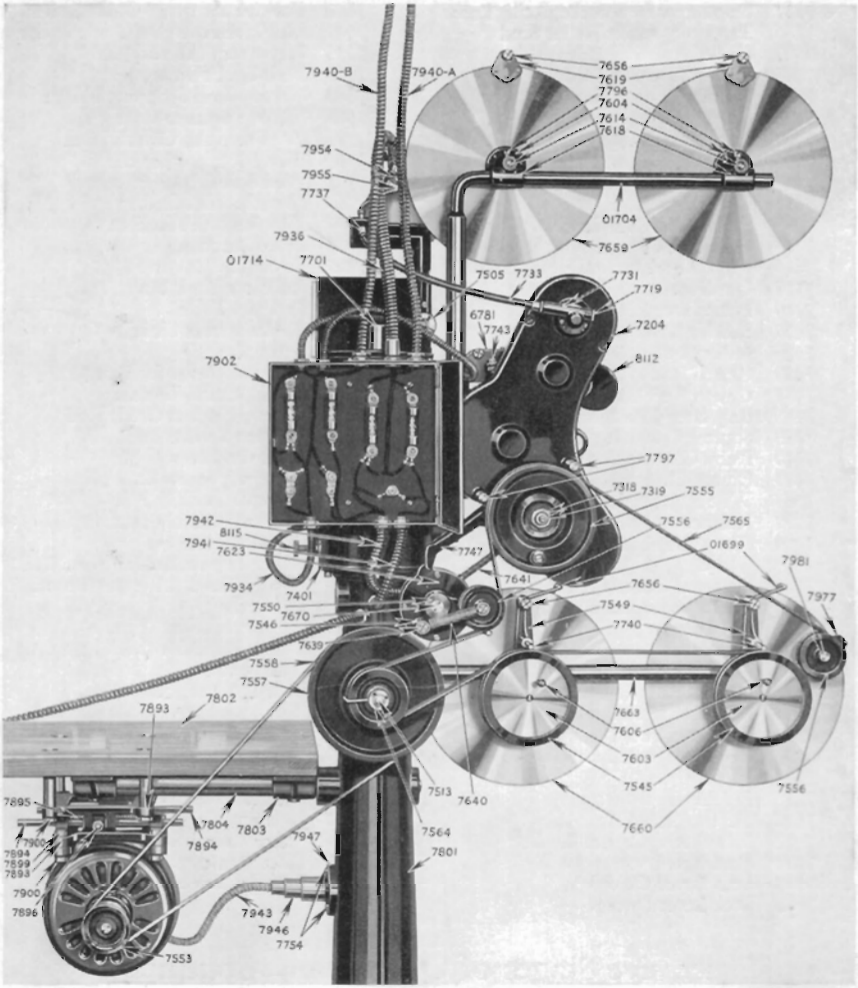


Fig. 12. Showing Principal Parts Numbered

01699	Takeup Reel Guard Shaft Assembly
01704	Feed Reel Arm Assembly
01714	Index Card Holder Assembly
Part 7204	Gear Case
7318	Flywheel Nut
7319	Main Drive Pinion Stud
7401	Lamp Case
7505	Wire Receptacle
7513	Screw
7545	Takeup Drive Pulley
7546	Switch Lock Spring Stud
7549	Takeup Bracket
7550	Switch Lock and Belt Tightener Lever
7553	60 Cycle Motor Pulley
7555	Main Drive Pulley
7556	Tightener and Takeup Pulley
7557	Counter Transmission Sheave Wheel
7558	Motor Belt
7564	Sheave Wheel Collar
7565	Driving Belt
7603	Takeup Friction and Crank Wheel
7604	Feed Reel Flange Hub
7606	Takeup Crank Handle
7614	Feed Reel Spindle

