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Regulations
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EXAMINATION OF BREECH MECHANISMS

GENERAL INSTRUCTIONS

1. The greatest care must be taken at all times to maintain breech mechanisms in the highest state of efficiency. Accidents, more or less serious, have almost invariably been traced to neglect in this respect.

2. All breech mechanisms and spare parts must be tested to see that they work correctly. Should any defect be brought to notice, it must be traced to its source. Any fitting or part in which a crack or flaw is observed must be exchanged.

3. Burrs may be removed by punching back and careful filing, but on no account must any portion of the component be cut away.

4. The stud or studs on the rear face of breech screws must be carefully examined, and if cracked the screw must be provisionally condemned. The existence of a crack, however fine, may be detected by slightly oiling the stud round its junction with the flange of the screw and giving it a smart tap; if there is a crack, a line of oil will delineate it.

5. The flanges on the rear of B.L. 9.2-in. Mks. X, Xv and X* breech screws must be examined for cracks, and any breech screw found to be cracked condemned.

6. Axial vents will be examined at each examination of a gun, or its fittings, for cracks and for undue wear in connection with the thrust collars or threads of the slide box. The tube chambers of vents taking vent sealing or percussion S.A. cartridge tubes will be gauged; for this purpose "Gauges, vent tube chamber" are supplied. Before the gauges are applied the "Rimer, vent, axial," will be used to remove any light obstruction, such as powder residue, in the tube chamber.

7. In the event of a tight tube, portion of tube or any hard obstruction remaining in the tube chamber, the "Borers, tube chamber" must be used, the one with the pointed end being used first, and then the one with the square end, great care being exercised in using them to avoid cutting away any portion of the tube chamber.

8. A gutta-percha impression will be taken of the tube chamber; if this shows scoring of more than 0.005-in. in depth, the vent must be condemned.

9. The fire channel of the vent must be examined to see that it is clear, and any obstructions removed by use of the "Bit, vent."

PARTS TO BE EXAMINED FOR WEAR

10. Special points in connection with the examination for wear of the following types of mechanisms will be found in the subjoined Table :—

Type of mechanism and ordnance concerned.	Parts to be examined for wear.
<i>Ring carrier (controlled)</i> ..	Hinge joints; ball bearings; bearing washers; teeth of pinions; cam grooves; horns on carrier; clips; threads on breech screw; recesses for clips; catches and latches retaining. Thrust rings on, and tube chambers in axial vents.
B.L. 18-in. howitzer, Mk. I.	
" 12-in. howitzer, Mks. III and V.	
" 9.2-in., Mk. IX.	
<i>Arm carrier (controlled)</i> ..	Hinge joints; ball bearings; teeth of pinion; breech mechanism levers; actuating links; recess for latches and catches retaining; threads on breech screws; flanges; actuating stud; carrier pintle; rotating cams; control arcs; crankshaft bearing; crossheads; axial vent thrust collar; axial vent; keys on carrier pintle and keyways in axial vent on all mechanisms fitted with P.K. percussion lock and Y slide box.
B.L. 14-in., Mk. VI.	
<i>Arm carrier</i>	
B.L. 12-in. howitzer, Mks. IIIA, IV, IVA, VA and VI.	
" 9.2-in., Mk. XV.	
" 9.2-in., Mks. XIII, XIII* and XIII A.	
" 9.2-in., Mks. X, XV and X*.	
" 9.2-in. howitzer, Mks. I, II and IIA.	
" 8-in. howitzer, Mk. VIII.	
" 6-in. 26-cwt. howitzer, Mk. I.	
" 6-in., Mks. XIX and XXI.	
" 6-in., Mk. XXIV.	
" 6-in., Mks. VII, VIIv and VII*.	
" 5.5-in., Mk. III.	
" 5-in., Mk. VIII.	
" 60-pr., Mks. I to I**.	
" 60-pr., Mks. II and II*.	
" 4.5-in., Mks. I, I* and II.	
<i>Arm carrier</i> ..	Hinge joints; bearing washers; pintle on carriers; thrust collars for striker retaining nut; holes for safety stop; breech mechanism levers; extractors; actuating plates; threads on breech screws; flanges; actuating studs; recesses for catches retaining; retaining catch plungers; striker heads, strikers and parts of (needle nut, threads at end of needle spindles); triggers.
Q.F. 6-in., B, Mk. II.	
" 4.7-in., B, Mk. IV.	
" 3-in. 20-cwt., Mks. III, III* and IIIA.	
" 12-pr. 12-cwt., Mks. I to IV.	

Type of mechanism and ordnance concerned.	Parts to be examined for wear.
<i>Arm carrier</i> (Continuous thread in carrier) Q.F. 18-pr., Mk. I to II*. „ 13-pr., Mk. I to III. „ 3.7-in. howitzer, Mk. I.	Hinge joints; threads on breech screws; threads in carriers; cam on end of firing levers; tripping pieces; keys on triggers, Part I; keyways on triggers, Part II (cock notch on strikers; triggers; trigger sears (3.7-in. howitzer)); retaining catches hard steel pieces; breech mechanism levers.
<i>Arm carrier</i> Q.F. 25-pr., Mk. I „ 18-pr., Mk. IV, IVA and IVB	Hinge joint; pintle on carrier; threads on breech screw; actuating stud flange; rotating cam; cam on end of firing lever; tripping piece; key on trigger, Part I; keyway on trigger, Part II.
<i>Falling block—</i> Q.F. 25-pr., Mk. II	Crank; actuating shaft; rollers; striker case; sear; trigger; roller paths and buffer spring.
Q.F. Hotchkiss, 6-pr. Guns, sub-calibre, Q.F. 6-pr., Mk. I. Guns, sub-calibre, Q.F. 3-pr., Mk. I, I*, III, V and VII.	} Crank roller; roller path in wedge; firing hammer; rocking shaft; and trigger sear.
Q.F. 3-pr. 2-cwt., Mk. I	Stud of breech mechanism lever arm and groove for same in gun.
<i>Falling block, semi-automatic</i> Q.F. 3-in. 20-cwt., Mk. I, I*, I**, I***, IA and IB. „ 3-in. howitzer, Mk. I. „ 6-pr. 10-cwt., Mk. I. „ 6-pr. 7-cwt., Mk. I. „ 2-pr., Mk. IX and X.	Crank; trigger sear; striker. Also breech block grooves for crank; firing spindle; actuating spindle; spring case; buffer block and spring of Q.F. 3-in. 20-cwt. Also rack and rack pinion; breech block actuating spring; actuating shaft of Q.F. 3-in. howitzer Mk. I, Q.F. 6-pr. 10-cwt. Mk. I and Q.F. 2-pr. Mk. IX and X.
<i>Sliding block</i> Q.F. 4.5-in. howitzer, Mk. I and II.	Breech mechanism lever and retaining catch hinge pin; cam plate; cam groove in breech block; stud for cam plate. Firing lever (recess and pawl); firing lever actuating pin; trigger bolt; striker.
<i>Sliding block</i> Q.F. 3.7-in. mortar, Mk. I.	Recess for breech mechanism lever retaining catch; spigot of crank; holes in breech block actuating link; breech block actuating link axis pin; holes in lug on breech block for actuating link; striker; trigger sear; firing lever; striker case.

Type of mechanism and ordnance concerned.	Parts to be examined for wear.
<i>Sliding block, semi-automatic</i> ..	Rack and pinion rack and extractors.
Q.F. 4.5-in., Mk. II.	Also crank and engaging surfaces of trigger sear of Q.F. 3-pr. 2-cwt. Mk. II.
„ 3.7-in., Mks. I to III.	Also breech mechanism lever retaining catch; breech block open retaining catch; sliding block; cocking and retracting levers; cocking, firing and retracting cranks; striker sear; striker; firing case; breech block buffer and stop and roller path in breech block of Q.F. 4.5-in. Mk. II, and 3.7-in. Mks. I to III.
<i>Automatic—</i>	
Q.F. 40-mm., Mk. I	Top and bottom lugs on breech block which contact with extractor; extractor; bearing surface of outer cocking lever; inner cocking lever; cam portion of cranks; striker; crank-shaft roller; toe of outer cranks; check plunger.
„ 2-pr., Mk. VIII	Extractor horns; extractor actuating lever; tumbler; trigger sear lever; trigger sear safety sear; striker; bent on lock frame; feed pawls; feed lever and tripper.

