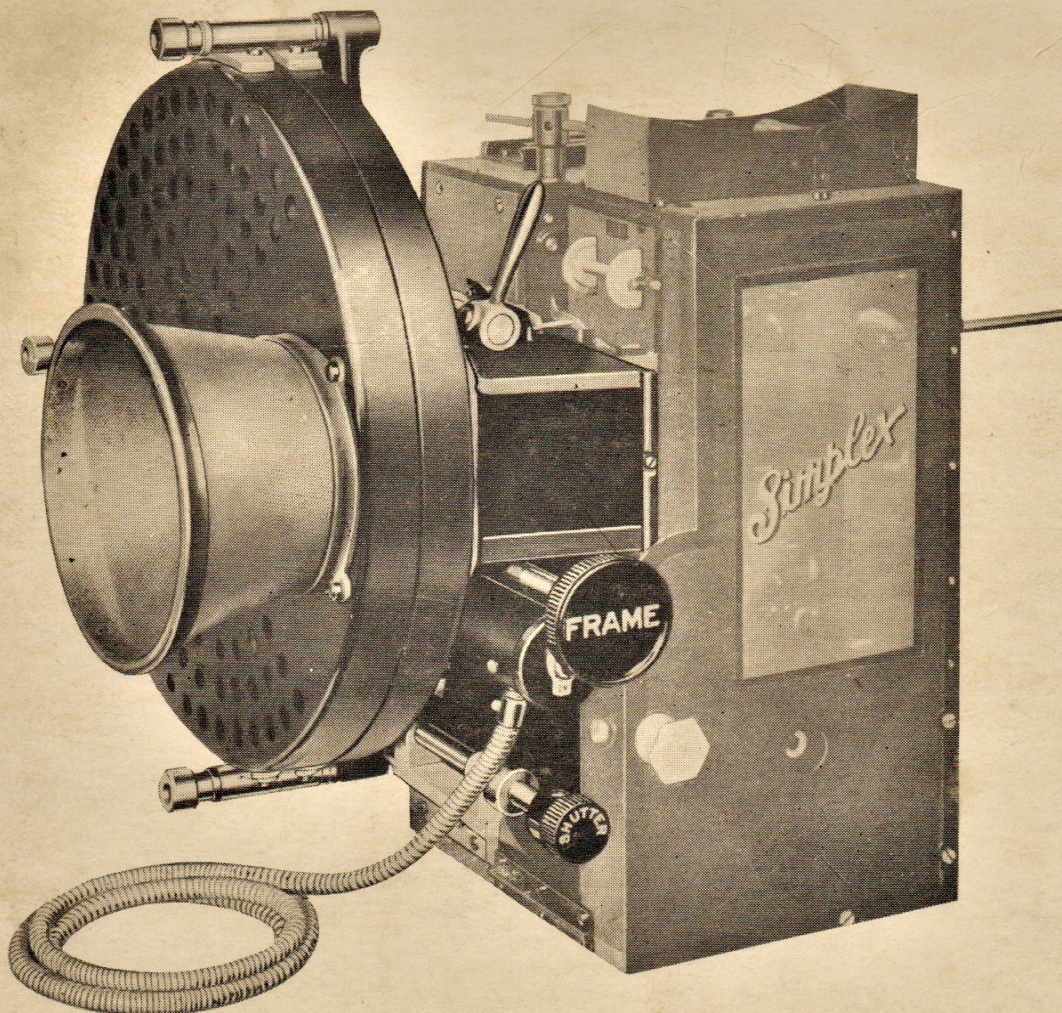


FREDERICK T. EGGAR

# Rear Shutter Assembly for *Simplex* Projectors

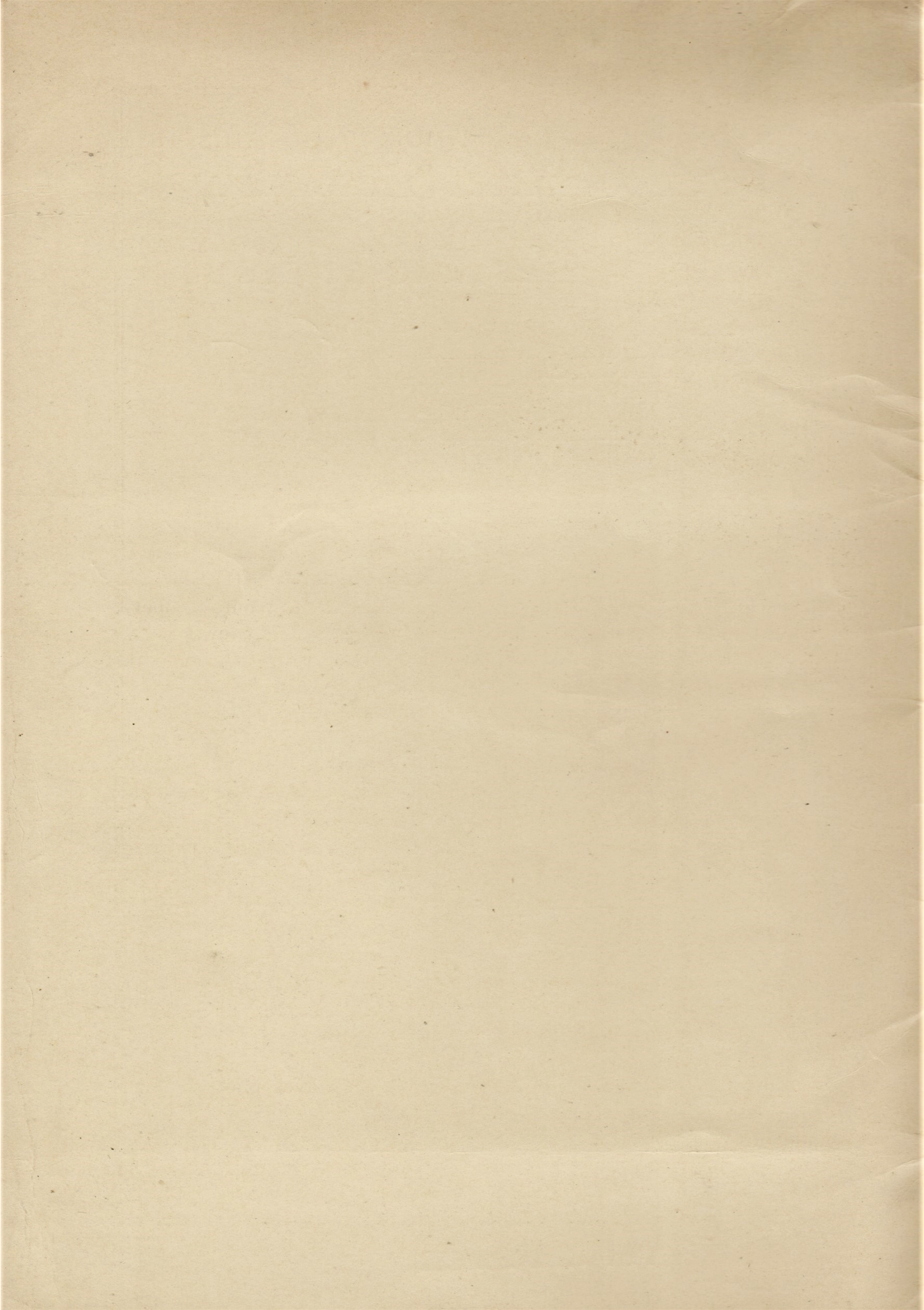
GENERAL DESCRIPTION  
AND  
OPERATING INSTRUCTIONS



INTERNATIONAL PROJECTOR CORPORATION  
90 GOLD STREET  
NEW YORK, N. Y.

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## Rear Shutter Assembly for Regular *Simplex* Projectors

TO SUPPLY the needs of theatre owners who have installed the regular model Simplex projector we have designed and placed on the market a new Rear Shutter Assembly similar to the one furnished with our new Super Simplex projector. This assembly shown in the illustration is attached to the regular Simplex mechanism and by its use all the advantages are acquired which are gained through the use of the Rear Shutter Assembly on the Super Simplex. A glance at the illustration will readily indicate that the new unit is not a makeshift proposition. For it has been practically designed, is easy to adapt and is attractive in appearance.

This new assembly includes many features found only in the Super Simplex, such as the new type gate opening device, eyeshield, new type framing device, the pilot lamp assembly and the shutter adjusting mechanism. All of these are manipulated from the operating side of the mechanism as shown in the cuts. The new assembly has been in practical operation for some time on the Super Simplex and when attached to the regular model Simplex projector will be found to give equally satisfactory results. The advent of sound pictures made it necessary to discard the old type opaque screens and substitute therefor various types of perforated screens, so that the sound might be more satisfactorily transmitted through the screen. Porous screens have reduced the light from 25 to 50% and this necessitated the use of much higher amperage in order to bring screen brilliancy back to somewhere near normal. The result of this increased amperage has been a tremendously increased amount of heat at the aperture plate and over the front of the mechanism. This not only caused warpage and damage to the rear of the mechanism, but also developed a great deal of buckling of the film and a corresponding amount of distortion of the sound track on the film. The former is readily visible on the screen and most annoying to the observer. The latter has not been so obvious, but it can be readily appreciated that sound waves photographed upon the film when distorted cannot possibly reproduce with proper fidelity the excellent results obtained in present day recording.

The elimination of these two defects has naturally been of great



importance, but the fire hazard which developed through the use of higher amperage was far more serious. It has been thoroughly realized that the film has never been adequately protected by cooling devices during its transit through the projector, but due to relatively lower amperages and various protective devices on the projector, the fire hazard has not been a particularly serious problem. With the introduction of sound, the greatly increased amperages increased the hazard to such an extent that fire authorities throughout the country have become very much interested in the matter. This will undoubtedly in the very near future culminate in laws being passed, which will compel users of motion picture equipment to provide adequate means for cooling the film.