7618	Feed Reel Bracket
7619	Film Guard Bracket
7623	Switch Case Cap
7639	Switch Lock Spring Collar
7640	Switch Lock Lever Spring
7641	Lock Lever Spring
7656	Screw for Reel Guards
7659	Feed Reel Flange
7660	Takeup Reel Stripping Flange
7663	Takeup Bracket Shaft
7670	Switch Operating Shaft
7701	Lamp Case Top
7719	Thrust Bearing for 7734
7731	Lower Intermediate Gear Bearing
7733	Flexible Shaft Casing
7737	Film Recorder Bracket
7740	Belt Guard
7743	Signal Circuit Interrupter Holder
7747	Brake Lever
7754	Terminal Plug Holder Screw
7796	Locking Screw for 7614
7797	Belt Guard for 7204
7801	Pedestal
7802	Pedestal Table
7803	Pedestal Table Bracket
7804	Table Bracket Shaft
7805	Motor Bolt
7877	Motor Support
7893	Motor Takeup Bracket
7894	Takeup Bracket Guide Rod
7895	Tension Spring
7896	Clamping Screw
7898	Clamping Screw Lock Nut
7899	Motor Assembly Bolt
7900	Motor Assembly Nut
7902	Terminal Box
7934	Clutch Lead Armor
7936	Pilot Light Arm
7940	Main Line Lead Armor (A, B, C)
7941	Lamp Lead Armor
7942	Starting Switch Lead Armor
7943	Motor Lead Armor (Motor to Pedestal)
7946	Terminal Holder (Female)
7947	Terminal Holder (Male)
7954	Pilot Lamp Socket
0955	Pilot Light Reflector
7977	Takeup Idler Arm
7981	Takeup Idler Stud
8112	Positive Tension Roller Lever
8115	Lamp Bracket Adjusting Screw
Des. 6781	Circuit Interrupter

Successive Stages of Operation—Continued

Printing Light and Circuit Interrupter (6781). Insert quickly, end of positive in Left Takeup Reel Hub (7616) keeping same securely against Left Flange (7660) by means of Left Takeup Reel Guard (01699). Note: With very little practice the operator is enabled to perform this last operation with skill and ease.

15. Look through the little Ruby Glass window (7440) immediately above dial, and make sure that the printer lamp is burning.

16. When the first scene has passed through the Printing Mechanism, the notched film passes the Circuit Interrupter (6781) momentarily closing a circuit which operates the clutch governing the Aperture Shutter Opening and drops the Pointer (7526) to the next number indicated on the Printer Index Card, concurrently causing the signal to be sounded, warning the operator to set the Shutter Time Setting Lever (7425) to the number pointed. This operation is repeated until the negative roll is finished.

17. When the end of the negative roll passes the Aperture Gate the operator immediately stops the Printing Mechanism by turning off the Combination Switch Handle (01789). Note: It is advisable not to turn off the Snap Switch (7953) as the motor operates more efficiently while warm.

18. Cut or tear off positive film at a point below Aperture Gate and put in position for succeeding prints. Then release film from Takeup Sprocket (7509) and release Takeup Reel Guards (01699). Pull out Stripping Flange (7660) which will remove the rolls of film.

19. After the printing of each roll rub over the Aperture Shutters, the Printing Sprocket, the Upper Aperture Plate (7303) and the Lower Aperture Plate (7305) with a dry cloth. Once or twice per hour—or oftener if necessary—saturate a small piece of cheese cloth with acetone, alcohol or any quick drying cleaner and wipe all of these parts, making certain that no accumulation of dirt or any foreign substance is allowed to adhere to them. Occasionally—or about twice per day—rub the same parts with an oily cloth, then with a dry cloth remove all oil from the Shutter, Plates and Sprocket. Oil all bearings once a day.

20. For use in connection with the teaching of new operators, it is recommended that two rolls of scrap stock of approximately 200 foot lengths be utilized to familiarize the beginner with the important stages of operation. One roll may be notched and Printing Index Card prepared the same as for regular printing.

Timing or Testing Negatives

THERE are several methods of accomplishing the work of timing and testing negatives, but the most commonly accepted and satisfactory procedure other than the use of a special Testing Machine, is as follows:

1. Take all negatives to be printed, and splice together in logical sequence of the scenes, keeping rolls within the required length or within the capacity of the rack or developing machine used.