11. Special points for examination for wear on locks and slide boxes :—

Lock and box, slide.	Nature of gun or howitzer suitable for—	Points to be examined.
Lock, electric, special	B.L. 18-in. howitzer, Mk. I	Firing hole bush; extractor tripper; needle.
Box, slide, special ..	„ „	Recess on rear face for needle withdrawing lever; extractor.
Lock, percussion, special	„ „	Firing hole bush; firing pin; extractor tripper; trigger; end of cocking handle engaging trigger.
Box, slide, special ...	„ „	Recess on rear face for cocking lever; extractor.
Lock, electric, E.E.1 ..	B.L. 14-in. gun, Mk. VI	Firing hole bush; toe pieces and tripping piece.
Box, slide, G.1 ..	„ „	Slides (safety and cocking); extractor; actuating collar.
Lock, percussion, P.D.	„ „	Firing hole bush; trigger; extractor actuating plate; toe piece; tripping piece; cocking notch; lug on sheath; firing pin.
Box, slide, G.1 ..	„ „	Slides (safety and cocking); extractor; actuating collar.

Lock and box, slide.	Nature of gun or howitzer suitable for—	Points to be examined.
Lock, percussion, P.G.	B.L. 9·2-in. gun, Mks. XIII, XIII* and XIII A	Firing hole bush ; trigger ; extractor actuating plate ; toe piece ; tripping piece ; cocking notch ; lug on sheath ; firing pin.
Box, slide, special ..	„ „	Extractor lever ; actuating collar ; safety slides.
Lock, electric and percussion, E.	B.L. 9·2-in. gun, Mks. X, Xv and X*	Firing hole bush ; trigger ; extractor actuating plate ; firing pin ; cocking notch ; toe piece ; tripping piece and lug on sheath.
Box, slide, A ..	„ „	Safety slides ; extractor lever ; actuating collar.
Lock, electric, special	B.L. 9·2-in. gun, Mk. IX	Firing hole bush ; serrated cutters ; upper contact actuating link ; punch and ivory washer.
Box, slide, special ..	„ „	Recess and projection on rear face engaging actuating lever.
Lock, percussion, special	„ „	Firing hole bush ; lug for safety plunger ; lug for cocking cam and cocking notch on striker ; recess in safety plunger ; actuating lever for upper contact ; extractor ; firing pin.
Box, slide, special ..	„ „	Recess and projection on rear face engaging actuating lever.
Lock, electric and percussion, special	B.L. 6-in. gun, Mk. XXI	Cocking notch on needle withdrawing sleeve ; guide bolt withdrawing lever ; trigger ; tripper firing pin ; trigger lever ; actuating plunger.
Box, slide, S. ..	„ „	Recess in rear face engaging tripping piece ; extractor.
Lock, electric and percussion, F.	B.L. 6-in gun, Mks. VII, VIIv and VII*	Firing hole bush ; trigger ; extractor actuating plate ; firing pin ; cocking notch ; toe piece ; tripping piece and lug on sheath.
Box, slide, A. ..	„ „	Safety slides ; extractor lever actuating collar.
Lock, percussion, P.H.	B.L. 9·2-in. howitzer, Mks. I and II	Projection on lock actuating lever ; front face engaging extractor ; firing pin.
	B.L. 8-in. howitzer, Mk. VIII	
	B.L. 6-in. 26-cwt. howitzer, Mk. I	
Box, slide, V.	B.L. 60-pr., Mks. I to I**	Recess in rear face engaging actuating lever ; extractor.

Lock and box, slide.	Nature of gun or howitzer suitable for—	Points to be examined.
Lock, percussion, P.J.	B.L. 6-in. gun, Mk. XIX	Projection on lock actuating lever; front face engaging extractor; firing pin.
Box, slide, W.	B.L. 60-pr., Mks. II and II* B.L. 4.5-in., Mks. I and I*	Recess in rear face engaging actuating lever; extractor.
Lock, percussion, P.K.	B.L. 12-in. howitzer, Mks. III, IIIA, IV, IVA, V, VA and VI B.L. 9.2-in. howitzer, Mks. II and IIA B.L. 8-in. howitzer, Mk. VIII	Firing hole bush; striker; trigger sear; projections on lock actuating lever; projection on front face of lock actuating extractor.
Box, slide, Y.	B.L. 6-in. 26-cwt. howitzer, Mk. I B.L. 60-pr., Mks. I to I**	Extractor and axis pin; slide box securing screws.
Lock, percussion, P.L., Mk. I	B.L. 5.5-in., Mk. III B.L. 5-in., Mk. VIII B.L. 4.5-in., Mk. II	Ribs on frame for excessive wear; pawl; sear; main spring; striker; sleeve; trigger and extractor tripper.
Box, slide, A.C.		Roller path for sleeve rollers; extractor; extractor axis pin; lock bearing surfaces for excessive wear.
Lock, percussion, P.L., Mk. II	B.L. 9.2-in., Mk. XV	Ribs on frame for excessive wear; pawl; sear; main spring; striker; sleeve; trigger and extractor tripper.
Lock, electric, E.N. . .	„ „	Needle; insulating washer; and bush.
Box, slide, A.D. . .	„ „	Roller path for striker; sleeve rollers; extractor; extractor axis pin; lock bearing surfaces for excessive wear.
Lock, electric, E.N. . .	B.L. 6-in., Mk. XXIV	Needle; insulating washer; and bush.
Lock, percussion, P.M.	„ „	Ribs on frame for excessive wear; pawl; sear; main spring; striker; sleeve; trigger and extractor tripper.
Box, slide, A.D. . .	„ „	Roller path for striker; sleeve rollers; extractor; extractor axis pin; lock bearing surfaces for excessive wear.

Note.—The guide engaging with slide box on all natures of locks, and the guides engaging with locks on all natures of slide boxes must be carefully watched for wear.

The “special” locks and slide boxes are stamped with the nature of ordnance with which they are used.

SPECIAL POINTS OF EXAMINATION AND REMARKS ON VARIOUS NATURES

B.L. 12-IN. HOWITZER, MKS. III, IIIA, IV, IVA, V, VA AND VI ;
9·2-IN. HOWITZER, MKS. II AND IIA ; 8-IN. HOWITZER,
Mk. VIII ; AND 6-IN. 26-CWT. HOWITZER, Mk. I, WITH
P.K. PERCUSSION LOCK AND Y SLIDE BOX.

12. With the breech closed properly there should be a minimum clearance of 0·04-in. and a maximum of 0·1-in. between the finger of the actuating lever and safety shutter. Any adjustments necessary must be carried out on the stop of the safety shutter. If its minimum clearance cannot be obtained the following procedure will be followed :—

- (a) Examine the axial vent and if repaired with a No. 4 vent head ascertain whether it is in correct position in relation to the keyways in axial vent.
- (b) Examine for wear in keyways in axial vent and keys on carrier pintle.

Q.F. 6-IN. B, 4·7-IN. B AND 12-PR. 12-CWT.

13. These natures are specially liable to set back of the threads in the breech opening and forward set of the threads on the breech screw, which is probably due to the conical shape of the breech screw and breech opening. This defect, in conjunction with wear on the threads, quickly causes a space to develop between the cartridge case and the breech screw.

14. Wear occurs in the carrier hinge ; this, if not excessive, can be rectified by replacement of the bearing washer and hinge bolt ; bad cases, however, necessitate repair to hinge lugs of gun or carrier.

15. The extractor must be examined for efficiency of action ; wear occurs on the end of the actuating plate, and also on the bolt where it engages the cartridge case.

16. The breech screw fixing screw and cannellure in carrier are liable to wear.

17. The thrust collars in the carrier, for reception of the striker retaining nut, the hole for reception of the safety stop, holes in link and breech mechanism lever, if badly worn, can be repaired by bushing.