The Super Simplex mechanism and the new assembly for the regular Simplex projector, have anticipated this and provide a certain solution for the fire hazard problem. Exhibitors are now enabled at a very low cost and little or no trouble to properly equip their projectors and protect the film from excessive heat. The new Rear Shutter Assembly also solves the problem of buckling and sound distortion.

Attempts have been made in various ways to reduce heat and eliminate buckling, but the results have never heretofore been satisfactory. The most successful efforts to cure this serious evil have been through the use of the rear shutter but practical difficulties were encountered which required long and careful study and much engineering skill to overcome. It is a great satisfaction to the International Projector Corporation to make this device available to users of regular Simplex equipment. The rear shutter assembly entirely meets the exacting demands of present day projection by providing more light and at the same time reducing the heat at the aperture. Illumination is increased greatly, the percentage increase depending on the focal length and type of lens being used, and the heat at the aperture plate is reduced between fifty and seventy-five per cent. This remarkable improvement is due to interposing the new shutter assembly between the arc lamp and the film thereby making it unnecessary to use heat plates or shields in proximity to the film. The blades of the shutter in their new position immediately eliminate fifty per cent of the heat from the arc and, in addition thereto, a further large decrease in heat is obtained by using this shutter to create a partial vacuum at the aperture and set up an air disturbance in the beam of light which accomplishes the desired



result. The air current set up by the shutter will positively keep the film cool and therefore prevent buckling. The width of the near shutter blade no longer depends on the size of the lens so that a shutter using a ninety degree effective blade can be used with a lens of any diameter, while with the old type shutter a minimum of one hundred and two degrees was necessary. A model of this assembly may be seen at any office of the National Theatre Supply Company, and a careful examination will convince the most skeptical that it will function exactly as above set forth. This assembly should be attached with the least possible delay to all existing models of the regular Simplex mechanism so that the projectionist may be relieved of the strain of projecting motion pictures and sound under the old conditions and to offset any drastic regulations which may come about through the increased fire hazards present in the old type equipment.



