Film-Tech

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562000 Switch

Description &

GAUMONT-KALEE

SOUNDHEADS

TYPES 83, 378 & 543 & 7[illegible]

Spare Parts Catalogue

[illegible] SERVICE RENTALS

[illegible] MERTON ST. TORONTO, ONTARIO, CANADA

M4S 1A7 (416) 485-4826

Mo-591 Compound Gear # 100/03/12489
Mo-593 Whole Adaptation Gearing. Required To
F.r GK-21-20-19 Mechanisms To Work Wh
Type 83 - 543 - 890 Soundheads

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GAUMONT-KALEE

PRODUCT

G.A. McLEOD ENTERPRISES
THEATRE EQUIPMENT SERVICE, RENTALS
258 MERTON ST. TORONTO, ONTARIO, CANADA
M4S 1A7 (416) 485-4826

Descriptio

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Soundhead Type 378
Soundhead Type 543
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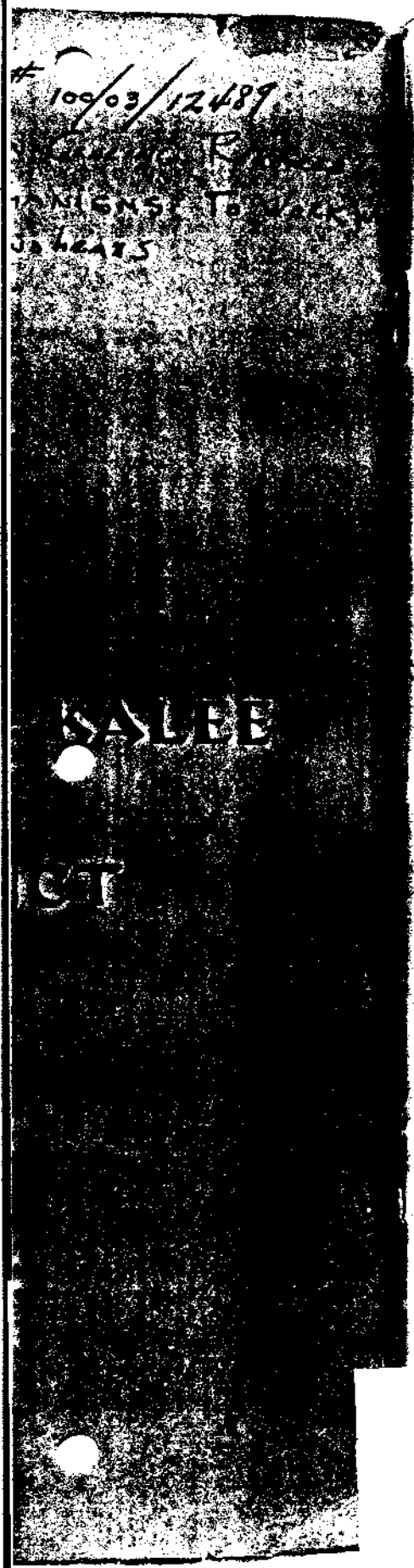

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SOUNDHEAD TYPE 83

The 83 Soundhead has been designed not only to satisfy the most rigorous cinema requirements, but to meet the even more exacting needs of film studio re-recording.

The 83 Soundhead incorporates features such as the fluid flywheel and enlarged image optical system which contributed to the success of the G2 and G3 heads, but is a completely new design.

The purpose animating the design was to secure a high grade performance that should remain utterly stable over long periods, and long life due to robust construction of all parts subject to wear. This the design very successfully accomplishes, and from the maintenance engineers' point of view the soundhead is one that can be kept in service for twenty years without going back to the factory, and without the necessity in that period of using a file, reamer, hammer or drift. No replacement part requires any 'fitting.' By reason of accurate jigging and complete uniformity of all component items that comprise an assembly, replacement parts go into position without requiring any tools other than a screwdriver and spanner. There is very ingenious provision for renewing worn shafts and bearings without the necessity of a fitter's skill. There are three rotating shafts in the soundhead, the one carrying the fluid flywheel and scanning drum, and two which carry a film sprocket at one end and a gear wheel on the other. These three shafts are not carried in bearings located in the soundhead casting, but the shaft, with its bearings, is contined in a long, flanged, housing of circular cross section which in turn fits a machined bore in the soundhead casting. The flywheel shaft runs on precision ball bearings as it is essential that it should impose the minimum load on the film. The two sprocket shafts run on oilite bearings as they are driven by the motor. When, after long service, it is necessary to replace bearings and shaft, the complete housing can be withdrawn by taking out three screws. A factory reconditioned shaft and bearings, complete in housing, replaces the worn components, which in turn are sent back to the factory to be reconditioned.

To cope with different voltages and periodicities it is necessary to use a number of different types of motor. For the normal British supply of from 190 to 260 volts, 50 cycles, a ¼ h.p. capacitor start motor is used, but this is supplied in three different models wound to suit respectively voltages of 190 to 210, 215 to 235, and 235 to 260. Externally and in all dimensions these three motors are identical. The motor is mounted in front of the soundhead with its shaft horizontal, and parallel with the sprocket shafts of the soundhead. The drive from motor to soundhead is by twin short endless canvas and rubber vee belts. The ratio of the belt pulleys on motor and soundhead is such that the motor speed of 1,470 r.p.m. is reduced to a speed at the soundhead of 990 r.p.m.

The motor itself is resiliently mounted, and is held to the stand by four set screws passing through elongated holes in the motor base. The set screws enter tapped holes in the stand. The motor and the belt drive are protected by a quickly detachable louvred cover, through which an inching handle projects on the operating side.

For 60 cycle supplies the same motor is used, with an appropriate increase in the reduction ratio of the belt drive. For 40 cycle supplies, a special 40 cycle motor is used, and the reduction ratio on the belt drive is decreased. For 25 cycles a special 25 cycle motor is used which, having two field poles, rotates at approximately the same speed as the standard 50 cycle motor. For 30 cycles, the 25 cycle motor is used with an appropriate adjustment to belt drive ratio.

For special studio requirements, a three-phase synchronous or an interlock motor is used, and as truly synchronous speed must be maintained on the film sprockets, gear drive takes the place of belt drive. Where, as in theatre practice, only a close approximation to talkie speed is required, belt drive has everything to recommend it. It simplifies the layout, is silent and long lived, and easily replaced.

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The driving pulley of the Soundhead rotates with the main driving pinion, to which it is held by three screws, on a heavy stationary layshaft, hardened and ground. This layshaft is very securely held, for an inch and a half of its length, in a $\frac{3}{4}$ in. machined bore in the soundhead casting. The layshaft is inserted from the non-operating side into the machined bore, its accurate location being determined by a shoulder on the shaft, and held in position by a nut on the operating side of the soundhead, into which the threaded end of the shaft just protrudes. The pulley and pinion are retained on the layshaft by a washer and large hexagonal retaining screw. The retaining screw is bored and tapped for a Rotherham type oiler. The pulley and pinion are oilite bushed, the overall length of the oilite bearing being $1\frac{1}{4}$ in. on a diameter of $\frac{5}{8}$ in. The Rotherham oiler communicates with an annular groove in the shaft, from which the oil reaches the bushes. A guiding idle sprocket for the chain drive to the bottom take-up is also carried on the layshaft.

In addition to this layshaft, there are only two other shafts to carry the rest of the gearing, including the gear which drives the projector and the chain wheel which drives the bottom take-up. These remaining two are the sprocket shafts already referred to, carried with their bearings in detachable housings. The shafts themselves are $\frac{5}{8}$ in. diameter, hardened and ground, and the housings are $3\frac{1}{2}$ in. long by $1\frac{3}{8}$ in. diameter. The shaft is on bearings 3 in. long with a centre annulus which acts as an oil reservoir. The housing has a large D-shaped flange on the operating side, and this flange carries the retaining roller, spindle and bracket, and the film stripper. The complete housing is inserted into its bore from the operating side of the soundhead, and secured by three screws which pass through the flange into tapped holes in the soundhead. The spacing of the three screws makes it impossible to fix the housing in anything but the right position, and the location of retaining roller and stripper on the flange ensure permanent alignment of these components with the sprocket.

These two assemblies of shaft, bearings and flanged housing carrying retaining roller and stripper, are identical and interchangeable, although the stripper, according to whether the assembly is used in the upper or lower position, adopts one of two different positions. Provision for these two positions is very neatly provided for by a small key, integral with the stripper, which engages with one of two key ways. In either position the stripper is positively held at the correct angle.

The two film sprockets are not the same in diameter on the film face. The upper is acting as a feed sprocket, for which the appropriate diameter is .945 in. The lower is acting as a hold back sprocket, for which the appropriate diameter is .932 in. Except for this difference in diameter the sprockets are similar, and are held on their shaft by an end screw and key washer. Reversal or replacement entails merely the withdrawal of the end screw, after first having detached the stripper. The same screwdriver will remove fixing screws of both stripper and sprockets.

The upper sprocket shaft carries, on the non-operating side, a large fibre gear, the driving chainwheel for the bottom take-up, and a small fibre gear. The two gears and the chainwheel are screwed together and rotate as one, and are keyed to the slotted end of the shaft by a key washer integral with the large gear wheel. The whole assembly is held on the shaft by an end screw. By withdrawing this screw the gear assembly can be slipped off the shaft, and withdrawing further screws will permit either of the gears or the chainwheel to be detached and replaced.

The main driving pinion on the layshaft engages with the large fibre gear on the upper sprocket shaft, the gear reduction being such that the 990 r.p.m. of the driving pinion is reduced to the correct speed of 360 r.p.m. on the sprocket shaft.

The large gear wheel is of such a diameter that its upper part is just proud of the top face of the soundhead. The projector is driven from this gear wheel.

The lower sprocket shaft carries on its non-operating side only a small steel gear and an idle guide sprocket for the chain drive to the bottom

Page 3

take-up. The gear is driven by the small fibre gear on the upper sprocket shaft, the ratio being of course 1 to 1. The gear on the lower shaft is keyed to the slotted spindle by a key washer integral with the gear wheel, and retained by an end screw.

All the gears in the train described are exceptionally robust and will give many years' service, but when replacement is required of any gear, bearing, or shaft, no tool other than a screwdriver and a spanner is required, and no fitting skill is entailed.

The gears and shafts already described are mounted on the soundhead casting proper. The scanning drum shaft, together with the optical system, photo cell, and exciter lamp, which together comprise the scanning unit assembly, are carried on a resiliently mounted plate attached to the soundhead casting.

The housing which carries the scanning drum shaft and fluid flywheel is 2 in. in diameter, and is offered up to its bore from the non-operating side. It is held in position by three screws passing through the flange of the housing into tapped holes in the plate. When it is necessary to detach or refit this housing, always remove the fluid flywheel from the shaft and lift up the lay on roller so that its flange will not foul the reproducing drum.

The fluid flywheel is retained on the shaft by a hexagonal end nut and a shouldered washer. Note too that there is another washer on the other side of the flywheel which must not be forgotten when a flywheel is changed. When a spanner is applied to the end nut, either to remove it or tighten it up, the shaft **must** be held stationary by a tommy bar pushed through the hole drilled through the shaft adjacent to the scanning drum. The flywheel must not be strained by using it to hold the shaft. The flywheel has a parallel bore which goes on to a parallel sided shaft. The scanning drum is of stainless steel.

Always treat the flywheel and shaft with care, because upon them depends the performance of the soundhead. Never use more than light pressure on the spanner when tightening up the retaining nut.

The lay-on roller, which holds the film in contact with the drum, also runs on ball bearings. An enclosed spring-loaded plunger, with non-adjustable tension, applies a predetermined thrust on the lay-on roller bracket. An engraved adjusting disc permits of tracking the lay-on roller in respect of the scanning drum so as to correct for possible displacement of the sound track. The complete lay-on roller assembly can be withdrawn by removing the retaining end screw on the spindle.

The optical system of the 83 Soundhead is one of its most interesting features. The exciter lamp is mounted in a compartment on the extreme left of the soundhead. Immediately in front of the lamp is a large condenser which projects the light horizontally forward to a prism mounted partly within the scanning drum. The prism reverses the light path and directs it back through the sound track, through the objective lens and on to the window carrying the mechanical slit. The window is in a housing containing a prism, which directs the received light vertically downwards on to the cathode of the photo cell. The optical magnification is six times, which means that an enlarged image, six times that of the actual sound track, is impressed on the window. With the film stationary it is immediately possible to check whether the focus is approximately correct, and with the film running it is immediately evident if either sprocket holes or the edge of the picture is being projected on to the slit. The window has fixed masks to accept the internationally accepted scanned width of sound track of .084 in. The adjustable tracking of the lay-on roller centres the scanned soundtrack on the window. The slit is correctly adjusted for azimuth (horizontality), at the Works, and locked with an Allen screw.

The efficiency of the optical system, due to the use of optical components of large effective aperture, and to the blooming of all the surface of condensers, lens and prisms, is high.