18. Particular attention must be given to the striker ; insulating bushes and washers should be intact. The bronze assembling nut, or cocking handle on the sheath, must be secured firmly by a split pin, and the two nuts on the rear end of the needle must be tightly screwed up. Insulation of the striker must be tested.

19. The breech screw retaining catch must be examined for efficiency in conjunction with the hard steel piece of the carrier ; also the breech mechanism lever retaining catch.

20. Action must be taken to ensure that the various locking plates and fixing screws are in position.

Q.F. 4.5-IN. HOWITZER, MKS. I AND II

21. The breech mechanism lever must be examined to see that the catch is functioning correctly and efficiently engaging the recess in the top of the breech. If the catch is inefficient, and the replacement of the worn catch or spring does not suffice, the Mk. I levers must be exchanged for Mk. II levers, which are fitted with a stronger spring of spiral pattern. If the recess in the breech for the retaining catch of the breech mechanism lever is worn, it can be repaired by the insertion of a steel repair piece.

22. The cam plate on the breech mechanism lever wears in conjunction with the cam grooves of the breech block. This affects the throw of the breech block and is the main cause of eccentricity of striker. Wear of the hinge pin for breech mechanism lever and hole for hinge pin in gun and lever, wear of hole in cam plate and on stud for cam plate also affect the concentricity of the striker. Mk. II cam plates made of phosphor bronze have been introduced to minimize wear on the spigot of the breech mechanism lever and in the cam groove of the breech block, also, as far as is practicable, to confine the wear to the cam plate. The Mk. I steel cam plates will, however, only be replaced as they become unserviceable. Where possible, defects will be overcome by replacing worn parts from spare, and if necessary the cam groove of the breech block can be repaired. Breech mechanism levers in which the axis pin hole in the arm of the lever has become worn can be repaired by bushing, and in cases where the spigot for reception of the cam plate is worn it can be repaired by restoring the spigot by the insertion of a stud.

23. Firing lever actuating pins get distorted and occasionally fracture in the recess which engages with the trigger bolt, and the trigger bolts wear at the engaging points.

24. Trigger bolts also get distorted on the square head which engages with the trigger ; when unduly worn or distorted they will be replaced.

25. The actuating edge of the pawl on the firing lever becomes worn, as also does the edge of the striker body which engages with the pawl. This defect tends to reduce the compression on the striker main spring on firing, and may lessen the effective blow of the striker. If the efficiency of the striker is affected, the worn parts will be replaced

Q.F. 3.7-IN. HOWITZER, Mk. I

26. Wear occurs in the carrier hinge. This can be rectified by fitting or replacing carrier hinge stud and, if necessary, bushing hole for carrier hinge stud. In the breech mechanism lever wear occurs in the hole for axis pin. This can be rectified by bushing hole or renewing axis pin.

The hard steel piece of the breech screw and the breech screw retaining catch must be examined for wear. Undue slackness on these parts is not desirable. All springs must be examined for efficiency.

Q.F. 3-IN. 20-CWT., MKS. I, I*, I**, I***, IA AND IB

27. This mechanism is designed for semi-automatic fire as well as independent action, and all parts must be kept working smoothly.

28. Semi-automatic closing can be tested as follows:—Set the actuating clutch lever to the semi-automatic position and open the mechanism by means of the No. 95 breech mechanism wrench applied to the breech mechanism actuating lever.

29. The action of opening the breech in this manner puts compression on the breech block spring, and the breech block, when open, is retained by the claws on the extractor arms gripping recesses in the block. On loading an empty cartridge, the breech block, released by the movement of the extractor, closes under the energy stored in the breech block spring. In the event of any sluggishness in closing, the breech block spring can be tightened by means of the No. 96 breech mechanism wrench applied to the box containing the spring.

30. The clutch changing the mechanism from hand to semi-automatic action, or vice versa, must be moved only when the mechanism is fully home in the closed position.

31. Slight wear may be expected on the roller of the crank and the corresponding grooves in the breech block which will affect the concentricity of the striker.

32. The firing spindle, actuating spindle and torsion spring must be examined for efficiency of action.

33. Examination must be made of the trigger sear to see that the friction rollers work freely and are not cracked and that engagement with the striker is satisfactory; also of the actuating plunger and spring for efficiency.

34. The clutch must be overhauled to see that it is working correctly, also the pawl retaining latch and the buffer block and spring.

35. Springs play an important part in this mechanism, and care must be taken to see that all springs are sound and act efficiently.

36. The extractors must be examined for any sign of flaws. See that the extractor claws (hooks) engage the block simultaneously.

Q.F. 18-PR., MKS. I TO II* AND 13-PR., MKS. I TO III

37. Wear occurs in the carrier hinge ; this can be rectified partially by the replacement of the hinge bolt, if worn ; in bad cases, however, it necessitates repair to the hinge lugs of the gun or carrier.

38. Wear also takes place in the breech screw threads and in the threads in the carrier which engage with one another ; this allows the breech screw to drop and foul the entrance of the breech opening of the gun.

39. To overcome this defect the breech screw is chamfered on the leading edge, as is also the entrance of the breech opening. Where necessary, repairs to carriers, by the renewal of the threaded portion for the reception of the breech screw, can be effected by bushing.

40. The projecting toe on the inner end of the firing lever, in conjunction with the tripping piece, also wears ; this tends to lessen the compression on the main spring of the striker when firing. When the blow of the striker is reduced on account of this defect and approaches the condemning limit, the worn parts must be replaced.

41. The key on the trigger, Part I, and keyway of trigger, Part II, become distorted by continual use ; when this defect affects the efficiency of the striker, the defective parts must be replaced.

42. The torsion spring of the trigger is often distorted ; this may occur through carelessness in assembling the collar and bush of the trigger.

43. The hard steel piece of the breech screw and the catch retaining breech screw must be examined for wear. Undue slackness on these parts is not desirable. All springs must be examined for efficiency.

44. By constant firing the striker rebound block sets up a burr on the interior of the breech screw which prevents free action of the striker ; these burrs must be removed by means of the " Rimer, breech screw."

Q.F. 25-PR., Mk. I AND 18-PR., MKS. IV, IVA AND IVB

45. The notes on 18-pr. Mks. I to II* mechanisms with reference to wear of the hinge, wear of the firing lever and tripping piece, burrs on the interior of the breech screw and wear and distortion of the trigger are also applicable to 18-pr. Mk. IV mechanisms.

46. In addition the following parts are liable to wear. The upper and end faces of the control arc, in conjunction with the toe of the breech mechanism lever, wear; and this allows a slight turning movement of the breech screw before entering the breech opening, also finally allowing the breech screw to revolve before the mechanism has swung sufficiently close to the breech face, thus causing abnormal wear on the rotating cam and burring the leading threads of breech screw and breech opening.

47. The striker must be kept working freely. A bad hang-up of the striker will, on the breech being opened, cause damage to the groove in the breech screw and to the safety lug on the striker, which normally engage each other when the breech screw starts unlocking.

Q.F. 25-PR., Mk. II

48. Excessive movement between the actuating shaft and crank and wear on crank roller, crank roller axis pin and roller path on breech block will cause lost motion of the breech block and may account for eccentricity or failure of striker. Wear may also occur on the roller and axis pin of the intermediate cocking lever, the roller path of the crank, the engaging surfaces of the intermediate cocking lever and cocking lever together with their respective axis pins which may cause the trigger sear to fail to engage the cocking sleeve.

49. The extractor levers must be examined for wear on hooks, flaws and distortion.

50. When the mechanism is assembled in the gun both extractor levers should engage the breech block simultaneously.

Q.F. 6-PR. HOTCHKISS, 6-PR. SUB-CALIBRE AND 3-PR. GUNS
CONVERTED TO SUB-CALIBRE

51. An essential part that wears in these mechanisms is the groove in the wedge, which, in conjunction with wear on the roller of the crank, lessens the lift of the wedge and consequently affects the concentricity of the striker.