# Diagrams



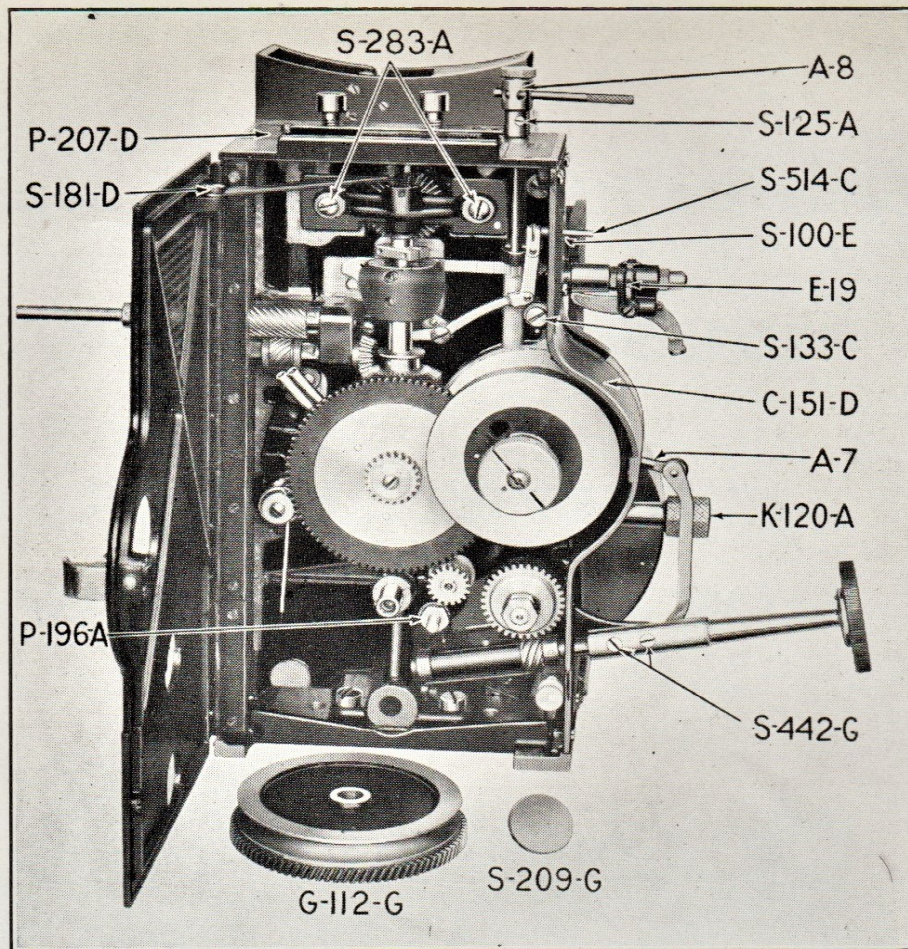


FIGURE 1

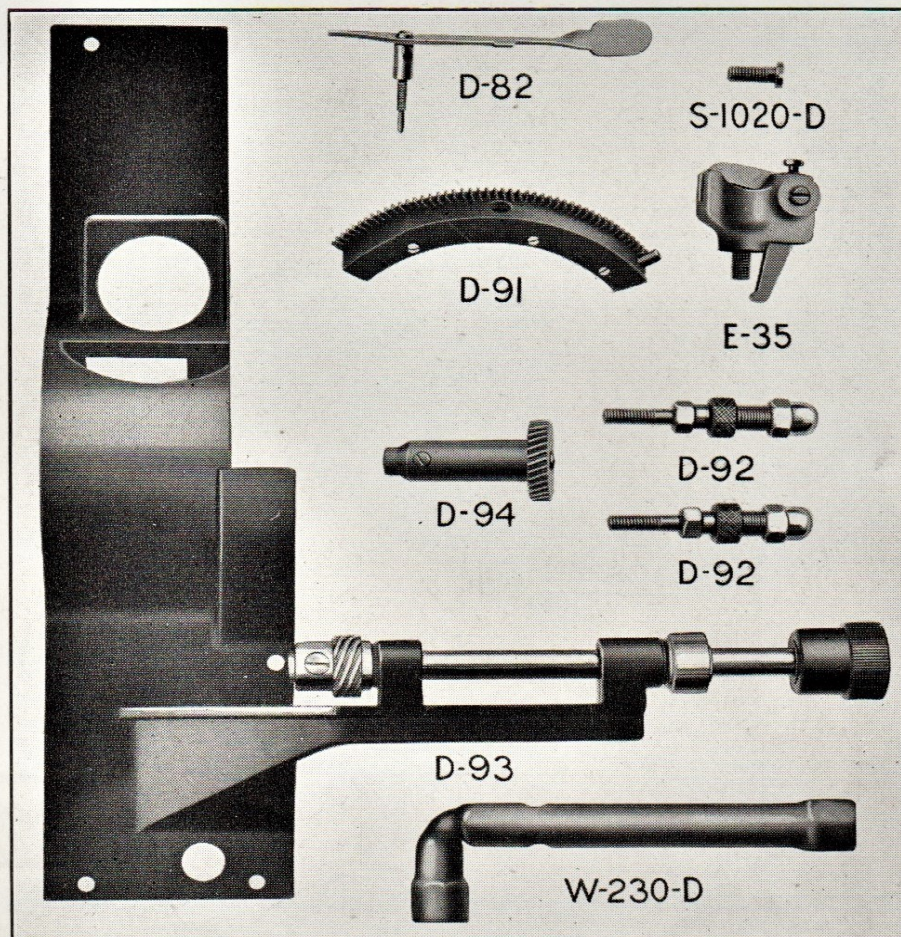


FIGURE 2



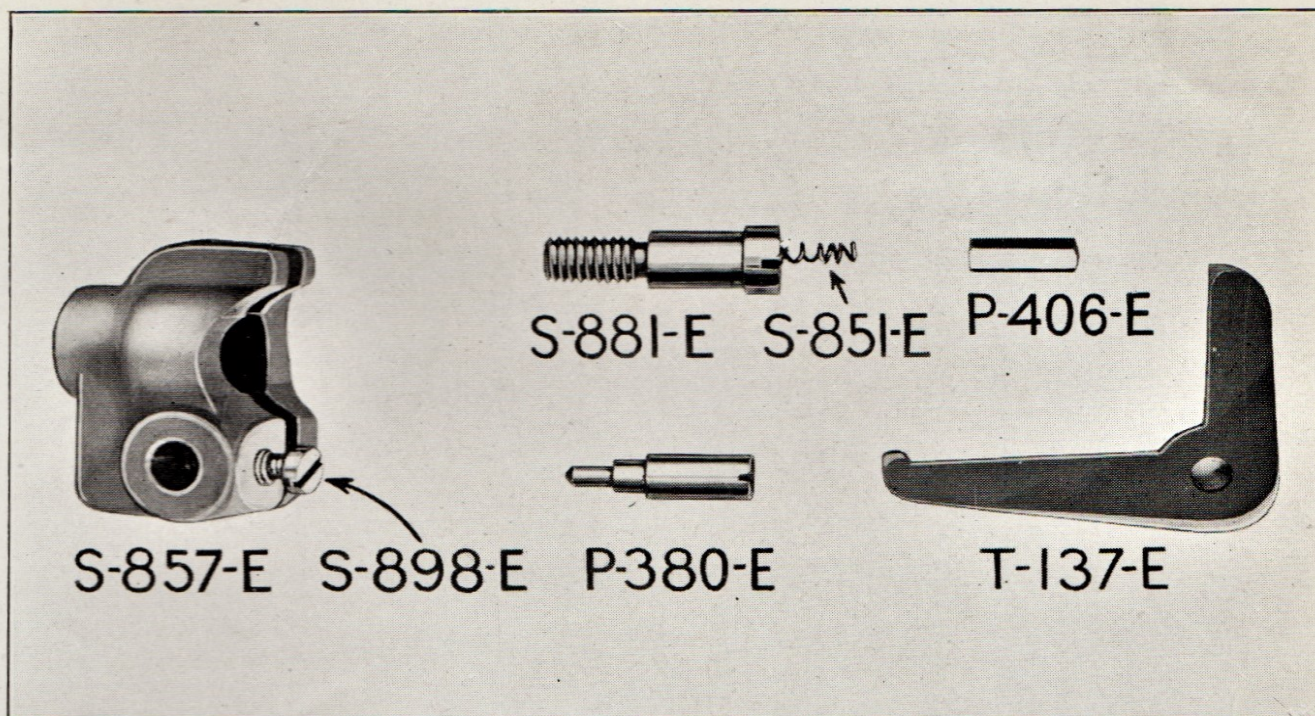


FIGURE 3

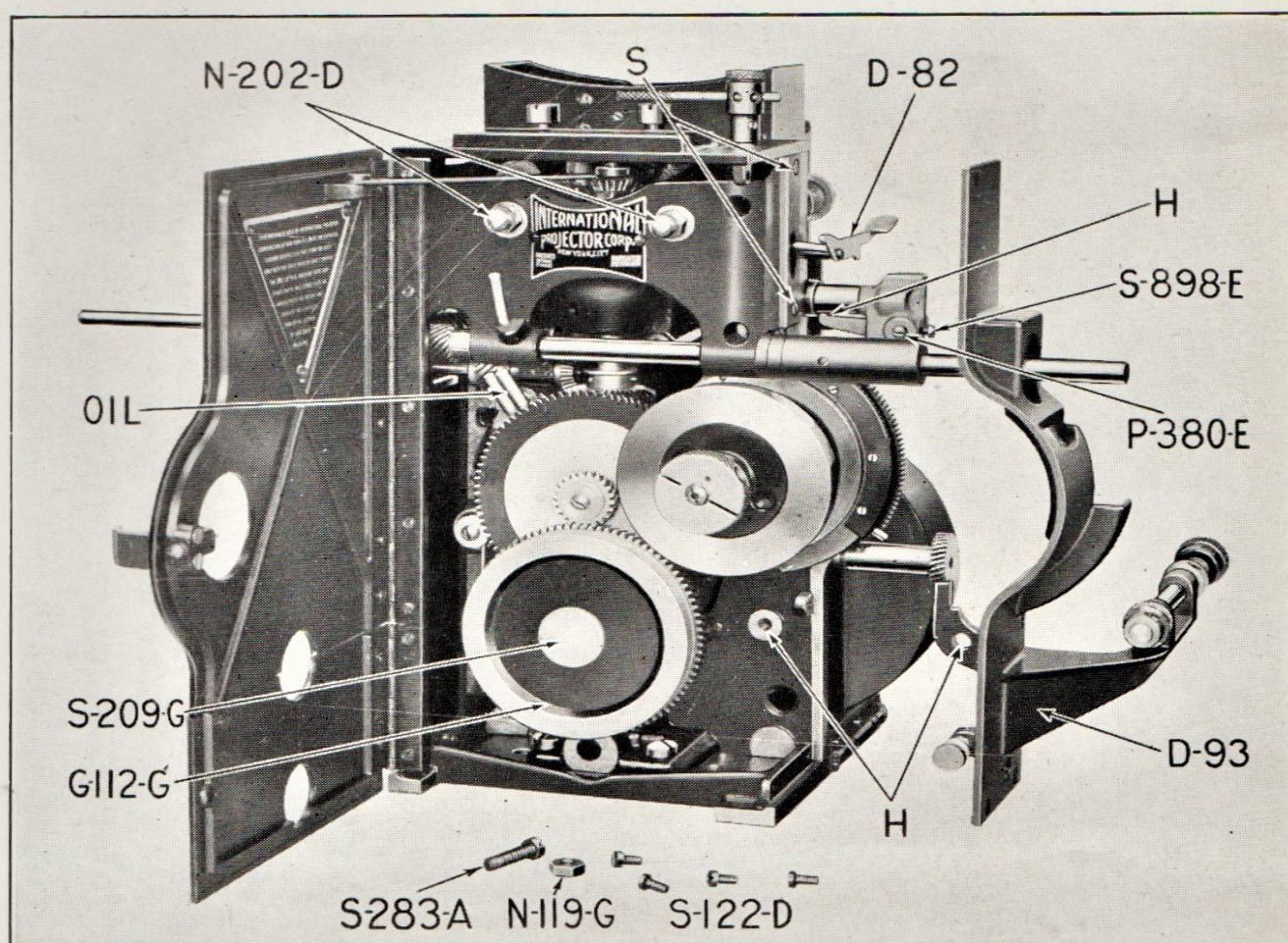


FIGURE 4



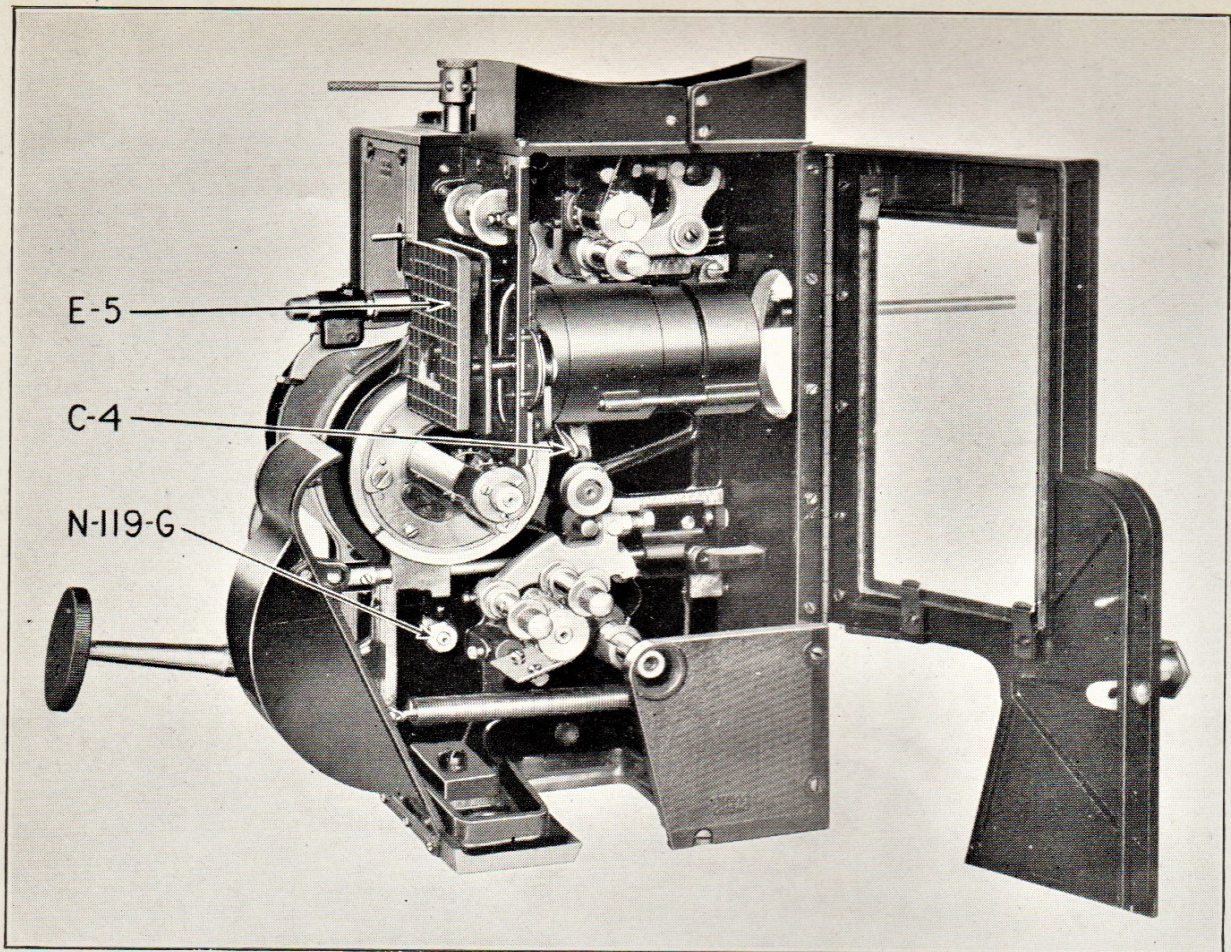


FIGURE 5

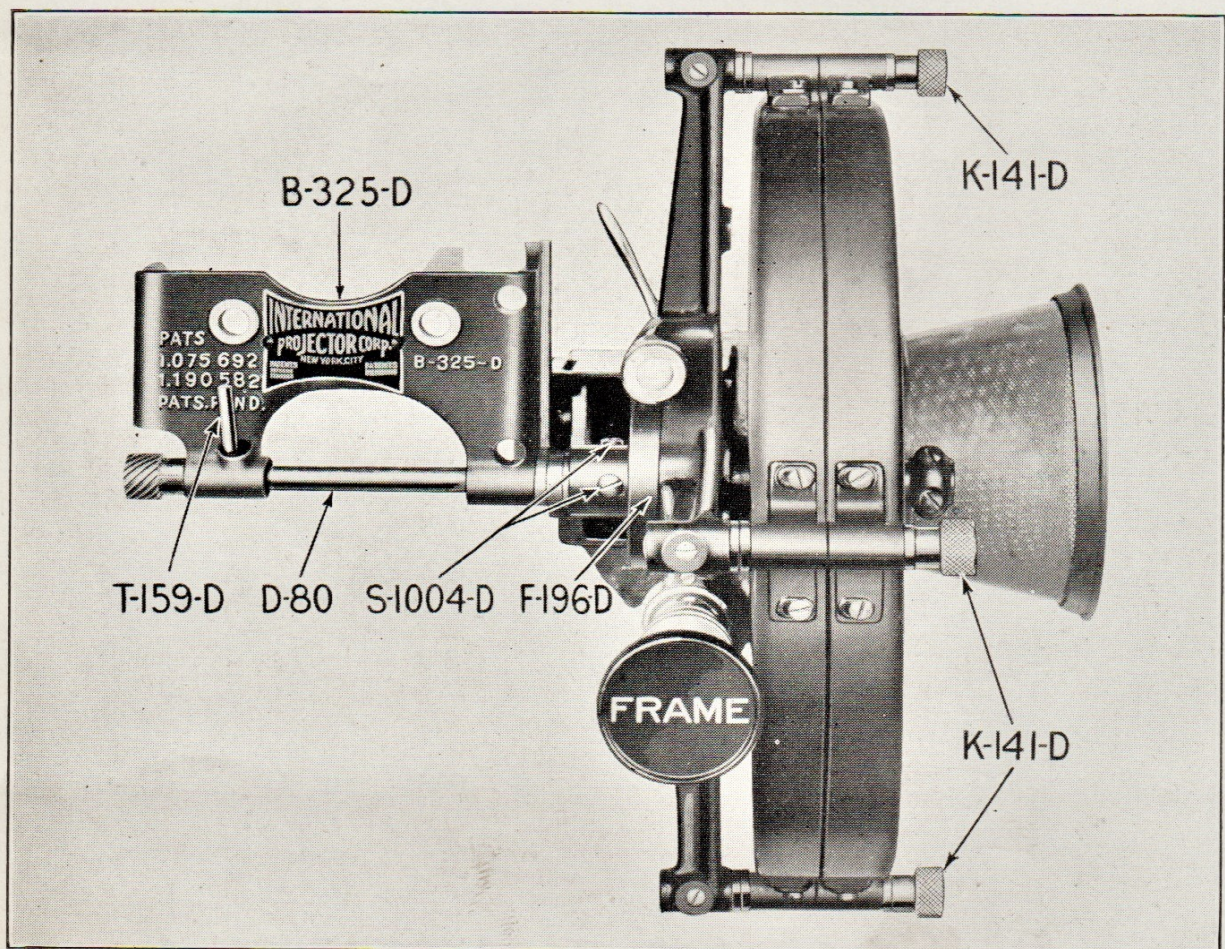


FIGURE 6



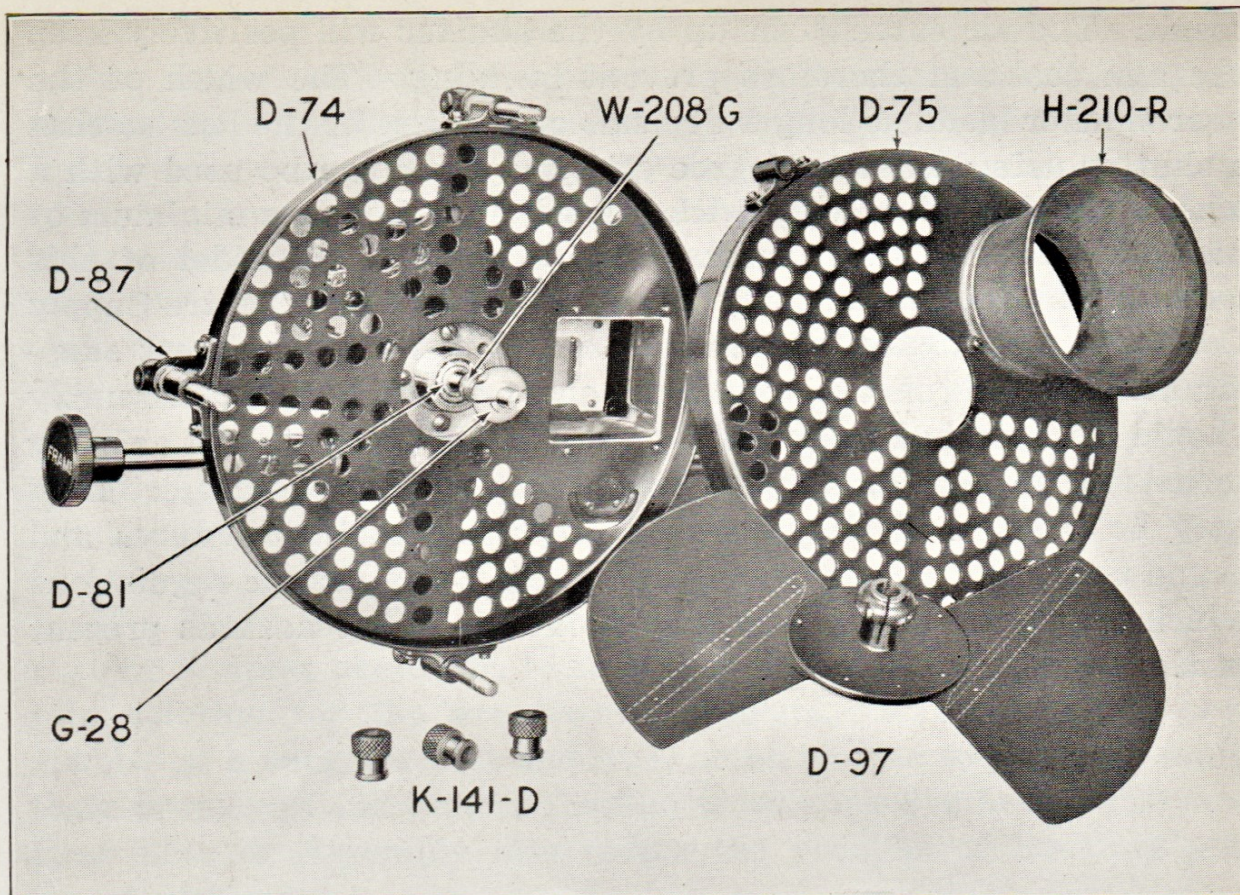


FIGURE 7

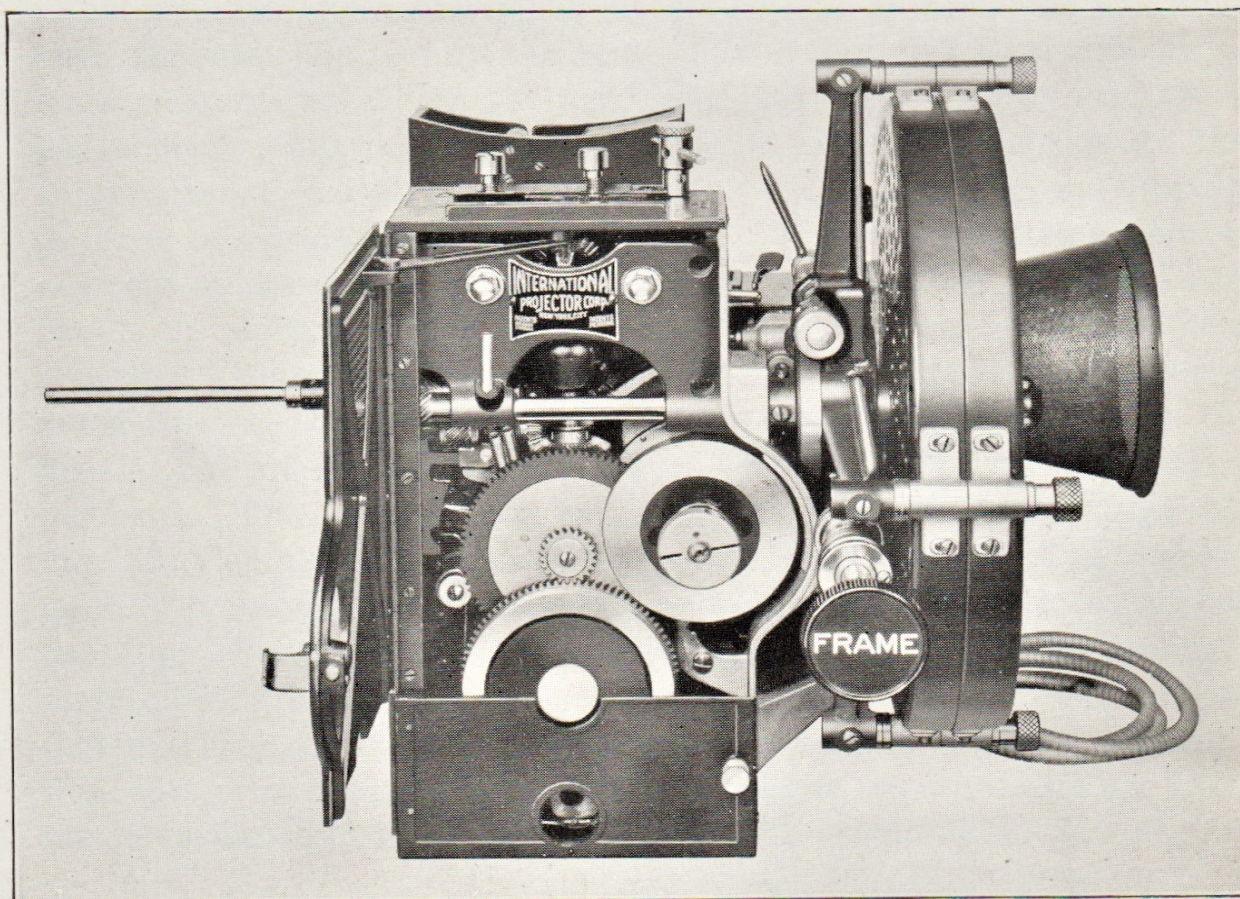


FIGURE 8

*Showing all new parts and complete rear shutter assembly properly attached*



# Instructions for Attaching *Simplex* Rear Shutter Assembly to Regular Type *Simplex* Mechanism

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**TOOLS REQUIRED:** Large and small screw drivers, hacksaw and pliers.

**R**EMOVE framing lever by loosening lock nut and unscrewing lever from socket or in later type Simplex, by loosening the two set screws S-442-G, Fig. 1, which hold