The exciter lamp is a normal 8-volt 4-amp type, and the photo cell is a normal gas type on a standard British 4-pin base. The Osram CMG22, the Cinema Television GS16 or the CG8, are suitable. For any overseas

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The complete soundhead is immune from rust. The soundhead and the plate upon which is assembled the scanning unit are of cast aluminium of heavy section. The three bearing housings are die castings. The exciter lamp mount, the prism mounts, and the condenser mount are all die castings, as are the cell housing, slit unit plate, brackets for lay-on roller and sprocket pad rollers, and the strippers. The lay-on roller is nitrided steel, and small rollers and retaining screws are either of stainless steel or chromium plated steel.

The enlarged image optical system of the soundhead has already been briefly described, but a detail refinement in connection with azimuth adjustment of the 83 Soundhead deserves mention. The window upon which the mechanical slit is engraved is locked by a 4 BA Allen screw immediately below the window. Just in front of the large condenser lens is a screw head, which is in fact the end of a fine worm which meshes with a worm wheel surrounding the window and slit assembly. If the 4 BA Allen screw be loosened, the window, carrying the slit, can be rotated by applying a small screwdriver to the screw head.

The slit is correctly set at the Works, and the adjustment provided is not intended to be used by operators or during ordinary service work. Once adjusted and locked it cannot vary, but a Supervising Engineer may need to satisfy himself that the setting is optimum. The only satisfactory way to do this is to employ a long length of focussing film, or an endless loop, and with a voltmeter, or a power level indicator, coupled to the output terminals of the power amplifier, alter the azimuth adjustment whilst the film is running until a maximum meter reading is obtained.

Focussing of the soundhead objective lens is also best done by the same method, focussing film and meter, as recommended for azimuth adjustment, although it can also be done by inspection of the image on the window, or by the ' blink ' method. If the inspection or blink method be used, it is essential that a sufficient length of focussing film be employed to ensure that it lies on the reproducing drum in exactly the same way as would a whole reel in normal running. This means that the focussing film should be laced through from bottom sprocket of projector to fire trap of lower spoolbox allowing the usual size of loops, and the film should be induced to adopt the normal running position past the scanning point by turning the inching handle.

The optical system of the 83 is of such a design that even with maximum light on the window, filament structure is not projected. The correct adjustment of exciter lamp, condenser lens and supplementary lens is that which gives maximum light on the window, and consequently greatest output from the photo cell. The exciter lamp should be set so that the horizontal bar of light from the condenser falls squarely across the entry side of the prism. The condenser should be adjusted so that the maximum intensity of light is projected on to the window, taking care to preserve horizontally of the condenser mask. Any deviation from the horizontal of the mask will immediately be apparent on the window. Optimum position for the condenser lens will be found to be that when the front edge of its barrel is level with the front edge of the mount. The supplementary lens, on the exit side of the prism, will usually be found to give greatest light when screwed right home. It is locked by a 6B A Allen key. Once condenser and supplementary lens have been adjusted there is no need to alter them. They do not require re-adjustment when an exciter lamp is changed.

When an exciter lamp is changed it is only necessary to check that the bar of light is across the centre of the prism, and that in consequence the light projected on to the bridge is evenly disposed above and below the slit. The height adjusting screw on the lamp holder will immediately correct for any difference between one lamp and another.

The photo cell, a gas type with caesium cathode, GS16, CMG22 or CG8, with a standard (British) four-pin base, is carried horizontally in a cast

aluminium box below the condenser lens. Access is obtained by removing the two cheese-headed screws in the front cover. Access to the pins of the cell holder is obtained by removing the screws which hold the dished cover on the front of the cell box.

Various types of slits can be used with the 83 Soundhead, depending upon the purpose for which the head is used. For re-recording, a very fine slit is used so that a straight line frequency response may be obtained from the cell. For all normal reproduction purposes a comparatively coarse slit is used, because the overall frequency response curve recommended by the Academy of Motion Picture Arts and Sciences entails serious curtailment above 2,000 cycles. The standard reproducing slit is 0.0108 inch high, and taking into account the six times magnification of the optical system, corresponds to a slit dimension at film of 0.0018 inch. This dimension naturally results in a considerably increased amount of light being passed to the photo cell, with a gain in cell output and an increased signal voltage on the grid of the first tube. Its effect on the frequency response curve is progressively to attentuate the response above 2,000 cycles. At 8,000 cycles the attenuation is 12dB, but this figure is a theoretical one based on the use of a perfect optical system. The actual attenuation at 8,000 cycles will in practice be 1 or 1½dB more, making a total of, say, 13½dB. To this must be added something of the order of 1dB for cell lead loss, and perhaps 1dB for amplifier loss at 8,000 cycles.

Irrespective of the type of amplifier with which the 83 Soundhead is used, the cell is cathode coupled. Low capacity coaxial cable is used for the connection between cell and amplifier, and high tension for the cell anode is conveyed on a separate unscreened cable.

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SOUNDHEAD TYPE 378

When the original design was being considered, it was proposed that a prefocussed type of exciter lamp should be used. Experience of prefocussed lamps showed that there was insufficient uniformity between specimens, and that even if initially the filament of a particular lamp lined up optically, it was necessary to provide adjustment to allow for filament sag with age. Accordingly, a normal type of 8-volt, 4-ampere lamp was adopted, and an adjustable exciter lamp holder of a similar, but not identical type to that fitted in the 83 Soundhead. The holder gives both vertical and horizontal movement of the lamp.

There is very great similarity between the 83 and 378 Soundheads. The two types are in fact variations of one basic design. The same method of drive on to a dual Vee belt pulley is used in both models, and the various types of motor used with the 83 Soundhead to cope with different voltages and periodicities are equally available and suitable for the 378 Soundhead.

The method of driving the picture projector mechanism is identical in the two types, and all projector adaptations designed for the 83 Soundhead are available and suitable for the 378 Soundhead. As between the two models, all external dimensions, and such material points as fixing centres and drive centres, are identical. The substitution of an 83 Soundhead by a 378 in any theatre installation would entail no more than the removal of the 83 and the fitting in its place of the 378. No modification to the rest of the equipment would be required.

Having stressed the similarity between the two Soundheads, it will be useful to itemise the points of difference.

Where the 83 employs the special feature of an optical system which projects a six times magnified image of the soundtrack on to a window carrying the mechanical scanning slit, the 378 Soundhead employs a normal type of optical system. The horizontally mounted optical tube projects the scanning light on to the emulsion side of the overhung edge of the film on the scanning drum, and a mirror assembly, mounted partly within the scanning drum, picks up the light modulated by the soundtrack and redirects it downwards and backwards to a photo-cell contained in a cover immediately below the optical tube.

To focus the optical system, the 2BA Allen clamping screw is loosened, and the chromium plated sleeve rotated by means of a tommy bar in one of the ring of holes. As with any soundhead, the most positive method of obtaining optimum focus adjustment is by employing an endless loop of 5,000 or 8,000 cycle test film, or several hundred feet of the same film laced through from top to bottom spoolbox, and with a meter attached to the output terminals of the power amplifier, adjust focus whilst the machine is running until a maximum meter reading is obtained. A less satisfactory method is by observation of the ' iris ' effect at the cathode of the P.E. Cell.

Slit azimuth (horizontality of slit) is adjusted at the Works and sealed.

The complete optical unit assembly, comprising lens tube and mirror assembly, is carried on a single light alloy casting which can be detached from the scanning plate by withdrawing three screws. With the casting detached from the plate it is possible to withdraw the lens tube from its ' U ' shaped carriage. With the 2BA Allen screw loosened off, downward rotation of a tommy bar in the ring of holes will move the actual lens tube, which normally is hidden by the chromium plated sleeve, back until it can be slipped out. The lens tube is carried on a chromium plated flange nearly two inches in diameter, and rivetted into this flange is a substantial pin. The pin is part of the azimuth adjustment, and permits of the whole lens tube, which carries within it the slit mask, being rotated the necessary few degrees by the adjusting screw. When in its normal working position the pin is butting up against a vertically mounted plunger with a strong spring. This plunger is fitted into the bearing block of the lens tube carriage from underneath, and rotation of the visible screw driver slotted end of the plunger will have no effect as its setting is determined and sealed at the Works. The azimuth adjusting screw is fitted into the bearing block from the top, and only the sealing is visible.

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When returning the lens tube to its carriage, hold the chromium plated sleeve in its working position, with the tommy bar holes nearest the mirror assembly, check that the two plain and one spring washer are in place on the lens tube (the spring washer should be the one nearest the large flange), and gently push the lens tube in until the threads on the tube engage with the threads on the sleeve. See that the chamfered end of the pin is correctly entered between the spring plunger and the azimuth locking screw, and then rotate the sleeve in an upward direction, thus drawing the lens tube into position.

It is not essential to detach the casting which carries the elements of the optical system in order to withdraw the lens tube, but the job is rendered easier by so doing, and at the same time it permits the lenses of the mirror system being inspected and cleaned if necessary. The surfaces of the lenses in both the lens tube and the mirror assembly are bloomed, and cleaning should be done very gently, with a clean, soft piece of silk.

The optical assembly, together with the exciter lamp holder, the scanning drum, shaft, and flywheel, the lay-on roller, the guide entry roller, and the photo cell and cover, are carried on a scanning plate which is rubber mounted at three points to the soundhead body proper.

The photo cell employed is a type GS16, CMG22, or CG8, as used in the 83. These cells are mounted on a standard British 4-pin base, but the cell holder can be exchanged for an American 4-pin holder to accept an American type 923 cell.

The 378 Soundhead employs one film sprocket only. The sprocket is a holdback type, and its shaft, bearings, and bearing housing are standard 83 parts. The single sprocket occupies the same position as the upper of the two sprockets in an 83 Soundhead, but it should be noted that where with two sprockets the upper one is a feed type, part 83005, with a single sprocket, it is a hold back type, part 83006.

In place of the lower sprocket of the 83 Soundhead, the 378 has a jockey roller on a spring loaded arm, locating in the same bore that accommodates the lower sprocket bearing housing in the 83. The pivoted arm gives the jockey roller 2½ inches of effective travel, and this enables it to deal with large amplitudes of film snatch. The geometry of the design is such that with film held stationary by the film sprocket, it is necessary to pull 4 inches of film into the lower spoolbox to cause the jocket roller to move through its permissible travel of 2½ inches.

It is, of course, desirable that the tension on the friction disc of the bottom take-up should be adjusted to give a sweet action, and bent or warped spools should not be used, but the roller on its swinging arm, in conjunction with the single film sprocket, will absorb disturbances of considerable magnitude and prevent their being reflected back to the scanning point.

As the 378 Soundhead has only one film sprocket, it has two gears and an idler chain sprocket less than the 83 Soundhead. Where in an 83 the non-operating side of the upper film sprocket shaft carries two gears and the driving chain sprocket for the bottom take-up, on the 378 there is only one gear and the chain sprocket. The smaller gear, part 83028, is not required, as there is no lower sprocket shaft for it to drive. Having no lower sprocket shaft, the 378 Soundhead has no gear part 83030, and no idler chain sprocket part 83031.

Because there is only one sprocket shaft requiring lubrication, the oil pipe assembly has only one oil pipe.

The lay-on roller assembly is built up entirely of 83 parts with the exception of the bearing arm, which is part 378010.

Page 8

SOUN

The Type 543 Sound
the exception that the

EXPLANATORY NO

Many of the parts
with type numbers in
soundheads. Parts wit
heads. Parts with 543

Example.

Part No. 83001 is
378001 is the Scann
Type 543 Soundhea
shafts of all three S
this particular part,

e, hold the chromium plated
bar holes nearest the mirror
ring washer are in place on
the one nearest the large
ntil the threads on the tube
at the chamfered end of the
g plunger and the azimuth
an upward direction, thus

n carries the elements of the
ube, but the job is rendered
mits the lenses of the mirror
ssary. The surfaces of the
assembly are bloomed, and
clean, soft piece of silk.

er lamp holder, the scanning
the guide entry roller, and
nning plate which is rubber
dy proper.

MG22, or CG8, as used in the
ritish 4-pin base, but the cell
4-pin holder to accept an

cket only. The sprocket is a
earing housing are standard
ame position as the upper of
should be noted that where
pe, part 83005, with a single

ndhead, the 378 has a jockey
ame [illegible] that accommodates
. The [illegible]voted arm gives the
d this enables it to deal with
ry of the design is such that
t is necessary to pull 4 inches
ocket roller to move through

n on the friction disc of the
a sweet action, and bent or
oller on its swinging arm, in
will absorb disturbances of
being reflected back to the

rocket, it has two gears and
dhead. Where in an 83 the
t shaft carries two gears and
-up, on the 378 there is only
ller gear, part 83028, is not
t for it to drive. Having no
no gear part 83030, and no

equiring lubrication, the oil

ntirely of 83 parts with the
78010.

SOUNDHEAD TYPE 543

The Type 543 Soundhead is identical with the Type 378 Soundhead with the exception that the take-up is belt-driven.

EXPLANATORY NOTE.