52. Wear of the crank axis and the corresponding bearing in the gun also bring about the above defect.

53. It must be seen that the roller on the crank is not cracked and is free to revolve.

54. The firing hammer must be examined for correctness of fit in conjunction with the rocking shaft, and also for correct engagement between the cock notch of the hammer and the lip of the trigger sear.

55. The arm of the rocking shaft and the cocking cam on the crank handle are liable to wear, also the axis of the rocking shaft and the bearings in the breech block. The screw stop wedge must be examined for cracks, bending and burrs, and for accuracy of fit in the gun.

Q.F. 3·7-IN. MORTAR, MK. I

56. Excessive movement between the breech mechanism lever, actuating shaft and the crank, and wear on crank spigot holes in actuating link, axis pins and holes in lug on breech block, will affect the throw of the breech block and may cause—

- (a) When opening the breech, the failure of the extractor levers to engage the breech block.
- (b) When breech is closed, eccentricity and failure of striker.
- (c) The accidental opening of the breech block.

57. The extractor levers must be examined for flaws, distortion and for wear on the hooks.

58. When the mechanism is assembled in the mortar both extractor levers should engage the breech block simultaneously.

Q.F. 4·5-IN., MK. II AND 3·7-IN., MKS. I, II AND III

59. Owing to the heavy nature of these mechanisms the surfaces of the breech block which engage the opening of the breech ring are liable to score; an indication that this is about to occur is sluggish movement of the breech mechanism. Care must therefore be taken to ensure that the lubricating passages are clear of any obstruction and no lubricant other than Achesons' EP/L oil must be used on the breech block.

60. In order to ensure correct movement of the mechanisms, the following points must be examined for excessive wear: Rollers and axis pins of the firing lever and plunger rollers of the retracting and cocking cranks, and to the sliding block, which must also be examined for fracture.

61. There must be no excessive movement between the dogs of the retracting and cocking cranks and the corresponding dogs of the cocking lever.

62. The extractors must be examined for flaws and distortion.

Q.F. 3-IN. HOWITZER, Mk. I ; 6-PR. 10-CWT., Mk. I ; 6-PR. 7-CWT., Mk. I ; 3-PR. 2-CWT., Mk. II and 2-PR., Mk. IX AND X

63. Should there be excessive movement between the crank and actuating shaft or wear between the engaging surfaces of the crank and breech block, lost movement will occur in the breech block and may cause eccentricity or failure of the striker.

64. With this type of mechanism the extractor levers retain the breech block in the open position, therefore they must be examined for wear in the hooks and for flaws and distortion.

65. When the mechanism is assembled in the gun both extractor levers should engage the breech block simultaneously.

Q.F. 40-MM., Mk. I

66. Because of the rapid movement of this mechanism, it is essential that parts which on examination show excessive wear be replaced.

67. There must be no excessive movement between the crank and crankshaft.

68. Extractor levers are subjected to a large amount of wear ; they are issued in matched pairs and should defects be found in one lever, both must be exchanged.

69. Wear may be expected on the engaging surfaces of the left inner crank and the cocking lever check plunger.

70. Assembly arrows are engraved on the striker spring cover and the breech block. Incorrect assembly may result in a broken outer cocking lever and other damage.

Q.F. 2-PR., Mk. VIII

71. This gun being wholly automatic, it is essential, in order to avoid stoppages, that working parts of the lock be exchanged on showing excessive wear. Stoppages may be caused by the following :—back extraction due to wear on engaging surfaces of extractor and actuating levers ; vertical grooves in extractor and guide in lock frame ; horns, extractor guides and extractor guide cams on the side plates ; and to the gibs and snibs which retain the cartridge in position when the lock is in recoil. Wear on rollers of lock frame will cause the lock to be unsteady when in motion and may also cause a stoppage.

72. Wear may also be expected on the engaging surfaces of the trigger and upper bent of striker, tumbler and cocking lug, and the safety sear and lower bent of striker.

73. The safety sear spring must function freely and the striker examined for flaws.

STANDARD TESTS FOR MECHANISM

74. To ensure the correctness of mechanisms the following tests must be applied on the annual inspection and before annual practice :—

<i>Nature of test</i>	<i>Applicable to—</i>
(1) Eccentricity of striker . .	} All guns and howitzers.
(2) Protrusion of striker . .	
(3) Clearance between firing hole bush and cartridge in gun.	All Q.F. guns and howitzers.
(4) Effective blow of percussion striker.	Guns and howitzers using percussion locks or strikers.
(5) Safety and efficiency . .	All guns and howitzers using electric locks or strikers.
(6) Gauge, interior recess of firing hole bush.	Q.F. 6-in., 4·7-in. and 12-pr. 12-cwt.
(7) Gauge, vent tube chamber	Guns and howitzers with axial vents.
(8) Main springs and pull-off	Q.F. 6-pr. Hotchkiss, 6-pr. sub-calibre and 3-pr. sub-calibre, Mk. I, I*, III, V and VII.
(9) Test for main spring . .	Q.F. 6-pr. Hotchkiss, 6-pr. sub-calibre and 3-pr. sub-calibre, Mk. I, I*, III, V and VII.

The following gives a description of each test in detail :—

(1) TEST FOR ECCENTRICITY OF STRIKER

75.—(a) To ensure that the needle or striker is concentric with the tube in the vent, or with the primer or tube in a Q.F. cartridge, “gauges, testing, striker eccentricity,” are provided for certain natures.

(b) The gauge consists of a dummy brass tube of the same size as the percussion or electric tube in use with the gun. The head is engraved with cross lines, and is generally stamped with the maker's initials. A recess is provided in the centre of the head to receive a copper plug supplied for the purpose.

(c) For those natures for which no gauge is provided a fired tube or primer can be used. The percussion cap must be removed and the recess filled with soap or beeswax.

(d) For B.L. guns and howitzers the gauge or tube is inserted in the tube chamber of the axial vent; for Q.F. guns and howitzers in the “gauge, clearance, firing hole bush to cartridge,” where this gauge is provided.

76. For Q.F. 6-pr. Hotchkiss, Nordenfelt and Q.F. 6-pr. and 3-pr. sub-calibre and Q.F. 3-pr. 2-cwt. guns for which a "gauge, clearance, etc.," is not provided, an empty cartridge case, adapted to take the "gauge, striker eccentricity," must be used (*see* List of Changes in War Material, paras 13692 and A2799).

77. Empty cartridge cases must also be used with adapters of fired primers for all other Q.F. natures when the "gauge, clearance, etc.," is not available, or when the test is carried out by the Royal Artillery as a matter of routine.

78. When the "gauge, clearance, etc.," is employed, care must be taken to see that the arrow mark on the plug corresponds with the zero mark on the gauge body, when the plug is screwed home flush with the surface.

79. When the gauge, tube or primer is inserted, care must be taken to note the position of the maker's initials on the outer edge in relation to the up, down, right or left positions in the gun.

80. The breech will then be closed, and the needle or striker allowed to indent the copper plug, soap or beeswax; the lock or striker being cocked and fired in percussion firing systems.

81. On the breech being re-opened the position of the indent in the copper plug, etc., will denote the amount and direction of eccentricity of the needle or striker.

82. In mechanisms that permit of adjustment to the lock or lock actuating link the necessary alteration must be made to the adjustable bush to bring the needle or striker concentric with the gauge.

83. Where adjustment is not provided for and the eccentricity is found to exceed 0.03-in., further examination must be made to ascertain the portion of the mechanism at fault, and when found steps must be taken to have it repaired or exchanged.

84. A list of parts that must be examined if eccentricity is disclosed is shown in Table 1.

(2) TEST FOR PROTRUSION OF STRIKER

85. This is a test to ensure that sufficient contact is being made between the firing pin, needle or striker and the vent sealing tube or primer.

86. Protrusion is tested by means of the "gauge, striker protrusion," which is applied to the front face of the breech screw, breech block or lock when the striker or needle is as far forward as it will go. Care must be taken that the exterior of the striker or needle and the interior of the breech screw

breech block or lock are clean and free from burrs and that the striker or needle is kept pressed fully home while testing.

87. The gauge consists of a steel plate stamped with the distinguishing number of the gauge and maximum and minimum dimensions.