framing handle on shaft. Remove knurled knob S-134-E on older type mechanisms, or gate lock E-19, Fig. 1, on newer type mechanisms, being sure to remove the stud leaving only thimble and spring; set thimble and spring to one side for a moment.

With a hacksaw saw off framing link stud A-7, Fig. 1, leaving 3/32" projecting from casting. Replace thimble and spring and attach new door lock E-35, Fig. 2, which will be found in envelope. Remove from envelope and dismantle as follows: Release screw S-898-E, Fig. 3, pull out eccentric pin P-380-E, Fig. 3, lift out part T-137-E, Fig. 3, turn up and let plunger P-406-E, Fig. 3, fall out. Do not remove spring S-851-E, Fig. 3, which actuates plunger. Assemble balance to mechanism as follows: Press thimble over spring and insert fastening screw S-881-E, Fig. 3, in gate holder stud with slot in vertical position, as shown in Fig. 4, with set screw S-898-E on bottom. Pull screw S-881-E up tightly; release gate trip lever C-4, Fig. 5, and make sure that gate opens and closes freely. Do not lose spring S-851-E, Fig. 3. Insert plunger P-406-E, Fig. 3, flat end in. Pay no attention to flat on plunger—this is ground in order to prevent vacuum or pressure forming behind plunger. Replace door lock trigger T-137-E, Fig. 3, and insert eccentric pin P-380-E in position originally found. Adjust this pin until there is a minimum point of clearance between point H, and film trap casting, as shown in Fig. 4. Tightly lock set screw S-898-E, Fig. 4.

Open doors on non-operating side of mechanism. Remove front cover C-151-D, Fig. 1, by removing six screws S-122-D attaching same to frame. (Retain all screws for future use.) Remove lower screw S-133-C, Fig. 1, replace with S-1020-D, Fig. 2, which will be found in envelope. Pull up tightly. Remove main driving gear G-112-G by removing screw S-209-G, Fig. 1, and set aside for future use.