Many of the parts are common to all three types of Soundhead. Parts with type numbers in the 83000 series will be found in 83, 378 and 543 soundheads. Parts with 378000 numbers will be found in 378 and 543 soundheads. Parts with 543000 numbers will be found only in the 543 soundhead.

Example.

Part No. 83001 is the Scanning Unit of the Type 83 Soundhead. Part No. 378001 is the Scanning Unit of the Type 378 Soundhead, and also of the Type 543 Soundhead, and is therefore common to both. The sprocket shafts of all three Soundheads are identical, hence the part number for this particular part, viz., 83081, applies to all three.

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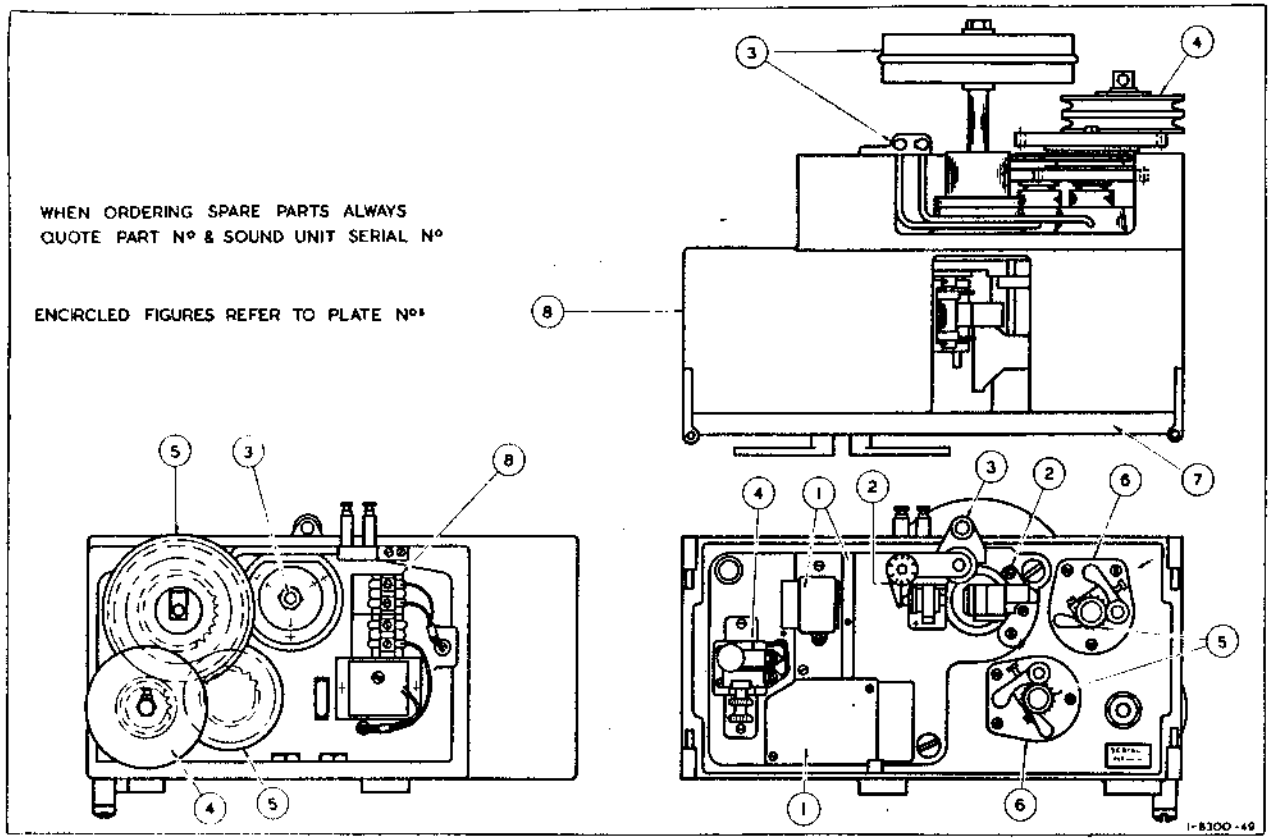
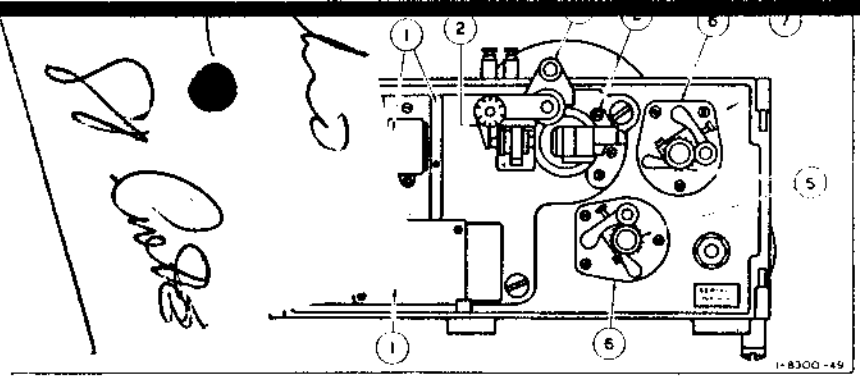
KEYPLATE FOR THE COMPLETE ASSEMBLY OF THE 83 SOUNDHEAD



Key Number	1
1	Slit Unit Assembly and P.E. Ce



Key Number	Description	Plate Number
1	Slit Unit Assembly and P.E. Cell Details	8301
2	Lay-on Roller, Plunger for Lay-on Roller and Large Prism with Auxiliary Condenser	8302
3	Flywheel Shaft and Housing Assembly and Scanning Unit Details ...	8303
4	Exciter Lampholder and Layshaft Assemblies	8304
5	Gearing for Feed and Holdback Sprocket Shaft Units	8305
6	Sprocket Shaft Unit and Jockey Roller Assembly	8306
7	Large and Small Doors	8307
8	Assembly of Screened Terminal Block and Miscellaneous Details ...	8308

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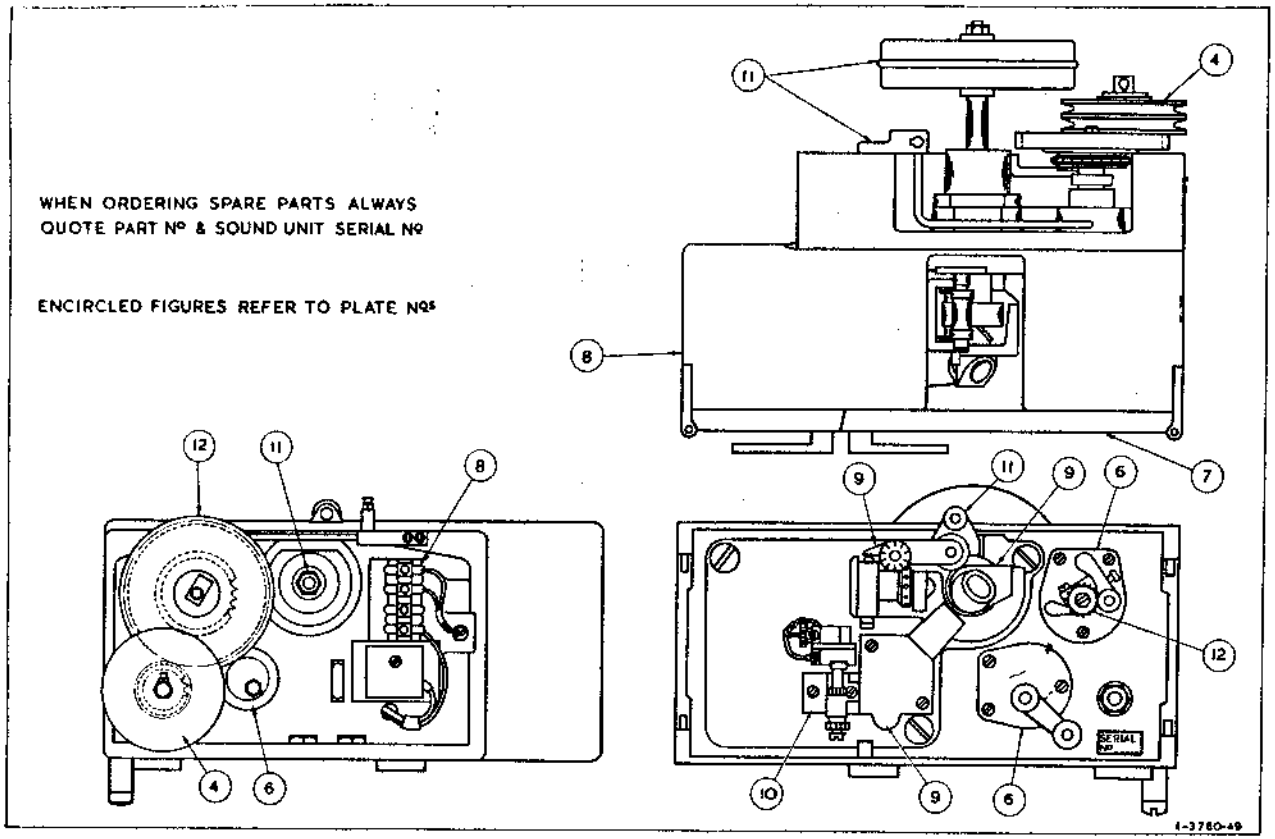
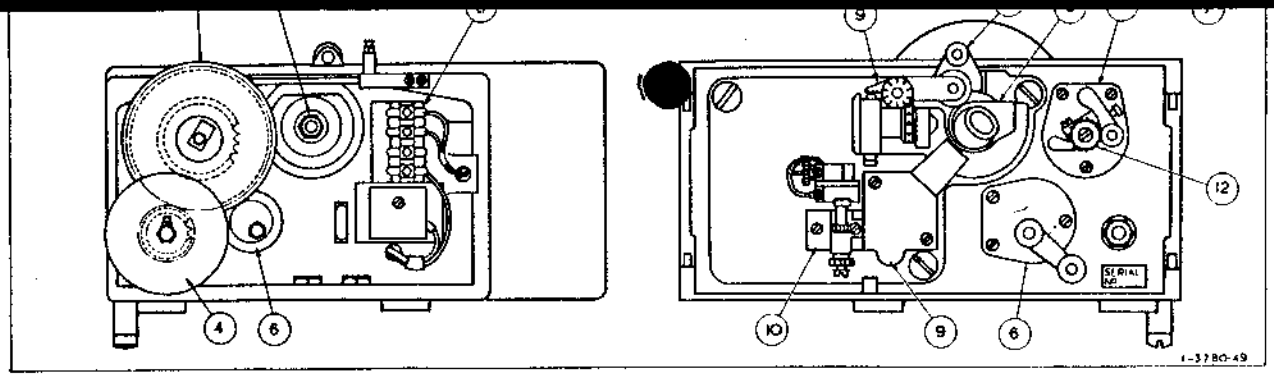
KEYPLATE FOR THE COMPLETE ASSEMBLY OF THE 378 SOUNDHEAD



A3

Key Number	Description	Plate Number
4	Layshaft Assembly	8304



A3

Key Number	Description	Plate Number
4	Layshaft Assembly	8304
6	Sprocket Shaft Unit and Jockey Roller Assembly	8306
7	Large and Small Doors	8307
8	Assembly of Screened Terminal Block and Miscellaneous Details ...	8308
9	Assembly of Lay-on Roller, Optical Unit and P.E. Cell Details ...	8309
10	Exciter Lampholder Assembly	8310
11	Flywheel Shaft and Housing Assembly and Scanning Unit Details ...	8311
12	Gearing for Holdback Sprocket Unit	8312