88. Protrusion limits are laid down for all natures of guns and howitzers, and are shown in Table 2, together with the distinguishing number of the gauge to be applied.

89. If the protrusion is not between the limits laid down, the striker, firing pin or needle, as the case may be, must be adjusted or exchanged.

90. The method of adjustment of needles, strikers or firing pins is shown in Table 3.

91. The methods of gauging the protrusion of the striker, needle or firing pin in the various mechanisms are given in paras. 92 to 109. When it is necessary to operate the mechanism in order to obtain protrusion, the blow must be taken on a wood block.

92. **Ordnance, Q.F. 6-in. B, 4.7-in. B and 12-pr. Guns.**—Swing the mechanism into the loading position, press in the breech screw retaining catch and revolve the screw into the locked position. The striker must then be pulled to the rear, sufficiently to take up any clearance due to wear, and the gauge applied to the front face of the breech screw. It must also be ascertained by inspection that the point of the needle is behind the face of the bush in the breech screw, when the breech is open.

93. **Ordnance, Q.F. 4.5-in. Howitzer.**—Close the breech and remove the cover plate. Open the breech, remove the actuating pin of the firing lever and withdraw the firing lever and striker. Remove the striker guide and main spring, replace the striker (without main spring), pressing it forward as far as it will go, and apply the gauge to the front face of the breech block.

94. **Ordnance, Q.F. 4.5-in., Mk. II ; 3.7-in., Mks. I to III ; 3-in. Howitzer, Mk. I ; 25-pr., Mk. II ; 6-pr. 10-cwt., Mk. I ; 6-pr. 7-cwt., Mk. I ; 2-pr., Mks. IX and X and 40-mm., Mk. I.**—Remove the breech block. See the striker is clean and free from foreign matter. Place the striker in the fired position. Apply striker protrusion gauge to the point of the firing pin and ascertain whether the protrusion is within the limits of the gauge, measured from the face of the breech block. The minimum should foul the firing pin and the maximum should clear.

95. **Ordnance, Q.F. 3.7-in. Howitzer.**—Swing the mechanism into the loading position, press in the breech screw retaining catch and revolve the screw into the locked position. The firing lever must now be pulled to the rear until the striker is in the fired position, and retained, when fully to the rear, whilst the gauge is applied to the front face of the breech screw.

96. **Ordnance, Q.F. 3-in. 20-cwt., Mks. I to I***, IA and IB.**—Remove the breech block from the gun, release the striker by means of the firing spindle, and apply the gauge to the front face of the breech block.

97. **Ordnance, Q.F. 3-in. 20-cwt., Mks. III, III* and IIIA.**—Swing the mechanism into the loading position, press in the breech screw retaining catch and revolve the screw into the locked position. (To prevent an incorrect reading of the protrusion, the breech mechanism lever must not be turned below the horizontal axis.) Release the striker by means of a lanyard on the trigger and apply the gauge to the front face of the breech screw.

98. **Ordnance, Q.F. 18-pr., Mks. I to II* and 13-pr., Mks. I to III.**—Swing the mechanism into the loading position, press in breech screw retaining catch and revolve the screw into the locked position. Remove the striker, take out the main spring, replace the striker (without main spring), pressing it forward as far as it will go, and apply the gauge to the front face of the breech screw.

99. **Ordnance, Q.F. 25-pr., Mk. I, and 18-pr., Mks. IV, IVA and IVB.**—Remove the mechanism from the gun and revolve the breech screw into the locked position. Remove the striker, take out the main spring, replace the striker (without main spring), pressing it forward as far as it will go, and apply the gauge to the front face of the breech screw. If it is not convenient to remove the mechanism from the gun, with the breech closed remove the breech mechanism lever and the striker, then unlock the breech screw by hand, swing the carrier to the loading position, rotate the breech screw by hand to the closed position, replace the striker (without main spring), pressing it forward as far as it will go, and apply the gauge to the front face of the breech screw.

100. **Ordnance, Q.F. Hotchkiss, 6-pr., and Guns, sub-calibre, Q.F. 6-pr. and 3-pr., Mks. I, I*, III, V and VII.**—Remove the wedge from the gun, release trigger sear and apply the gauge to the front face of the wedge.

101. **Ordnance, Q.F. Nordenfelt, 6-pr., and Guns, sub-calibre, Q.F. 3-pr., Mks. II, II* and IV.**—Remove the

breech block and wedge together from the gun, press the breech block into the firing position, release the trigger lever and apply the gauge to the front face of the breech block.

102. **Ordnance, Q.F. 3-pr. 2-cwt., Mk. I.**—Remove the breech block from the gun, revolve the breech mechanism lever to the closed position, fire the mechanism by pressing in the sear and apply the gauge to the front face.

103. **Ordnance, Q.F. 3-pr. 2-cwt., Mk. II.**—Remove the breech block from the gun, insert the striker case, with striker in the fired position, and apply the gauge to the front face.

104. **Ordnance, Q.F. 2-pr., Mk. VIII.**—Remove the mechanism cover and withdraw the lock to the rear, using the rack actuating lever. Remove the lock and see it is clean and free from foreign matter, test it on a bench with the extractor in its correct firing position and the striker fired. The minimum clearance on the gauge should foul and the maximum should clear the point of the striker.

105. **Ordnance, B.L.—Gun Locks (except P.H., P.J., P.K., P.L., Mks. I and II and P.M.).**—Remove the lock from the slide box and force the upper contact, needle or striker through the firing hole as far as it will go, first releasing the trigger in percussion locks, and apply the gauge to the front face of the lock.

106. **Ordnance, B.L.—Lock, Percussion, P.H.**—Remove the lock from the slide box in the following manner: Remove extractor axis pin, press down the plunger retaining catch of the actuating lever and turn the lever to the right, when the lock, together with the extractor, will come away from the slide box. Put the lock to the closed position and apply the thrust plate of the gauge to the rear end of the striker spindle. Press the striker forward as far as it will go and apply the gauge to the front face of the lock.

107. **Ordnance, B.L.—Lock, Percussion, P.J.**—Remove the lock from the slide box in the following manner: Remove the keep pin and cocking cam cover securing pin and withdraw cam and cover. Remove the actuating lever stop screw and turn the lever to the right, when the lock and extractor will come away from the slide box. Put the lock to the closed position, replace the cocking cam, cocking cam cover and securing pin, and apply the gauge to the front face of the lock.

108. **Ordnance, B.L.—Lock, Percussion, P.K.**—Remove the lock from the slide box in the following manner: Remove the extractor axis screw, depress the actuating lever counter clockwise, when the lock will slide out of the slide box. Remove the keep pin, cap, actuating lever and axis pin from the lock.

Hold the lock the reverse way up to which it is used and ensure that the striker lever drops clear of the firing plunger. Press the striker forward and apply the gauge to the front face of the lock.

109. Ordnance, B.L.—Locks, Percussion, P.L., Mks. I and II and P.M.—Remove the lock from the slide box. See the lock is clean and free from foreign matter. Place the striker in the fired position. The minimum clearance on the gauge should foul and the maximum should clear the point of the striker.

(3) TEST FOR CLEARANCE BETWEEN FIRING HOLE BUSH AND CARTRIDGE IN GUN

110. Gauges, measuring, distance between firing hole bush and rear face of cartridge are provided for Q.F. ordnance and are on charge at each station where there is an ordnance mechanical engineer or an inspecting ordnance officer. The gauge consists of a steel body similar in exterior form to the rear end of the cartridge case of the nature of gun concerned. The outer end of the gauge body is engraved with a scale graduated in 20 divisions, and is furnished with a screwed plug, having an indicating arrow marked on the rear end corresponding with the zero mark on the gauge body when the plug is screwed home. When set at zero the gauge represents a cartridge case with high thickness of rim. The graduations on the body represent intervals of 0.0025-in. marked by short lines, and 0.005-in. by longer lines and numbered. The plug is secured in position by means of a securing block and clamping screw.