With wrench W-230-D, provided in envelope, remove nuts, one of which will be seen at N-119-G, Fig. 5, the other at P-196-A, Fig. 1. The entire framing device unit may now be removed and set aside or discarded. Set aside one nut N-119-G for future use. On older type Simplexes two nuts, washers and a spring will be found at P-196-A, Fig. 1. These should be removed as above described for the newer type equipment. It might be found necessary to drive out stud S-142-G, Plate 3, in regular instruction book. (Drive out from the threaded side.)

Remove S-100-E, Fig. 1, and replace with D-82, Fig. 2, found in envelope. (It is not necessary to disassemble these parts. The screw turns in the lever which is a lift for S-514-C, Fig. 1. Assembly is shown in place in Fig. 4.) Remove focusing knob complete, A-8, Fig. 1, by loosening set screw S-125-A, Fig. 1; set aside for future use. Remove top cover P-207-D, Fig. 1, by removing S-181-D, Fig. 1, two screws on top and one in front of mechanism which attach top plate to main frame; set aside for future use. To prevent loss of screws, insert screws in holes from which they have been taken.

Remove screws S-283-A, Fig. 1, one at a time, replacing same with stud bolts D-92, Fig. 2, found in envelope; set aside one screw S-283-A with nut N-119-G for future use. **NOTE: CHANGE ONE SCREW AT A TIME SO AS NOT TO DISTURB THE POSITION OF THE VERTICAL SHAFT GEARS.** Pull these bolts up tightly. Remove nickel plated nuts from studs and screw knurled nuts back towards mechanism. Remove shutter lift pin S-514-C, Fig. 1. If on old type mechanism this pin is not present, it is not necessary to touch the assembly. We shall be glad to furnish on request, no charge, one of these pins which may readily be inserted by the projectionist.