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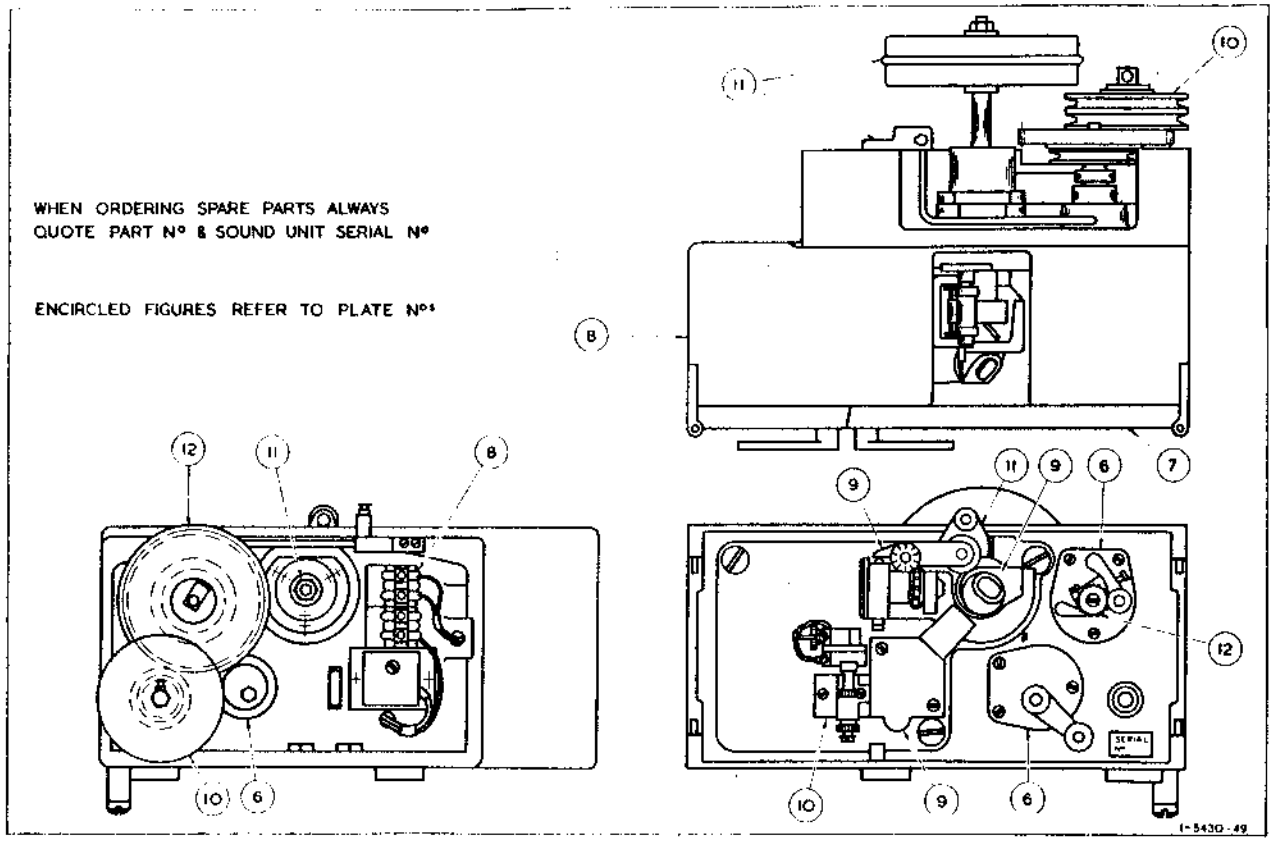
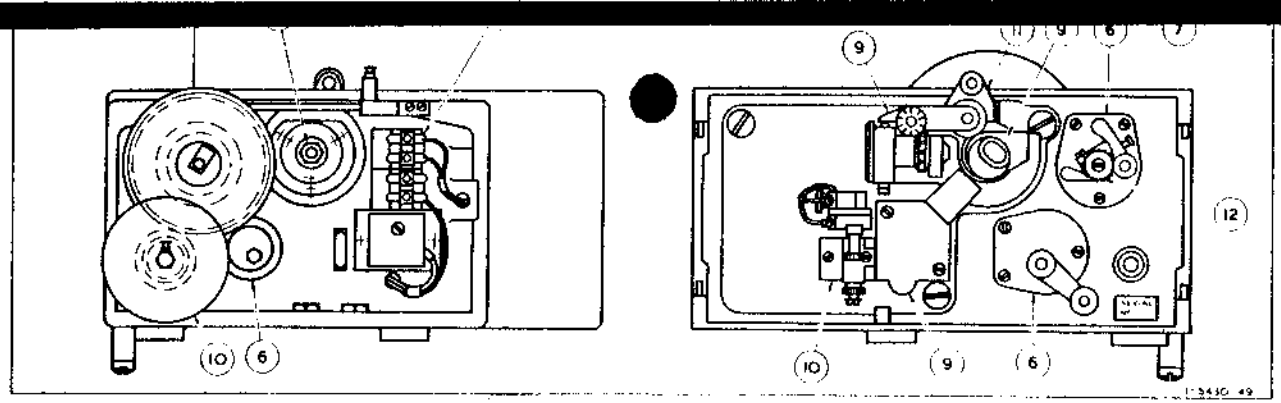
KEYPLATE FOR THE COMPLETE ASSEMBLY OF 543 SOUNDHEAD

WHEN ORDERING SPARE PARTS ALWAYS
QUOTE PART N° & SOUND UNIT SERIAL N°

ENCIRCLED FIGURES REFER TO PLATE N°s



Key Number	Description	Plate Number
6	Sprocket Shaft Unit and Jockey Roller Assembly	8306



Key Number	Description	Plate Number
6	Sprocket Shaft Unit and Jockey Roller Assembly	8306
7	Large and Small Doors	8307
8	Assembly of Screened Terminal Block and Miscellaneous Details ...	8308
9	Assembly of Lay-on Roller, Optical Unit and P.E. Cell Details ...	8309
10	Exciter Lampholder and Layshaft Assemblies	8310
11	Flywheel Shaft and Housing Assembly and Scanning Unit Details ...	8311
12	Gearing for Holdback Sprocket Unit	8312

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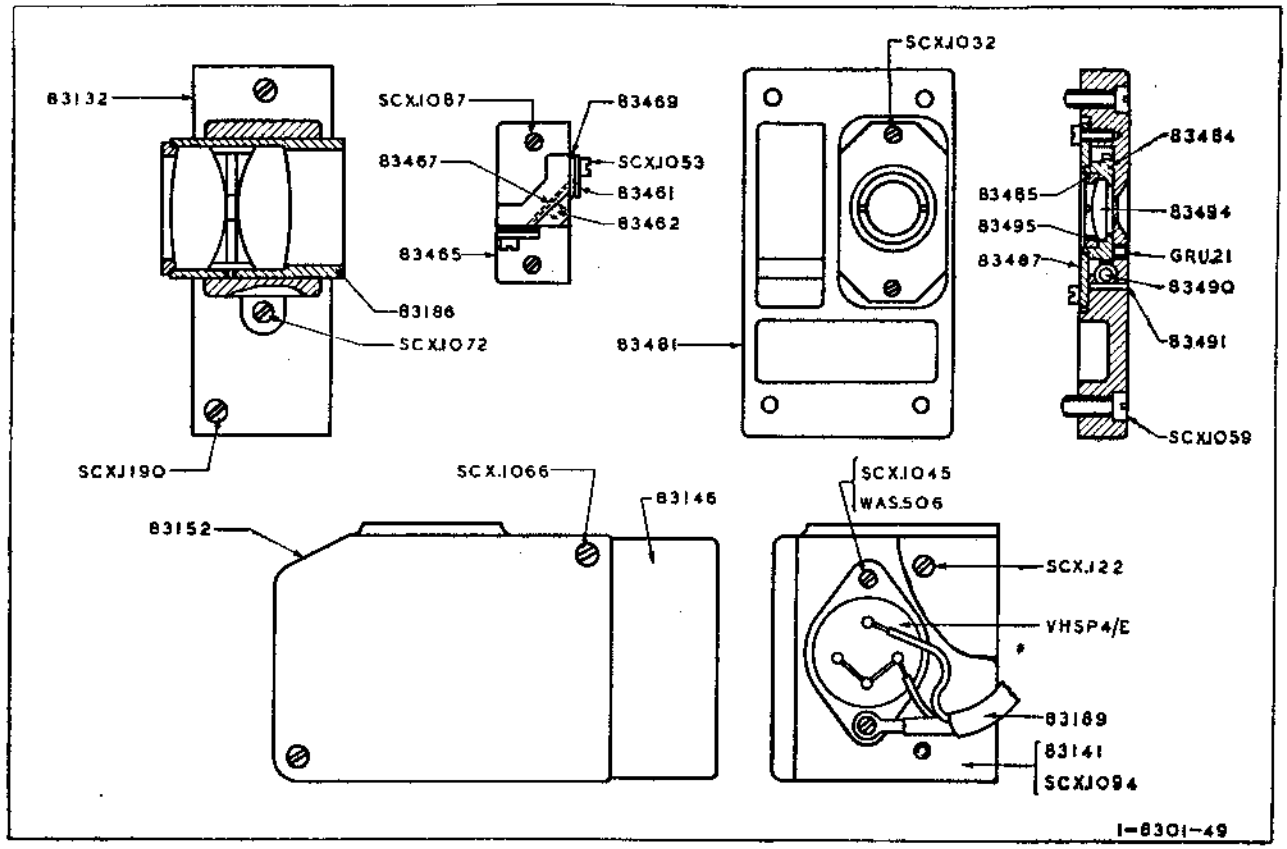
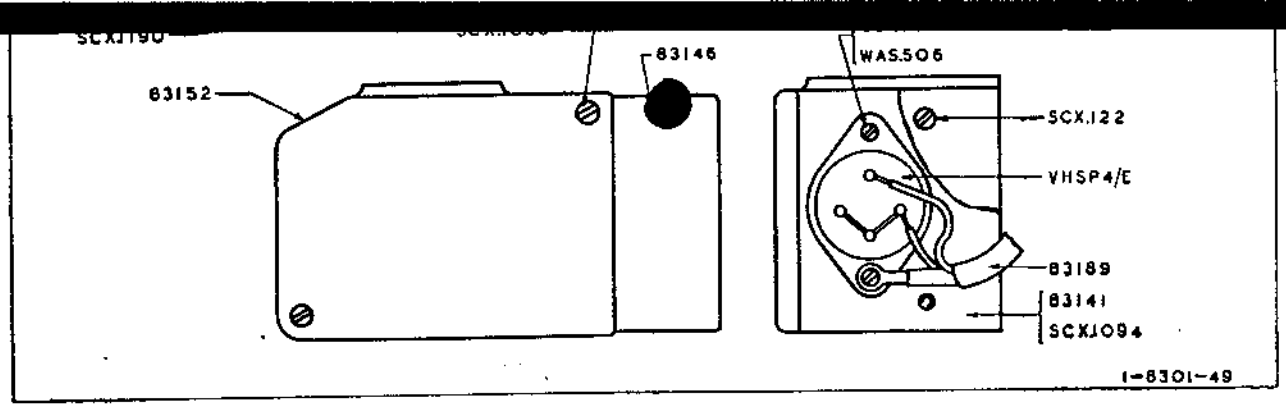
SLIT UNIT ASSEMBLY AND P.E. CELL DETAILS FOR 83 SOUNDHEAD



PART No.	DESCRIPTION
83132	Condenser Mount Casting
83141	Cell Holder

PART No.	DESCRIPTION
83462	Small Prism
83465	Mount for Small Prism

PART No.	DESCRIPTION
83487	Rear Bearing Plate for Slit Unit
83490	Slit Driving Worm



PART No.	DESCRIPTION
83132	Condenser Mount Casting
83141	Cell Holder
83146	Cell Holder Cover
83152	Cell Cover
83186	Large Condenser Lens Assembly
83189	Cell Cable Form
83461	Clamp for Small Prism

PART No.	DESCRIPTION
83462	Small Prism
83465	Mount for Small Prism
83467	Cushion for Small Prism
83469	Packing Strip
83481	Front Plate for Slit Unit
83484	Slit Mount Gear
83485	Slit Locking Ring

PART No.	DESCRIPTION
83487	Rear Bearing Plate for Slit Unit
83490	Slit Driving Worm
83491	Pin
83494	Slit Glass .0108" Slit Width
83495	Washer
VHSP4/E	Photo Cell Holder

WASHERS, PINS AND SCREWS

GRU.21	Screw fixing	83484
SCX.1032	,,	83487
SCX.1083	,,	83461
SCX.1059	,,	83134
SCX.122	Screw Fixing	83146
SCX.1072	,,	83186
SCX.1087	,,	83465
SCX.1045	,,	VHSP 4/E
WAS.506	Washer for	VHSP 4/E
SCX.1094	Screw fixing	83141
SCX.1190	,,	83132
SCX.1066	,,	83141 and 83152