2. Examine negative closely for approximate printing time noting on the Printing Index Card or Index Strip the density number of each scene.

3. Notch film in accordance with instruction contained in paragraph (1) Film Radial Notcher. See page 7.

4. Thread negative on Printing Mechanism. (See paragraph 5 "Successive Stages of Operation.")

5. Take positive and eliminate threading operation, passing the film through the Printing Gate and over the Printing Sprocket only.

6. Start machine (see paragraph 14 "Successive Stages of Operation") with time set as indicated on Printing Index Test Card.

7. Be prepared to stop machine almost immediately after it starts, thereby obtaining a test print of two or three pictures.

8. Then take out positive, marking point at which printed, and start machine again, holding out gate as far as stop will permit with left hand, allowing only the remainder of the negative for that scene to run through the machine until next scene is indicated by the signal given by the Circuit Interrupter. (Holding out gate will prevent possibility of scratching negative while idling through machine.)

9. Repeat operation as above until roll is finished. Note: For a roll of fifteen scenes, the test print should not be over four feet.

10. Develop test print.

11. Take test print before a good light and with the original Printing Index Card or Strip examine each scene and correct card or strip to numbers denoting the proper density.

12. Then make print of entire roll of negative and develop the positive. If further assurance is desired of proper timing, the positive may be screened and the time again corrected on the Printing Index Cards or Index Strip before additional copies of the print are made.

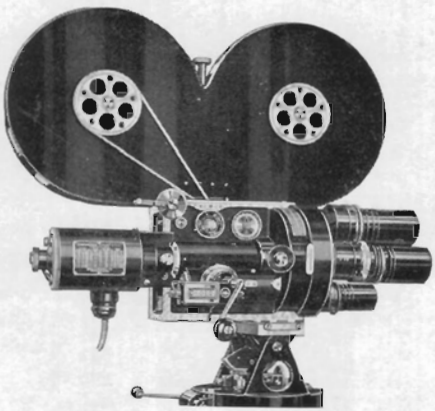
The New BELL & HOWELL Fully Automatic Sound and Picture Production Printer

THIS new printer is fully automatic and, once set up, needs only threading with Positive film at the end of each roll printed. It works equally well forward or reverse—one operator can take care of several printers. Absolute Densitrometric Control for any given "Gamma" is assured irrespective of which printer you use. The printer is equipped with automatic Film Cleaners, automatic safety Trips and is interlocked so as to make it impossible to operate it incorrectly. Deliveries will be made in 1932. Full details will be furnished gladly on request.

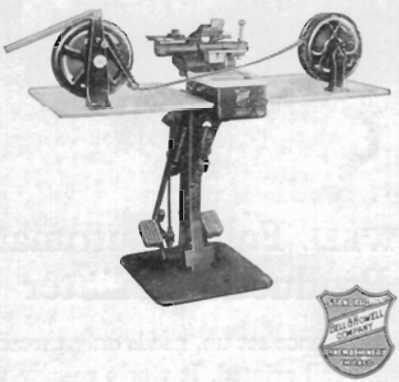
The Bell & Howell Standard Cinematograph Camera

THE B & H Pioneer Standard Camera can be adapted for interchangeable regular and ultraspeed operation. It can be silenced for sound work; all sound recording systems can be used with this camera.

A special mechanism for color work by the Bi-Pack process, interchangeable with the regular mechanism, is available. This also can be silenced for sound work.



The Bell & Howell Standard Film Splicing Machine



THIS splicing machine makes neat and flexible splices of various standard widths. Splice is very quickly made and is stronger than the original film. Extra blades available for making different width splices on one machine. Special 16 and 35 mm. combination and other special splicers available. Safe, sure, and very easy to operate.

BELL & HOWELL

BELL & HOWELL COMPANY, 1801-15 LARCHMONT AVENUE, CHICAGO, ILL.
NEW YORK, 11 WEST 42ND ST. . . . . HOLLYWOOD, 716 NORTH LA BREA AVE.
LONDON (B & H CO., LTD.) 320 REGENT ST. . . . . *Established* 1907