Let us now leave the mechanism and confine our attention for a few minutes to the rear shutter bracket assembly as received. It is necessary to disassemble this partly before going further. The entire assembly is shown in Fig. 6.

Remove shutter guard by removing the three knurled retaining screws K-141-D, Fig. 6, and lifting shutter guard from studs. Next remove revolving shutter from shaft by loosening two screws in shutter hub which clamp it to the shaft. Next remove spacing collar G-28, Fig. 7, from shaft by loosening locking screw. Behind this spacing collar will be found four steel washers W-208-G, Fig. 7. Remove these from the shaft and set aside for reassembling. Do not lose any of these washers—they are hardened and ground to exact dimensions.



The next step is to separate the attaching bracket B-325-D, Fig. 6, (to which is fastened the name plate) and shutter shaft assembly from the main unit. This is done by removing two screws S-1004-D, Fig. 6, in hub and slipping the bracket casting with shutter shaft out of its supporting bearing. When this is done the ball bearing D-81, Fig. 7, which supports the rear of the shutter shaft will slip out of its retaining ring. Set this aside for future assembly. We can now proceed with the assembling of the unit to the mechanism. First, however, slightly bend outward and forward oil tubes marked "OIL" on Fig. 4, in order that they may clear the new shutter bracket about to be attached. The best way to do this is to insert a pin punch in the top of the tubes bending slightly outward and forward towards front of mechanism. Bend down about  $\frac{1}{4}$ " but be sure tubes do not strike micarta gear. Before going further, examine carefully new shutter shaft gear and see that no steel chips or dirt are embedded in the teeth.

Mount bracket B-325-D, Fig. 6, by slipping it over the two studs previously inserted in the mechanism to receive it. Press the bracket tightly against the main frame of the mechanism and while doing so bring the knurled nuts on the inner side of the bracket gently against the bosses on the casting. Next insert two of the screws which were removed when removing cover C-151-D, in holes marked S, Fig. 4. Pull these screws up tightly and then back off about a quarter turn. Next place the two nickel plated nuts N-202-D, Fig. 4, in position on studs, and tighten up solidly. The knurled nuts will then take the strain from the pressure applied by the nickel plated nuts and the bracket will be held securely in position. Next tighten solidly the two screws S, Fig. 4. See that mechanism turns freely and gate locking device operates satisfactorily. If gate locking device or flywheel shaft does not operate freely, it is because the knurled nuts before mentioned are not brought tightly against casting bosses before tightening nickel plated nuts.

Replace fire shutter lift pin S-514-C, Fig. 1. Remove any cooling plate device or heat shield such as E-5, Fig. 5, which may be attached to the mechanism, leaving the fire shutter and film trap entirely exposed. Remove from envelope gear sector D-91, Fig. 2. See that projecting stud is screwed tightly into sector. Loosen the three set screws in the side of sector and slip sector over framing cam surface A-7, Fig. 1. It will be found that the hole in this gear sector now fits over the protruding pin left by previously sawing off framing link stud. This sector should be attached with stop pin on the bottom, as shown in Fig. 4.



Press gear sector tightly over framing cam and tighten the three set screws above referred to solidly against framing cam surface. The gear sector will now be rigidly attached to the framing cam. Remove shutter adjusting knob K-120-A, Fig. 1, from mechanism; replace with gear D-94, Fig. 2, found in envelope. Be sure that set screw in gear hub lines up and is inserted rigidly in spot on shaft. Replace mechanism cover P-207-D, Fig. 1, using the screws originally removed. Do not tighten screws solidly, however, until instructions are given later.

Assemble to mechanism new cover assembly D-93, Fig. 2, being sure that shutter adjusting gears mesh properly. Use balance of screws S-122-D (4), shown in Fig. 4, originally removed from old type cover. Now tighten screws, two on top and one in front, rigidly attaching top cover P-207-D, Fig. 1. Replace screw S-181-D, Fig. 1, through door opening link as originally removed. See that door closes and opens freely. Take the screw S-283-A and nut N-119-G, Fig. 4, previously set aside and place the screw through holes shown at H, Fig. 4, and fasten solidly with nut N-119-G on opposite side of frame. This solidly locks cover D-93 to main frame. Replace G-112-G and S-209-G, Fig. 1, being careful that gear properly meshes and slips solidly against driving spindle collar. Reassemble lens focusing knob A-8, Fig. 1, as originally removed.

Set the intermittent oil box so that oil level line is parallel with base of mechanism. This may be done by pulling down or pushing up on gear sector now attached to framing cam. Slip main shutter guard assembly complete with eye shield, framing handle, pilot light, etc., over bearing on B-325-D, Fig. 6, from which it was originally removed, taking care that shutter lift lever D-82, Fig. 4, is lifted so as not to interfere. Set framing knob so that the word "FRAME" reads horizontally, as shown in Fig. 6. Press this assembly back as far as it will go, placing gear and framing gear sector in mesh, allowing a slight clearance between them, and replace the two screws S-1004-D, Fig. 6. Lock these screws tightly. Slip ball bearing D-81, Fig. 7, over shutter spindle, pushing it back into its housing as far as it will go. Replace the four washers W-208-G, Fig. 7, previously removed together with the spacing collar G-28, Fig. 7, over shutter shaft. Remove all end play in shutter shaft by pulling on same and pushing spacing collar back tightly against washers. Lock clamp screw in spacing collar tightly. Attach revolving shutter and set in the usual manner. Replace shutter guard D-75, Fig. 7, and its retaining screws K-141-D, Fig. 7, and the mechanism is now ready to be set on stand and placed in operation. Be sure to oil thoroughly all working parts before placing in service.







*Simplex*

TRADE MARK REG'D.

*The International Projector*

THE INTERNATIONAL PROJECTOR CORPORATION

90 GOLD STREET, NEW YORK



H-G. RSA. 6-3-30  
Printed in U. S. A.