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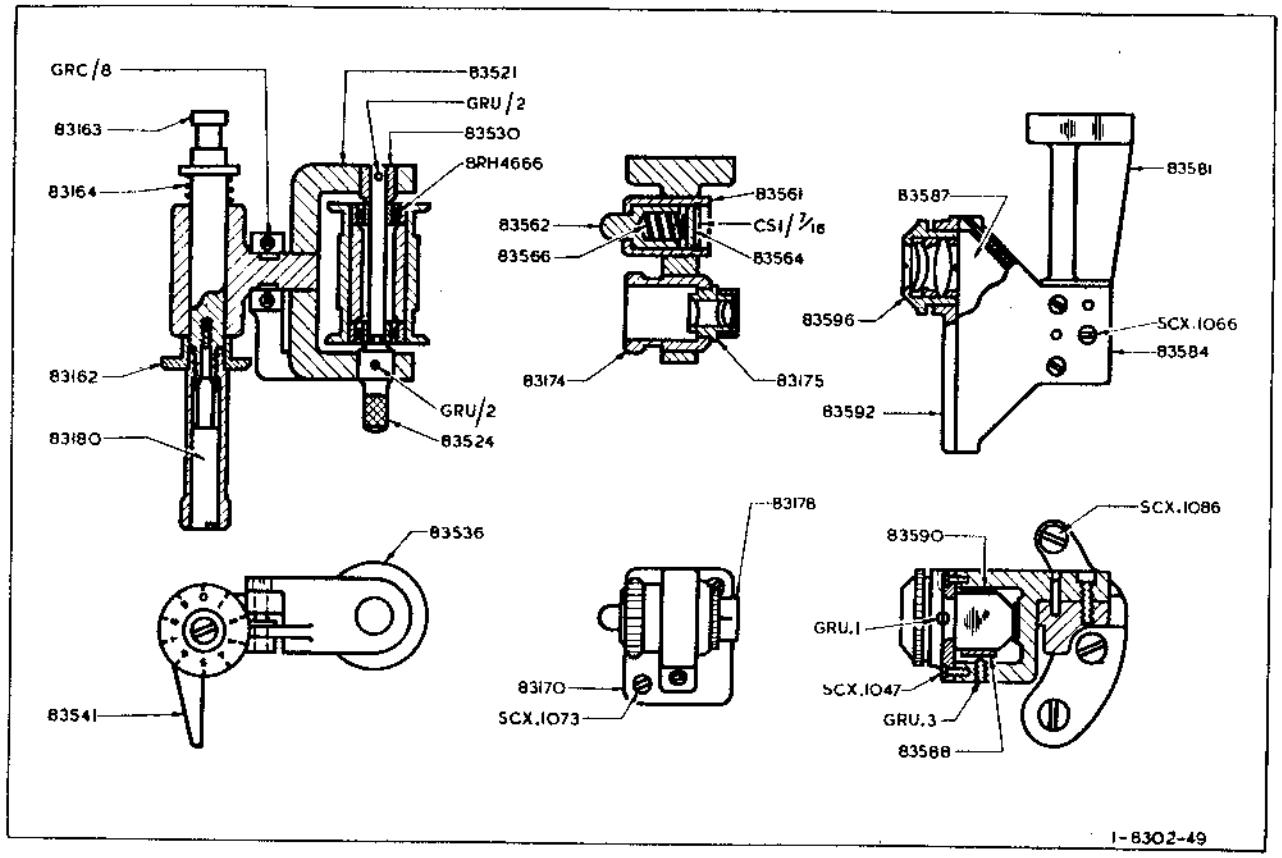
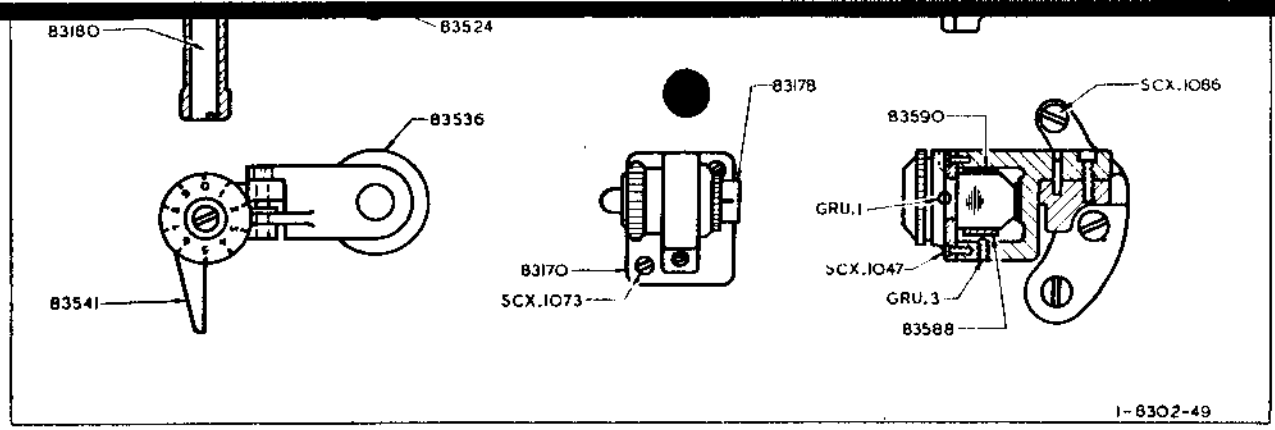
LAYON ROLLER PLUNGER FOR LAYON ROLLER, AND LARGE PRISM WITH AUXILIARY CONDENSER ASSEMBLIES FOR 83 SOUNDHEAD



PART No.	DESCRIPTION
83125	Exciter Lampholder Assembly Complete
83190	Exciter Lamp Cable Form
83421	Lamp Bracket
83423	Angle Bracket
83425	Slide
83427	Elevating Screw
83428	Retainer
83433	Saddle Assembly
83434	Saddle Clamp Nut
83435	Insulator
83438	Lamp Clamping Screw
83964	Lampholder
83968	Nut
83448	Contact Assembly



PART No.	DESCRIPTION
83125	Exciter Lampholder Assembly Complete
83180	Exciter Lamp Cable Form
83421	Lamp Bracket
83423	Angle Bracket
83425	Slide
83427	Elevating Screw
83428	Retainer
83433	Saddle Assembly
83434	Saddle Clamp Nut
83435	Insulator
83438	Lamp Clamping Screw
83964	Lampholder
83968	Nut
83448	Contact Assembly

WASHERS, PINS AND SCREWS

SCX.1060	Screw fixing	83425	SCX.1072	Screw fixing	83125		
SCX.1066	,,	83448	SCX.1088	,,	83433	SCX. 2045	Screw fixing 83428

LAYSHAFT ASSEMBLY FOR 83 AND 378 SOUND UNITS

83012	Layshaft Assembly Complete	83743	Thrust Washer (Inner)	83748	Washer (Outer)
83052	Leather Washer	83744	Main Drive Pinion	83749	Retaining Screw
83741	Layshaft	83745	Main Drive Pulley		
83742	Idler Sprocket	83746	Pulley Sleeve	OALI/3-16	Oiler, Rotherham

WASHERS, PINS AND SCREWS

SCX.1135	Screw fixing 83746	NUT 9/145	Nut for 83741	WAS 3/426	Washer for 83741

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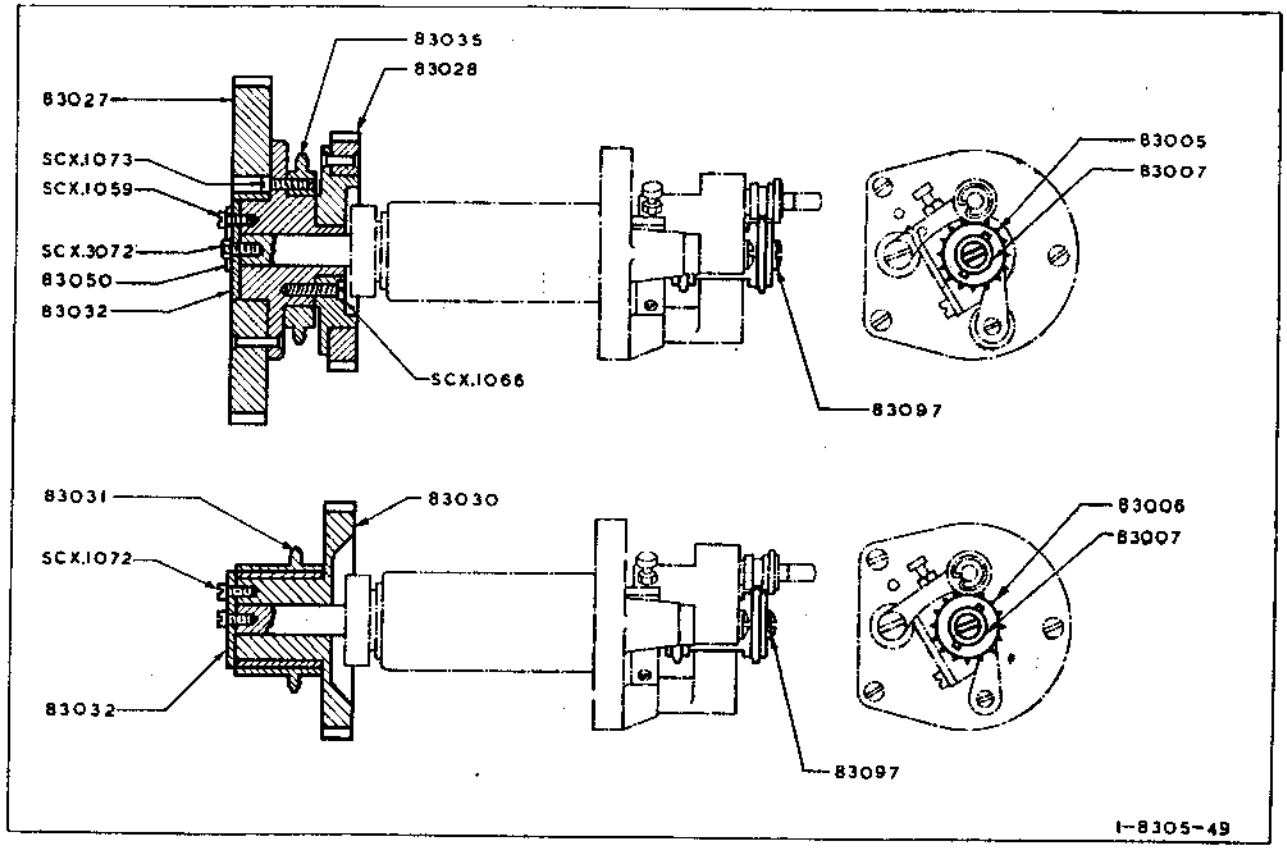
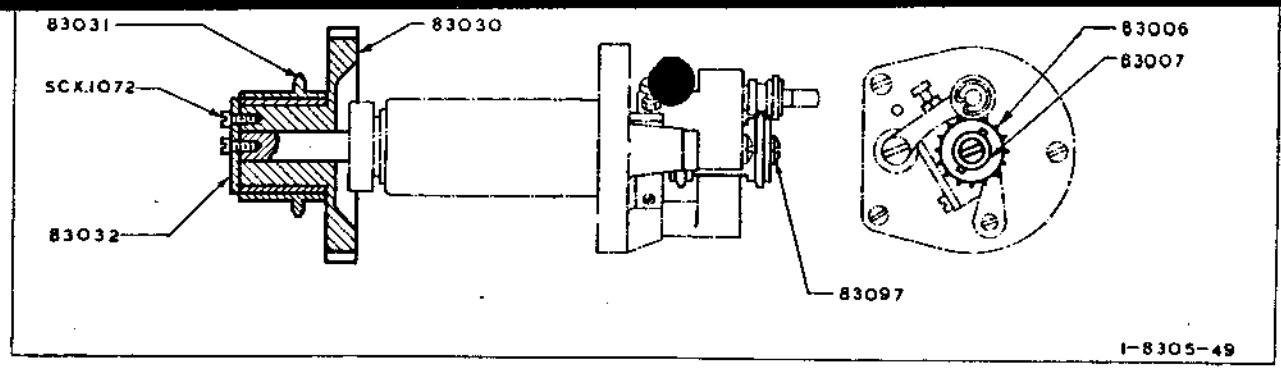
GEARING FOR FEED AND HOLDBACK SPROCKET SHAFT UNITS ON 83 SOUNDHEAD



PART No.	DESCRIPTION
83005	Feed Sprocket
83006	Hold Back Sprocket
83007	Keywasher

PART No.	DESCRIPTION
83028	Sound Sprocket Gear
83030	Hold Back Sprocket Gear

PART No.	DESCRIPTION
83035	Main Drive Chain Sprocket
83050	Keeper



PART No.	DESCRIPTION
83005	Feed Sprocket
83006	Hold Back Sprocket
83007	Keywasher
83027	Main Drive Gear

PART No.	DESCRIPTION
83028	Sound Sprocket Gear
83030	Hold Back Sprocket Gear
83031	Idler Sprocket
83032	Large Key Washer

PART No.	DESCRIPTION
83035	Main Drive Chain Sprocket
83050	Keeper
83097	End Screw

WASHERS, PINS AND SCREWS

SCX.1059	Screw fixing	83050, 83032
SCX.3072	,,	83050, 83032
SCX.1072	Screw fixing	83030, 83032
SCX.1073	,,	83035
SCX.1066	Screw fixing	83028, 83035