111. The gauge can also be used as an adapter for gauges, striker eccentricity or testing blow of striker, but when so used the indicating plug must be screwed home with the arrow mark on the plug corresponding with the zero mark on the gauge body.

112. To use the gauge set the indicating plug so as to read slightly larger than the approximate space that exists, the plug being held in the desired position by tightening up the clamping screw. Open the breech mechanism and insert the gauge in the gun; close the mechanism gently, if necessary adjusting the gauge by resetting it until the mechanism can be closed with the firing hole bush in easy contact with the gauge. Remove the gauge, when the amount of clearance can be read by means of the arrow mark on the indicating plug and the graduations on the rear face of the gauge body.

113. Care must be taken when the gauge is being used to ensure that it seats properly in the chamber. Burrs on the surfaces of the rear end of the chamber, a bent or burred

extractor or a firing hole bush which has unscrewed slightly may cause the gauge to register inaccurately, or possibly prevent the breech being closed upon the gauge, even with the indicating plug screwed home to zero.

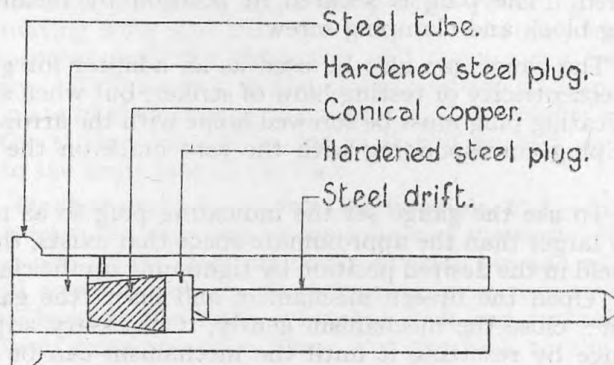
In guns fitted with short chamber liners the latter sometimes develop a rearward movement which may become sufficient to take up all the clearance and render it impossible to close the breech with the gauge, set at zero, in the chamber, in which case the gun must be provisionally condemned.

114. The maximum amount of clearance must not exceed 0.05-in. for 4.5-in. howitzers and 0.03-in. for other natures. When the gun is found to be up to these limits it must be specially examined. The fault may lie in the gun itself, and be due to wear or setting back of the threads in the breech opening, or to the A or inner A tube having moved forward. On the other hand, the threads of the breech screw may be worn or set forward. If the space cannot be reduced to within the authorized limits by fitting a new breech screw, the gun must be provisionally condemned.

(4) TEST FOR EFFECTIVE BLOW OF PERCUSSION STRIKER

115. The gauge consists of a steel body made to the same external dimensions as the service tubes for the various guns and howitzers.

116. It is recessed in the head to receive two small hardened steel plugs with a conical copper between them, as shown in the following drawing :—



117. The hole running through the gauge is for the insertion of a drift to knock out the plugs and copper after taking the blow.

118. The thin plug must always be put in first ; its use is to close the drift hole and to give a fair, flat bearing for the base of the copper.

119. The coppers, as issued, must be correct in length to 0.001-in., but must be measured before use to verify this and to see that they have not been used before.

120. In B.L. guns or howitzers, after placing a copper in the gauge, the latter is placed in the vent like an ordinary tube and the striker snapped on it.

121. In Q.F. guns or howitzers it is placed in the "gauge, clearance, firing hole bush to cartridge." In other natures, such as Hotchkiss, Nordenfelt, sub-calibre and Q.F. 3-pr. 2-cwt. guns, a cartridge case must be bored out and shortened 4-in. to suit. (See List of Changes in War Material, paras. 13692 and A2799.)

122. After snapping, the gauge is removed and the copper and plug gently tapped out with the drift.

123. The copper is again measured with the micrometer, and the decrease in length is obtained. The corresponding blow in in.-lb. is shown in Table 4.

124. The condemning limit for the blows of locks and strikers is shown in Table 5.

125. The gauges require care in use, and before a main spring is condemned for being too weak the following points must be attended to:—

(a) Three blows, using a new copper for each, must be taken with each lock or striker, and the average taken as correct. Owing to slight variations in the quality of the coppers, variations of 4 per cent. in the value of the blow given by different coppers are to be expected at times.

(b) The first blow is sometimes weaker than the succeeding one if the striker point is soft, thereby cushioning the blow, and in that case it must be examined to see if it is flattened or set up.

(c) If the blows given by the same striker are very erratic, it may be due either to the gauge not being fully home in the vent, or in a Q.F. gun to the case not being home in the chamber, some of the blow being therefore expended in driving the gauge or case home.

(d) Dirt, rust or obstruction in some parts of the locks may prevent the free movement of the striker, and so cause a low result. The thicker hardened steel plug may after considerable use become set up on its outer face and then fail to slide freely in the body of the gauge. The high places must then be carefully ground off its circumference and its free movement in the gauge restored.

- (e) The condition of a lock or striker is an important factor towards obtaining the actual blow that a spring will give. Any defect that prevents the free movement of the sheath or moving parts of the lock or striker would result in a weak blow being obtained.
- (f) Wear between slide box and lock, or between slide box and the thrust collars or threads on the axial vent, will tend to affect the blow obtained, and the condition of these parts must be taken into consideration when sentencing a lock or striker.
- (g) Constant testing is liable to flatten gradually the point of the firing pin; if this occurs the pin must be changed. For this reason the strikers or firing pins must not be subjected to repeated testing, and the number of blows as at (a) must not be exceeded at any one test.

(5) TEST FOR SAFETY AND EFFICIENCY

126. To make sure that the electric current is correct, the circuit complete and that there is no short circuit, while at the same time the safety conditions are fulfilled, and there is no delay in firing, the following test may be conveniently applied to all guns with single motion mechanism fired electrically, viz. :—

- (a) See that the ground is clear in front of the muzzle.
- (b) In B.L. guns place an electric tube in the vent.
- (c) In Q.F. guns load empty cartridge case with electric tube in adapter.
- (d) Keep the trigger or firing lever firmly pressed. Then close the mechanism until the breech screw is locked but the breech mechanism is not quite home.
- (e) With continuous motion mechanisms the hand wheel would be turned until the last motion of the link is about to be given.
- (f) At this point the gun should not fire.
- (g) On finally closing the breech mechanism lever or turning the hand wheel, and thus giving the final motion to the lock in B.L. guns, or turn to the safety stop in Q.F. guns, the gun should fire without delay.

127. In the event of missfires, these may be due to a fault shown up by the other tests or to short circuiting.

- (a) If short circuiting is suspected, the insulation of the lock or striker must be tested, both when in and also when out of the gun.

- (b) If correct when out of the gun and incorrect when in position in the gun, the short circuiting will probably be found to be due to the striker, firing pin or lock contact touching the side of the firing hole in the lock frame or firing hole bush.
- (c) In addition to short circuiting, failure to fire may occur owing to the striker, firing pin or lock contact rubbing over the insulation of the electric tube and carrying a portion of the insulation with it.

(6) GAUGE, INTERIOR RECESS OF FIRING HOLE BUSH

128. Remove the breech screw from the carrier and see that the interior of the breech screw is free from grit or oil residue. Insert the pointed end of the gauge into the screw so as to engage the coned portion with the conical recess in the firing hole bush. If correct, the front end of the gauge should be flush with the bottom of the recess in the front face of the breech screw. If not correct, the breech screw must be provisionally condemned.

(7) GAUGE, VENT TUBE CHAMBER

129. Insert each gauge in the tube chamber of the vent after making sure that all residue is out of the chamber. If any of the gauges enter to the unserviceable limit, the vent must be provisionally condemned.

(8) Q.F. 6-PR. HOTCHKISS, 6-PR. SUB-CALIBRE AND 3-PR. SUB-CALIBRE GUNS, MKS. I, I*, III, V AND VII—TESTS FOR MAIN SPRING AND PULL-OFF.

130. In order to ensure that the firing mechanism has been properly assembled and that the various parts are in good working order, the following tests will be applied on each occasion after re-assembling, or if much firing has taken place.

131. The gun being first cocked, the trigger must be pulled :

- (a) By attaching a dead weight by a cord led over a pulley so that the pull on the trigger is parallel to the axis of the gun, or
- (b) With a spring balance, if one is available.