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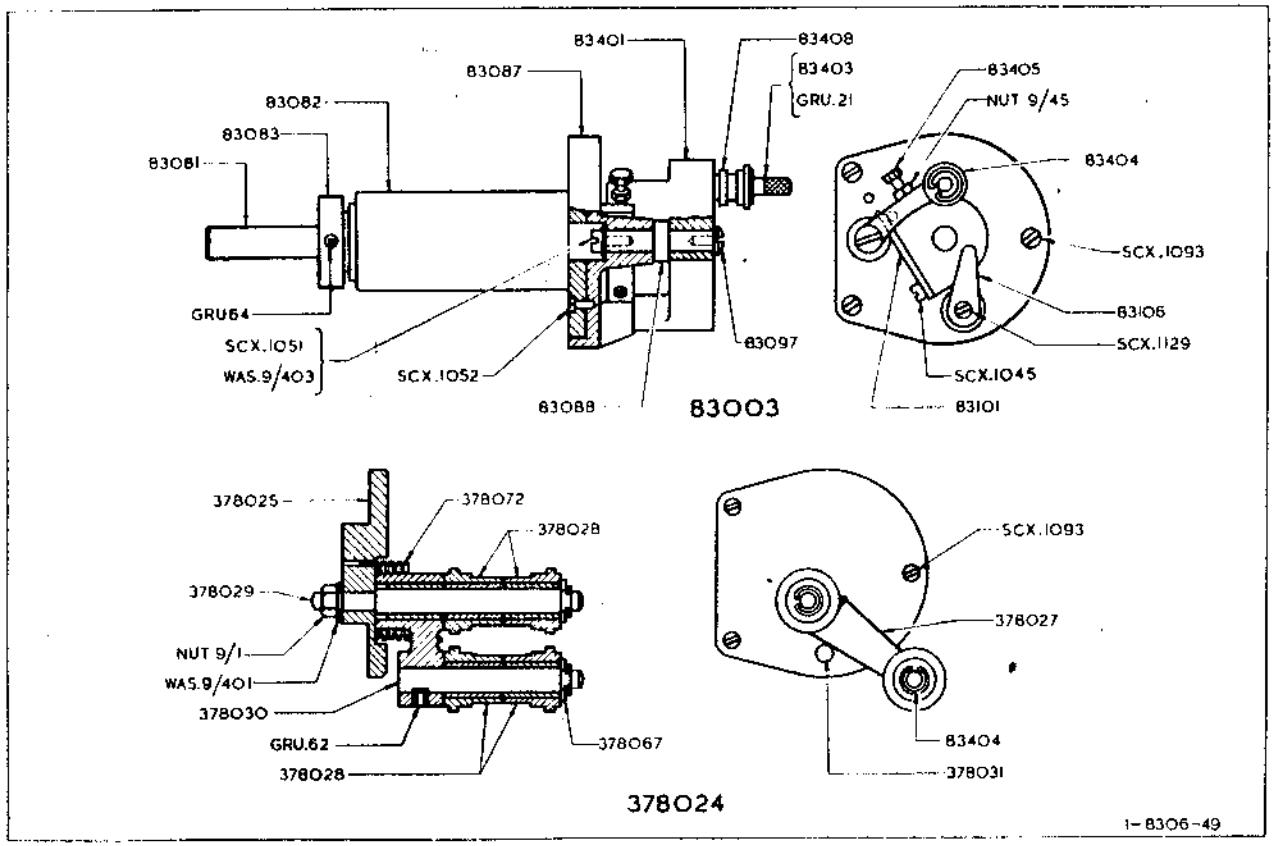
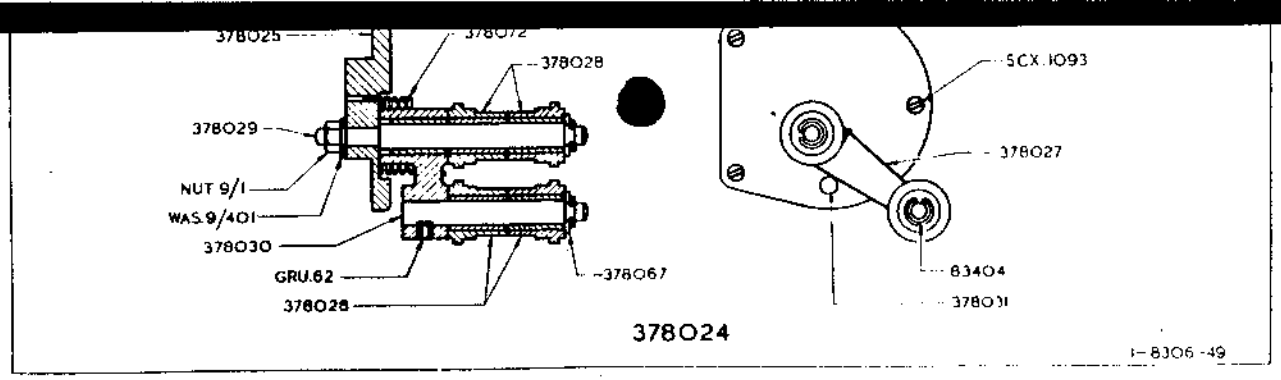
SPROCKET SHAFT UNIT FOR 83, 378 AND 543 SOUNDHEADS



PART No.	DESCRIPTION
83003	Sprocket Shaft Unit Complete
83081	Sprocket Shaft
83082	Sprocket Shaft Bearing
83083	Locking Collar
83087	Mounting Bracket

PART No.	DESCRIPTION
83088	Roller Pivot
83097	End Screw
83101	Flat Spring
83106	Stripper
83401	Cradle Roller Arm

PART No.	DESCRIPTION
83403	Spindle for Cradle Roller
83404	Circlip
83405	Adjusting Screw
83408	Cradle Roller -
83096	Sprocket Roller and Arm Assembly



378024

PART No.	DESCRIPTION
83003	Sprocket Shaft Unit Complete
83081	Sprocket Shaft
83082	Sprocket Shaft Bearing
83083	Locking Collar
83087	Mounting Bracket
83088	Roller Pivot
83097	End Screw
83101	Flat Spring
83106	Stripper
83401	Cradle Roller Arm
83403	Spindle for Cradle Roller
83404	Circlip
83405	Adjusting Screw
83408	Cradle Roller
83096	Sprocket Roller and Arm Assembly

WASHERS, PINS AND SCREWS

SCX.1093	Screw fixing	83003
GRU.21	,,	83403
GRU.64	,,	83083
SCX.1045	Screw fixing	83101
SCX.1051	,,	83088
SCX.1052	,,	83082
SCX.1129	Screw fixing	83106
NUT 9/45	Nut fixing	83405
WAS 9/403	Washer for	83088

JOCKEY ROLLER ASSEMBLY FOR 378 AND 543 SOUNDHEADS

PART No.	DESCRIPTION
378024	Jockey Roller Assembly Complete
378025	Mounting
378027	Arm Assembly
378028	Roller Assembly
378029	Shaft
378030	Shaft
378031	Stop Pin
378033	Jockey Roller Arm
378035	Jockey Roller
378067	Washer
378072	Spring
83404	Circlip

WASHERS, PINS AND SCREWS

GRU.62	Screw fixing	378030
SCX.1093	,,	378024
NUT 9/I	Nut fixing	378029
WAS 9/401	Washer for	378029

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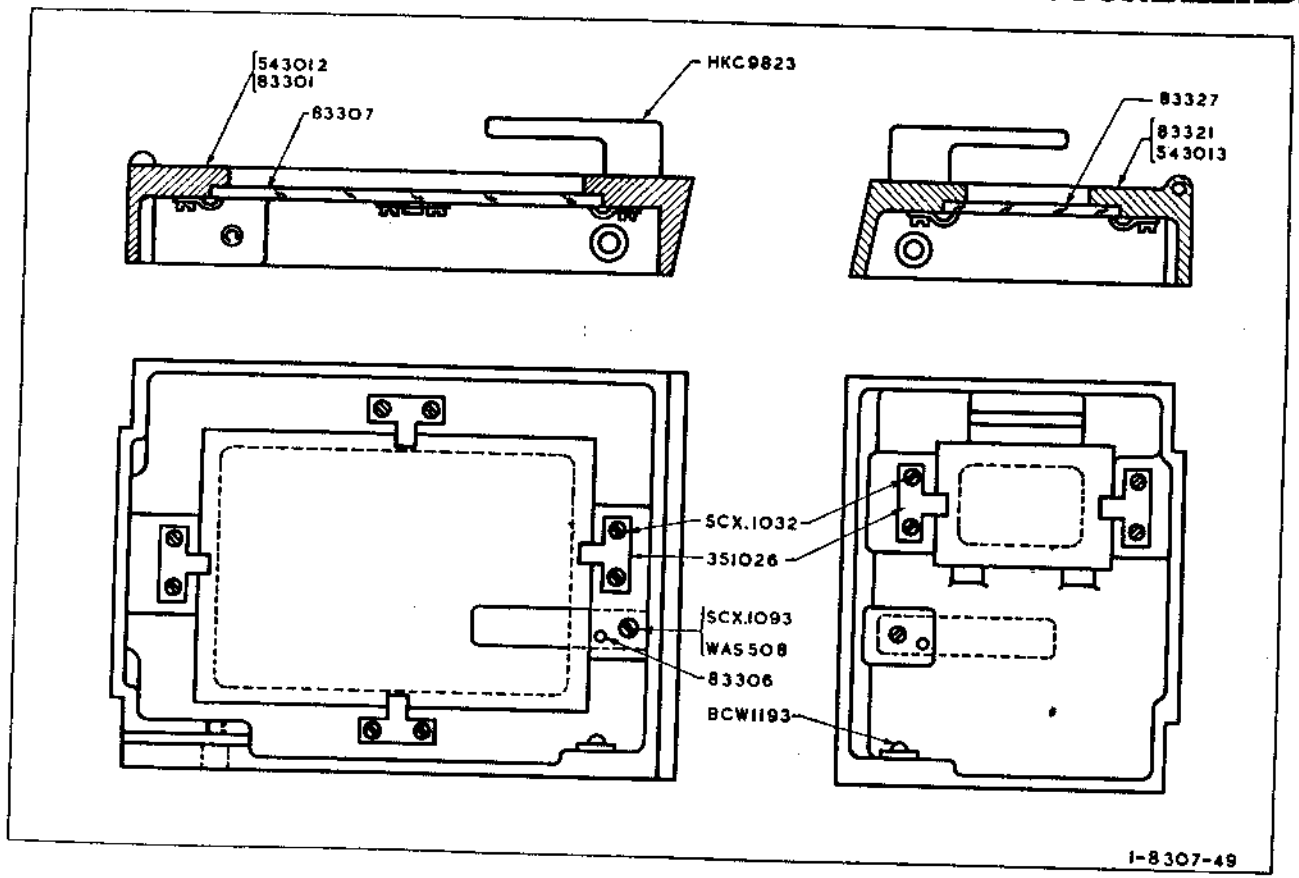
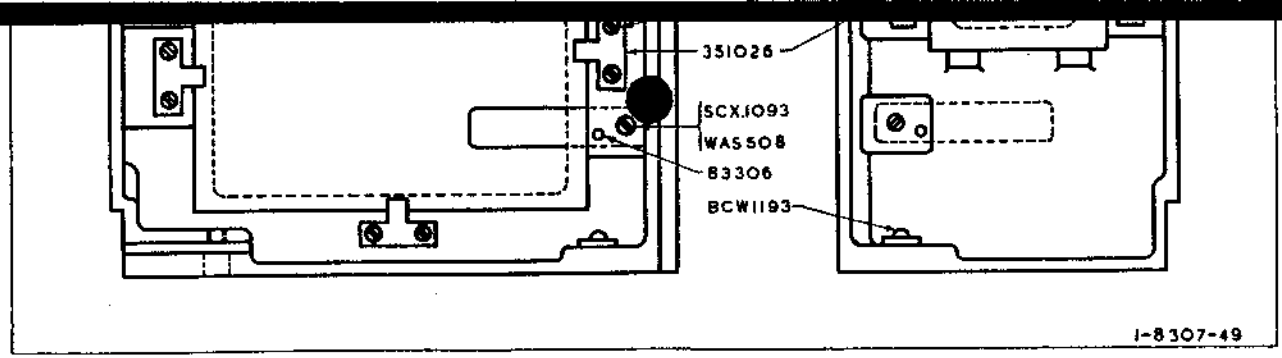
LARGE AND SMALL DOORS FOR 83, 378 AND 543 SOUNDHEADS



PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
83301	Door, Large, for 83 and 378	83327			



PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
83301	Door, Large, for 83 and 378	83327	Window, Small	HKC.9823	Handle
83306	Dowel Pin	351026	Window Clamp		
83307	Window, Large	543012	Door, Large, for 543		
83321	Door, Small, for 83 and 378	543013	Door, Small, for 543	BCW.1193	Ball Catch

WASHERS, PINS AND SCREWS

SCX.1032	Screw fixing 351026	SCX.1093	,, HKC.9823	WAS. 508	Washer for HKC.9823

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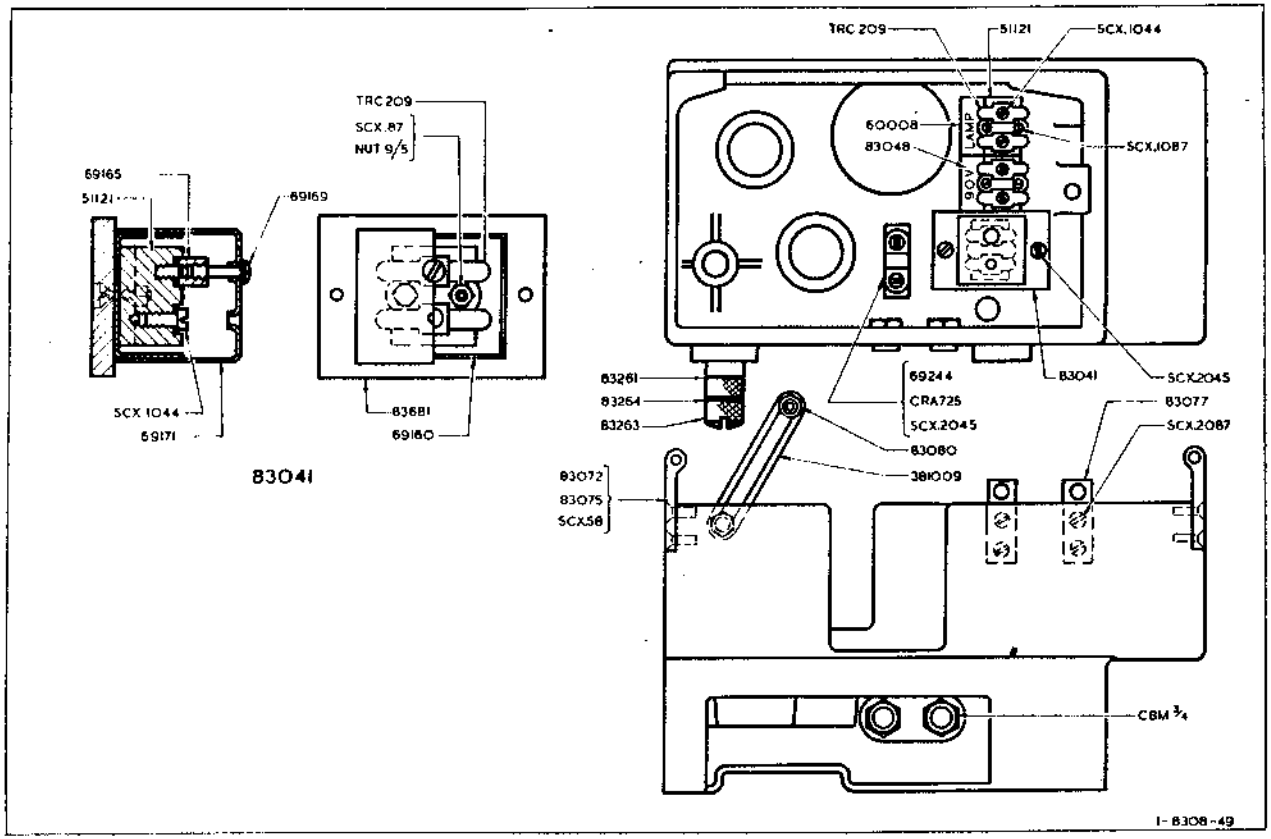
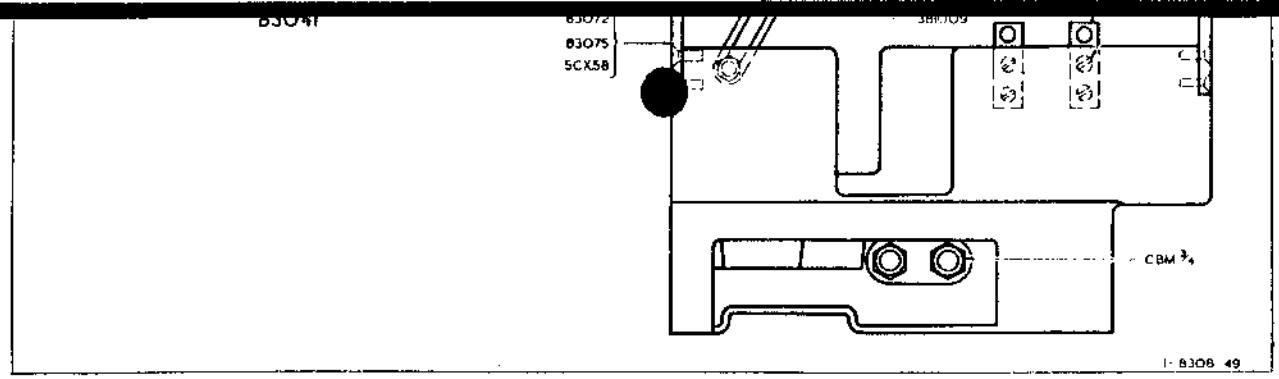
ASSEMBLY OF SCREENED TERMINAL BLOCK AND MISCELLANEOUS DETAILS FOR 83, 378 AND 543 SOUNDHEADS



PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
83041	Assembly of Screened Terminal Block	69171	Main Cover for Screened Terminal Block	83264	Washer
51121	Terminal Block Two Way	69244	Distance Piece	381009	Door Stay



PART No.	DESCRIPTION
83041	Assembly of Screened Terminal Block
51121	Terminal Block Two Way
60008	Designation Plate
69160	Lower Cover for Screened Terminal Block
69165	Earth Terminal for Screened Terminal Block
69169	Earth Screw for Screened Terminal Block
69171	Main Cover for Screened Terminal Block
69244	Distance Piece
83048	Designation Plate
83072	Hinge Assembly (Top)
83075	Hinge Assembly (Lower)
83077	Catch Plate
83080	Screw, Shouldered
83261	Body Oil Collector
83263	Screw Cap
83264	Washer
381009	Door Stay
CBM ¾"	Conduit Bush Hexagon
TRC.209	Terminal Tag
CRA.725	Cable Clip
83681	Base

WASHERS, PINS AND SCREWS

SCX.87	Screw fixing 83681 and 51121, 69160	SCX.1087	Screw fixing 60008, 83048, 51121	Nut 9/5	Nut for SCX/87
SCX.1044	,, TRC.209	SCX.2045	,, 83041, CRA.725	SCX.58	Screw fixing 83072, 83075 to Soundhead Casting
		SCX.2087	,, 83077		

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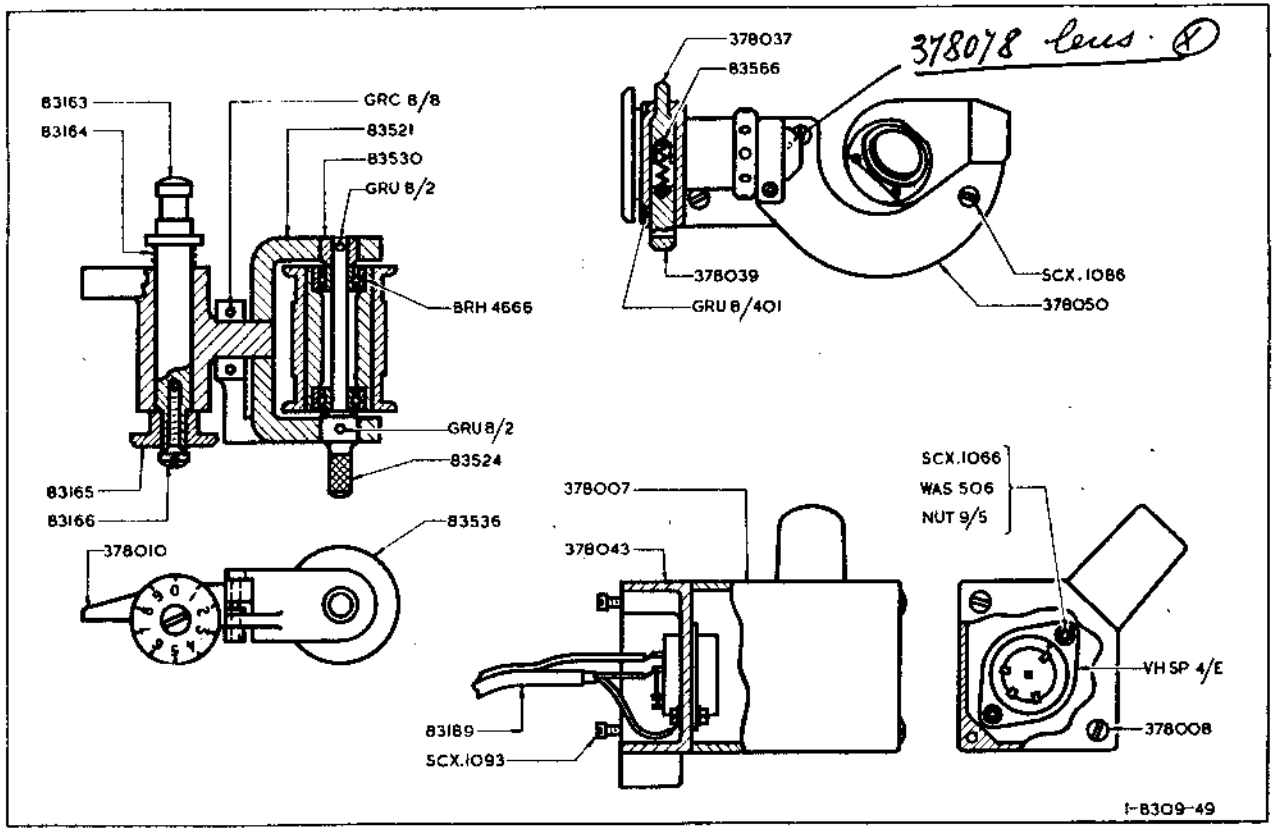
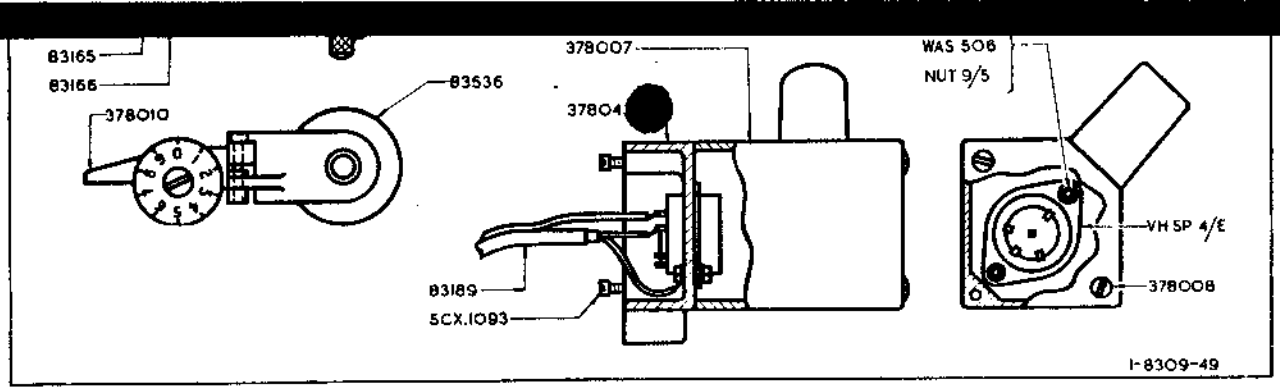
ASSEMBLY OF LAYON ROLLER: OPTICAL UNIT, AND P.E. CELL DETAILS FOR 378 AND 543 SOUNDHEADS



⊗ 378078 lens —

PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
378050	Complete Optical Unit	83524	Spindle	378037	Plunger
83163	Pivot Spindle	83530	Locating Collar	378039	Spring Plug



⊗ 378078 lens —

PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
378050	Complete Optical Unit	83524	Spindle	378037	Plunger
83163	Pivot Spindle	83530	Locating Collar	378039	Spring Plug
83164	Spring	83536	Lay-on Roller	378043	P.E. Cell Holder Assembly
83165	Adjusting Knob	83566	Plunger Spring	BRH.4666	Ball Race
83166	Locking Screw	378007	P.E. Cell Cover	VH.SP4/E	P.E. Cell Holder
83189	Cell Cable Form	378008	P.E. Cell Cover Fixing Screws		
83521	Lay-on Roller Arm	378010	Bearing Arm		

WASHERS, PINS AND SCREWS

GRU.8/2	Screw fixing	83530 and 83524	SCX.1066	Screw fixing	VHSP 4/E	NUT.9/5	Nut for	SCX.1066
GRC.8/8	,,	378010 and 83521	SCX.1086	,,	378050			
GRU.8/401	,,	378039	SCX.1093	,,	378043	WAS.506	Washer for	SCX.1066