132. The pull-off of the trigger necessary to fire the gun after cocking should be :—

- 30 to 40-lb. with trigger retaining spring.
- 15 to 20-lb. without trigger retaining spring.

133. If the pull-off is less than the low limit, the mechanism must be examined, and if the cock notches are worn the

hammer must be exchanged from spare; if, however, it is found to be correct, the trigger sear spring, trigger retaining spring, or sear, is probably at fault and must be exchanged. It may be necessary to replace both hammer and springs.

(9) TEST FOR MAIN SPRING (HOTCHKISS PATTERN ONLY)

134. This test is to ascertain that the main spring is of correct dimensions, for which a gauge is provided.

Method of using the "Gauge, main spring"

135. Place the curved end of the main spring against the pillar of the gauge in such a position that the trunnion on the other free end of the spring is towards the slot for its reception in the gauge. When the spring is of correct shape and dimensions the trunnion will then occupy a central position in the slot of the gauge. The length of the slot gives the limits within which permanent compression or expansion of the springs is allowable.

TABLE 1

(Referred to in para. 84)

LIST OF PARTS TO BE EXAMINED IF
ECCENTRICITY IS DISCLOSED

Nature of gun or howitzer.	Parts to be examined.
Ordinance, B.L.—	
18-in. howitzer, Mk. I ..	} Lock and slide box.
12-in. howitzer, Mks. III, IIIA, IV, IVA, V, VA and VI ..	
9.2-in. howitzer, Mks. I, II and IIA ..	
9.2-in., Mk. IX ..	
8-in. howitzer, Mk. VIII ..	
6-in., Mk. XIX ..	
6-in., 26-cwt. howitzer, Mk. I ..	
60-pr., Mks. I to I** ..	
60-pr., Mks. II and II* ..	
4.5-in., Mks. I and I* ..	
14-in., Mk. VI ..	} Pinions (teeth). Pinion link or crank (cam groove). Lock actuating link and eccentric bush of guide bolt. (Intermediate lever or link.) Lock and slide box.
9.2-in., Mks. X, Xv, X*, XIII, XIII* and XIII A ..	

Nature of gun or howitzer.	Parts to be examined.
6-in., Mks. VII, VIIv and VII*	Breech mechanism lever (safety bracket). Bush of breech mechanism lever retaining catch. Lock and slide box.
9.2-in., Mk. XV	Lock actuating link; lock actuating slide; lock and slide box.
6-in., Mk. XXIV	
5.5-in., Mk. III	
5-in., Mk. VIII	
4.5-in., Mk. II	Cam plate on breech mechanism lever and roller on guide bolt. Lock and slide box.
6-in., Mk. XXI	
Ordnance, Q.F.—	Striker and recess for striker in carrier. Pintle and cannellure of carrier. Breech screw. Fixing screw. Striker.
6-in. B, 4.7-in. B and 12-pr. 12-cwt.	
4.5-in. howitzer, Mks. I and II	Cam plate on breech mechanism lever and corresponding groove in breech block.
4.5-in., Mk. II	
3.7-in., Mks. I to III	Striker case; sliding block and groove in breech block.
3.7-in. howitzer, Mk. I	
18-pr., Mks. I to II*	Carrier, hinge lug; carrier hinge pin; continuous threads on breech screw and carrier; and striker.
13-pr., Mks. I to III	
3.7-in. mortar, Mk. I	Striker case; wear on crank spigot; holes in actuating link axis pin and holes in lug of breech block.
25-pr., Mk. I	
18-pr., Mks. IV, IVA and IVB	Carrier hinge lug; carrier hinge pin; carrier pintle; and striker.
25-pr., Mk. II	
3-in. 20-cwt., Mks. I to I***, IA and IB	Striker case; crank roller; axis pin; and roller path on breech block.
3-in. 20-cwt., Mks. III, III* and IIIA	
3-in. howitzer, Mk. I	Rollers on crank and corresponding groove in breech block.
6-pr. 10-cwt., Mk. I	
6 pr. 7 cwt., Mk. I	Wear on carrier hinge lug; striker case; and striker.
3-pr. 2-cwt., Mk. II	
2-pr., Mks. IX and X	Striker case; engaging surface of crank and breech block.
Hotchkiss, 6-pr. and guns, sub-calibre, Q.F. 6-pr. and 3-pr., Mks. I, I*, III, V and VII	
Nordenfelt, 6-pr. and guns, sub-calibre, Q.F. 3-pr., Mks. II, II* and IV	Firing hammer; cam groove in wedge; friction roller on crank; and crank bearing.
3-pr. 2-cwt., Mk. I	
2-pr., Mk. VIII	Firing pin; breech mechanism lever; bearing for breech mechanism lever; and hole in breech block through which lever passes.
40-mm., Mk. I	
	Stud of arm for breech mechanism lever and groove for same in gun.
	Wear on horns of extractor and extractor guides; wear on flat at top of extractor; wear on engaging surfaces on extractor grooves and vertical guide on lock frame, guide strips and horizontal grooves on guide plate.
	Engaging portion of cranks and breech block.

(Referred to in para. 88)

LIMITS OF PROTRUSION AND GAUGES TO BE USED TO TEST PROTRUSION

Gauge No.	Mk.	Limits.		For use with	Remarks.
		Max.	Min.		
1	I	in. 0·11	in. 0·09	Existing stocks to be used up for the following natures :— Q.F. 6-in. B, 4·7-in. B, 25-pr. Mk. I, 3-in. 20-cwt., 18-pr. to 12-pr. 12-cwt., 3-pr. 2-cwt., 2-pr. Mks. IX and X, 6-pr. 10-cwt. Mk. I and 6-pr. 7-cwt. Mk. I guns; 4·5-in. and 3·7-in. howrs.	} Obsolescent.
1†	II	0·11	0·09	Q.F. 6-in. B, 4·7-in. B and 12-pr. 12-cwt.	
2	I	0·15	0·13	Guns, sub-calibre, Q.F. 3-pr., Mks. II, II* and IV	} Obsolescent.
3	I	0·09	0·07	B.L. gun locks except P.H., P.J. and P.K. locks	
4	I	0·2125 0·122	0·1925 0·102	Q.F. Nordenfelt 6-pr., Mk. III. Existing stocks to be used up for 6-pr. Hotchkiss	
		0·127	0·107	Existing stocks to be used up for 3-pr. sub-calibre, Mks. I, I*, III, V and VII	
10	I	0·065	0·055	B.L. 4·5-in. Mks. I and I*, 60-pr. Mks. II and II* and 6-in. Mk. XIX guns with perc. lock P.J.; 6-in. 26-cwt. Mk. I, 8-in. Mk. VIII, 9·2-in. Mks. II and IIa and 12-in. Mks. III, IIIa, IV, IVa, V, Va and VI howrs. and 60-pr. Mks. I to I** guns with perc. lock P.K.	} Obsolescent.
11†	I	0·115	0·095	Q.F. 3-in. 20-cwt., Mks. I to I***, Ia and Ib	
12†	I	0·10	0·08	Q.F. 3-in. 20-cwt., Mks. III, III* and IIIa	
13	I	0·123	0·103	Q.F. Hotchkiss 6-pr. and 6-pr. 6-cwt. guns and Q.F. 6-pr. Mk. I sub-calibre gun	
14	I	0·125	0·105	Guns, sub-calibre, Q.F. 3-pr., Mks. I, I*, III, V and VII	} Obsolescent.
15†	I	0·105	0·085	Q.F. 4·5-in. howr. and 13-pr., 18-pr. and 25-pr. Mk. I guns	
16†	I	0·11	0·09	Q.F. 4·5-in. Mk. II, 3·7-in. Mks. I to III, 25-pr. Mk. II, 6-pr. 10-cwt. Mk. I, 6-pr. 7-cwt. Mk. I, 3-pr. 2-cwt. Mks. I and II and 2-pr. Mks. IX and X guns; Q.F. 3·7-in. Mk. I and 3-in. Mk. I howrs.; Q.F. 3·7-in. Mk. I mortar; and P.L. Mks. I and II and P.M. perc. locks	
19	II	0·045	0·042	B.L. 60-pr. Mks. I to I** guns 9·2-in. Mk. I howr. with P.H. perc. lock	
20	I	0·13	0·11	Q.F. 2-pr., Mk. VIII gun	} Obsolescent.
25	I	0·115	0·095	Q.F. 40-mm. Mk. I gun	

† Gauges, Mk. I No. 1, will be issued in lieu until stocks are exhausted.