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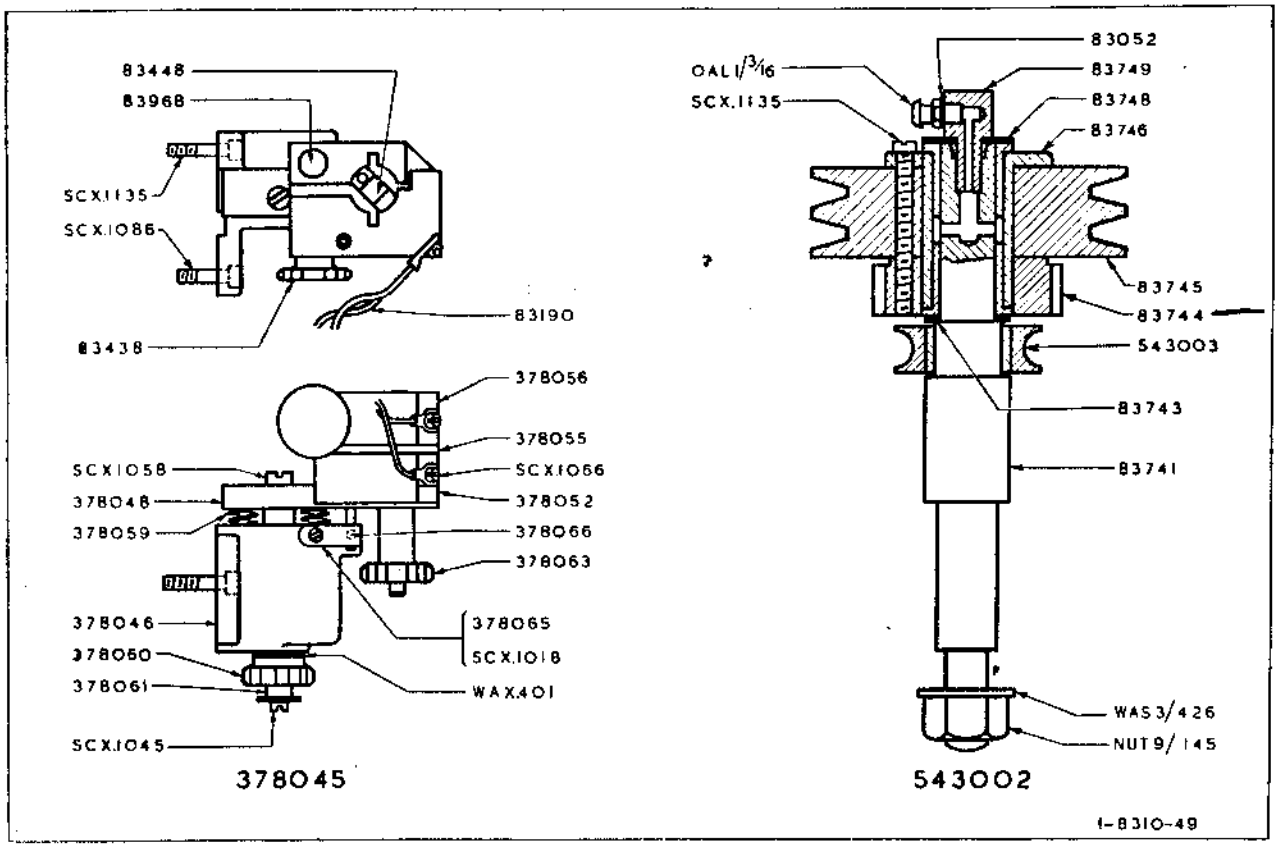
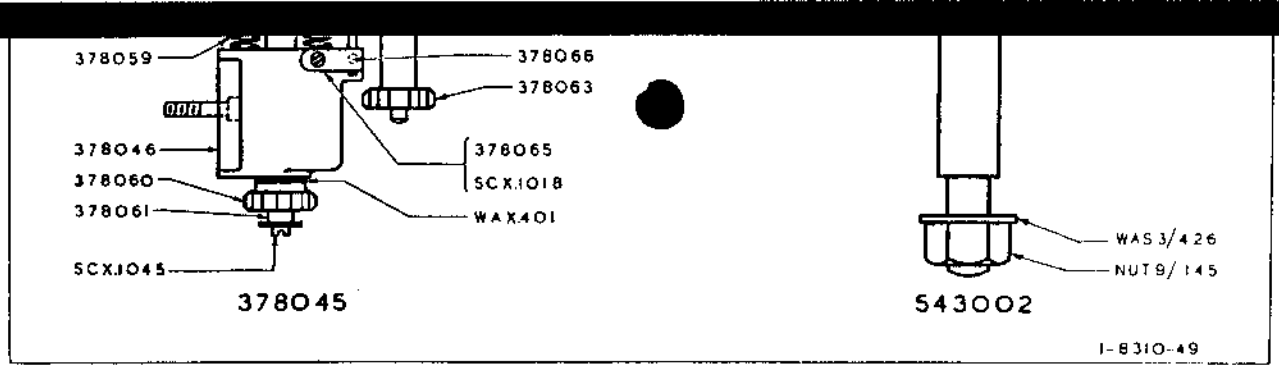
EXCITER LAMPHOLDER ASSEMBLY FOR 378 AND 543 SOUNDHEADS



PART No.	DESCRIPTION
378045	Exciter Lampholder Complete
83190	Exciter Lamp Cable Form
83438	Lamp Clamping Screw
83448	Contact Assembly
83968	Nut
378046	Lamp Bracket

PART No.	DESCRIPTION
378048	Slide Assembly
378052	Saddle Assembly
378055	Insulator
378056	Clamp Assembly
389059	Spring
378060	Adjusting Nut

PART No.	DESCRIPTION
378061	Vertical Adjusting Spindle
378063	Saddle Clamp Nut
378065	Spring (Flat)
378066	Pin



PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
378045	Exciter Lampholder Complete	378048	Slide Assembly	378061	Vertical Adjusting Spindle
83190	Exciter Lamp Cable Form	378052	Saddle Assembly	378063	Saddle Clamp Nut
83438	Lamp Clamping Screw	378055	Insulator	378065	Spring (Flat)
83448	Contact Assembly	378056	Clamp Assembly	378066	Pin
83968	Nut	389059	Spring		
378046	Lamp Bracket	378060	Adjusting Nut		

WASHERS, PINS AND SCREWS

SCX.1018	Screw fixing	378065	SCX.1066	Screw fixing	83190		
SCX.1045	,,	378060	SCX.1086	,,	378045		
SCX.1068	,,	378061	SCX.1135	,,	378045	WAS.401	Washer for 378060

LAYSHAFT ASSEMBLY FOR 543 SOUNDHEAD

543002	Layshaft Assembly Complete	83744	Main Drive Pinion	83749	Retaining Screw
83052	Leather Washer	83745	Main Drive Pulley	543003	Idler Pulley
83741	Layshaft	83746	Pulley Sleeve		
83743	Thrust Washer (Inner)	83748	Washer, Outer	OAL1/3-16"	Oiler Rotherham

WASHERS, PINS AND SCREWS

SCX.1135	Screw fixing	83746	Nut 9/145	Nut for	83741	WAX.3/426	Washers for 83741

x 83744 x 33089 = 83995 for the set

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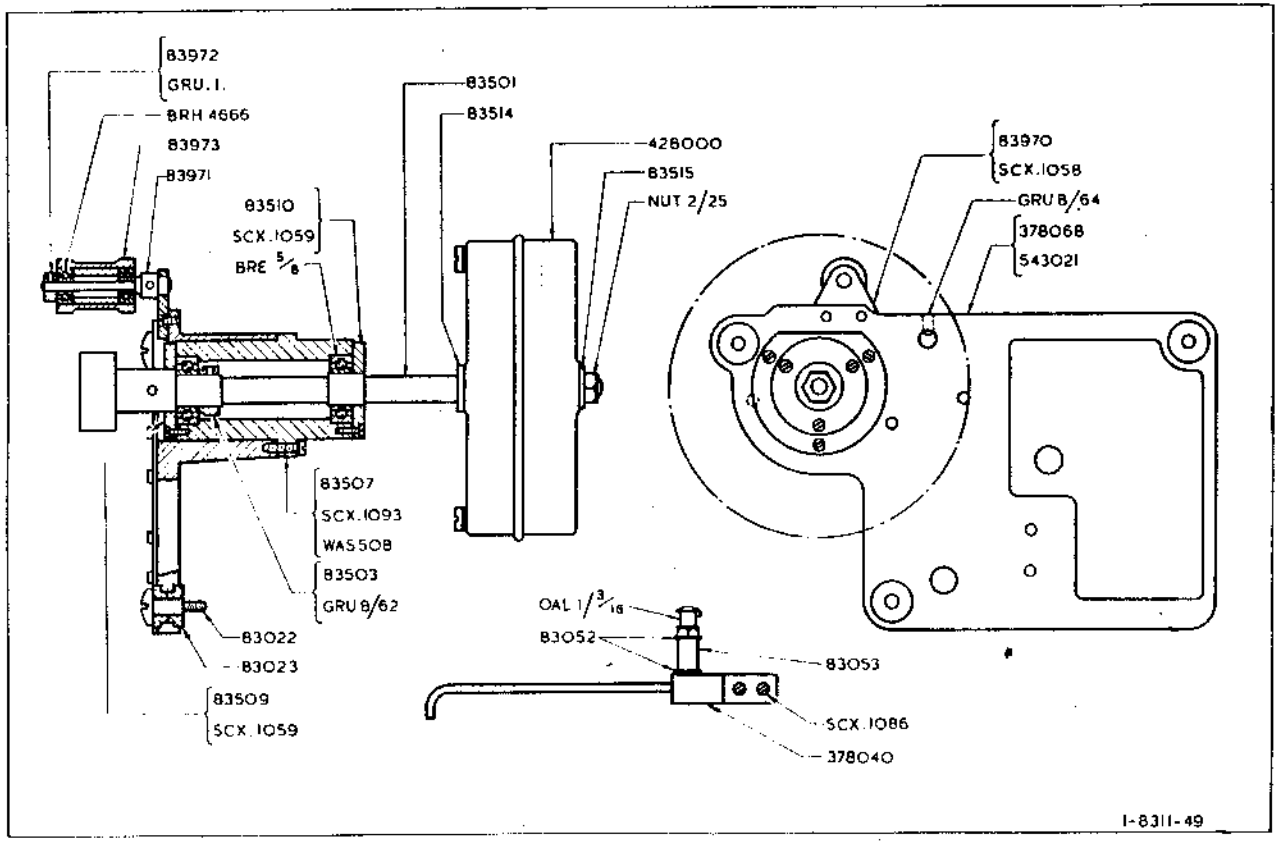
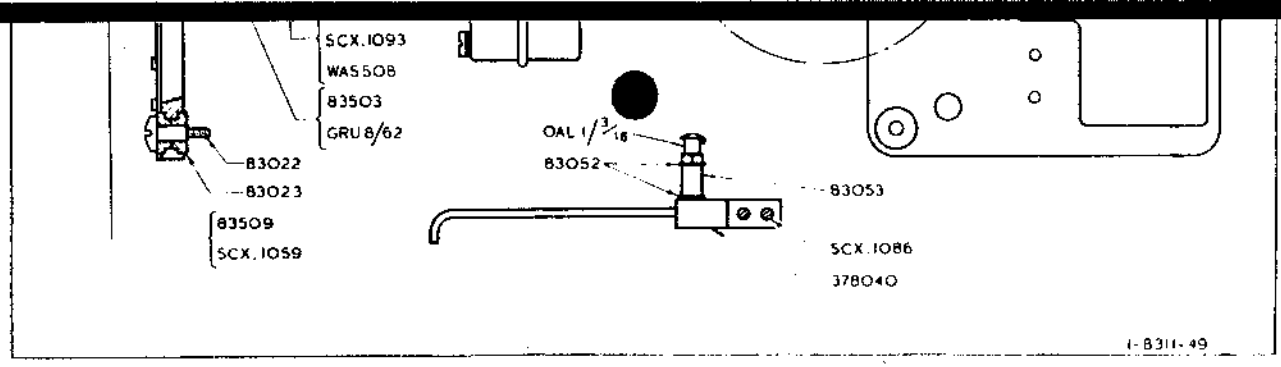
FLYWHEEL SHAFT AND HOUSING ASSEMBLY AND SCANNING UNIT DETAILS FOR 378 AND 543 SOUNDHEADS



PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION
83022	Mounting Screw	83509	Bearing Cover Plate	83973	Guide Roller
83023	Mounting Cushion	83510	Bearing Cover Plate	378040	Oil Pipe Assembly
83052	Leather Washer	83514	Flywheel Shaft Collar	378068	Scanning Unit Casting for 378
83053	Oiler Mounting	83515	Flywheel Shaft Washer	428000	Flywheel Assembly
		83970	Mounting Plate for Guide	543021	Scanning Unit Casting for 543



PART No.	DESCRIPTION
83022	Mounting Screw
83023	Mounting Cushion
83052	Leather Washer
83053	Oiler Mounting
83501	Flywheel Roller and Shaft Assembly
83503	Locking Collar
83507	Flywheel Shaft Housing

PART No.	DESCRIPTION
83509	Bearing Cover Plate
83510	Bearing Cover Plate
83514	Flywheel Shaft Collar
83515	Flywheel Shaft Washer
83970	Mounting Plate for Guide Roller
83971	Spindle for Guide Roller
83972	Collar for Guide Roller

PART No.	DESCRIPTION
83973	Guide Roller
378040	Oil Pipe Assembly
378068	Scanning Unit Casting for 378
428000	Flywheel Assembly
543021	Scanning Unit Casting for 543
OAL1/3-16"	Oiler Rotherham
BRE.5/8"	Ball Race
BRH.4666	Ball Race

WASHERS, PINS AND SCREWS

GRU.1	Screw fixing	83972
GRU.8/62	,,	83503
GRU.8/64	,,	83163
SCX.1058	Screw fixing	83970
SCX.1059	,,	83509 and 83510
SCX.1086	,,	378040
SCX.1093	Screw fixing	83507
Nut 2/25	Nut for	83501
WAS.508	Washer for	83507

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A GAUMONT-KALEE PRODUCT

by

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