TABLE 3

(Referred to in para. 90)

METHOD OF ADJUSTMENT OF STRIKERS,
NEEDLES OR FIRING PINS

Nature of lock or striker.	Method of adjustment.
Ordinance, B.L.—	
Locks—	} Renew leather washers or other insulation under head of needle; should this be insufficient the firing pin or needle must be replaced.
Electric and percussion—	
E	
F	
Electric—	
E.E.1	
E.N.	
18-in. howitzer—Lock, electric	
6-in., Mk. XXI—Lock, electric and percussion	
Ordinance, Q.F.—	
6-in. B—Striker, E and P	}
4·7-in. B†—Striker, E and P	
12-pr. 12-cwt.—Striker, E and P	
Ordinance, B.L.—	
Locks, percussion—	} Renew striker or firing pin.
P.D.	
P.G.	
P.H.	
P.J.	
P.K.	
P.L., Mks. I and II	
P.M.	
18-in. howitzer—Lock, percussion	
9·2-in., Mk. IX—Lock, percussion	
Ordinance, Q.F.—	
4·5-in., Mk. II—Striker	}
4·5-in. howitzer, Mk. I—Striker	
3·7-in., Mks. I to III—Striker	
3·7-in. howitzer, Mk. I—Striker	
3·7-in. mortar, Mk. I—Striker	

† With Mk. III needles, spare firing pins are issued, a proportion of which are 0·03-in. longer than those issued with the needles. When the protrusion of the needle is less than 0·1-in. through the firing hole bush of the breech screw, one of the longer pins must be used.

TABLE 3—continued

Nature of lock or striker.	Method of adjustment.	
Ordnance, Q.F.—continued.		
3-in. 20-cwt.—	Renew striker or firing pin.	
Mks. I to I***, IA and IB— Striker		
Mks. III, III* and IIIA— Striker		
25-pr., Mks. I and II—Striker		
18-pr., Mks. IV, IVA and IVB —Striker		
3-in. howitzer, Mk. I—Striker		
13-pr., Mks. I to III and 18-pr., Mks. I to II*— Striker		
Hotchkiss, 6-pr.—Striker ..		
Nordenfelt, 6-pr.—Striker ..		
6-pr. 10-cwt., Mk. I—Striker		
6-pr. 7-cwt., Mk. I—Striker		
3-pr. 2-cwt., Mks. I and II— Striker		
2-pr., Mk. VIII—Striker ..		
2-pr., Mks. IX and X—Striker		
40-mm., Mk. I—Striker ..		
Guns, sub-calibre, Q.F.—		
6-pr., Mk. I—Striker ..		
3-pr.—Striker		
Ordnance, B.L.—		
9-2-in., Mk. IX—Lock, elec- tric		Renew the ivory washer under the cutter or punch; should this be found insufficient the cutter or punch must be replaced.

TABLE 4

(Referred to in para. 123)

**BLOW IN IN.-LB. RELATIVE TO COMPRESSION
OF 0.35-IN. COPPERS**

Compression.	Blow.	Compression.	Blow.
(in.)	(in.-lb.)	(in.)	(in.-lb.)
0.001 ..	0.35	0.032 ..	21.8
0.002 ..	0.7	0.033 ..	23.0
0.003 ..	1.1	0.034 ..	24.1
0.004 ..	1.5	0.035 ..	25.3
0.005 ..	1.9	0.036 ..	26.5
0.006 ..	2.4	0.037 ..	27.7
0.007 ..	2.9	0.038 ..	29.0
0.008 ..	3.4	0.039 ..	30.3
0.009 ..	3.9	0.040 ..	31.6
0.010 ..	4.4	0.041 ..	33.0
0.011 ..	4.9	0.042 ..	34.3
0.012 ..	5.5	0.043 ..	35.7
0.013 ..	6.1	0.044 ..	37.1
0.014 ..	6.7	0.045 ..	38.5
0.015 ..	7.3	0.046 ..	40.0
0.016 ..	7.9	0.047 ..	41.5
0.017 ..	8.6	0.048 ..	43.0
0.018 ..	9.3	0.049 ..	44.5
0.019 ..	10.0	0.050 ..	46.0
0.020 ..	10.7	0.051 ..	47.5
0.021 ..	11.5	0.052 ..	49.1
0.022 ..	12.3	0.053 ..	50.7
0.023 ..	13.1	0.054 ..	52.3
0.024 ..	13.9	0.055 ..	53.9
0.025 ..	14.8	0.056 ..	55.5
0.026 ..	15.7	0.057 ..	57.2
0.027 ..	16.6	0.058 ..	58.9
0.028 ..	17.6	0.059 ..	60.6
0.029 ..	18.6	0.060 ..	62.3
0.030 ..	19.6	0.061 ..	64.1
0.031 ..	20.7	0.062 ..	65.9

(Referred to in para. 124)

CONDEMNING LIMIT FOR BLOW OF LOCKS AND STRIKERS

Nature of lock or striker.	At outstations the spring of any lock or striker which gives a blow in in.-lb. less than shown below for each nature must be condemned.
Ordinance, B.L.—	
Locks—	
Percussion—	
P.H.	3
P.J.	4
P.K.	4½
P.C.	}
P.D.	
P.G.	
P.L., Mks. I and II	
P.M.	
Electric and percussion—	
E	}
F	
18-in. howitzer—Lock, percussion	
9·2-in., Mk. IX—Lock, percussion	
6-in., Mk. XXI—Lock, electric and percussion	
Ordinance, Q.F.—	
6-in. B, Mk. II—Striker, E and P	}
4·7-in. B—Striker, E and P	
12-pr. 12-cwt.—Striker, E and P	
4·5-in., Mk. II—Striker	
4·5-in. howitzer, Mk. I—Striker	
3·7-in., Mks. I to III—Striker	
3·7-in. howitzer, Mk. I—Striker	
3·7-in. mortar, Mk. I—Striker	
3-in. 20-cwt.—	
Mks. I to I***, IA and IB—Striker	
Mks. III, III* and IIIA—Striker	}
25-pr., Mks. I and II—Striker	
18-pr., Mks. IV, IVA and IVB—Striker	
3-in. howitzer, Mk. I—Striker	
13-pr., Mks. I to III and 18-pr., Mks. I to II*—Striker	
Hotchkiss, 6-pr.—Striker (Mk. II spring)	
Nordenfelt, 6-pr.—Striker	
6-pr. 10-cwt., Mk. I—Striker	
6-pr. 7-cwt., Mk. I—Striker	
3-pr. 2-cwt., Mks. I and II—Striker	
2-pr., Mk. VIII—Striker	}
2-pr., Mks. IX and X—Striker	
Guns, sub-calibre, Q.F.—	
6-pr., Mk. I—Striker	}
3-pr.—	
Mks. I, I*, III, V and VII—Striker	
Mks. II, II* and IV—Striker	
Ordinance, Q.F.—	
40-mm., Mk. I—Striker	10

Notified in A.C.Is. 10th December, 1941

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**REGULATIONS FOR ARMY
ORDNANCE SERVICES, PART II**

PAMPHLET NO. 16, 1941

AMENDMENTS (No. 1A)

26
Regulations
2106

Para. 124.

Add at end.

Amdt. 1A
Dec., 1941

Any instances of difficulty in obtaining the blow of strikers in the case of Q.F. guns will be reported to the Chief Inspector of Armaments, the defective spring being replaced and forwarded with the report. Copies of such defect reports will also be forwarded to the War Office (D.O.S.(E)).

270
Guns
172

Page 28. *Delete* item Gauge No. 25 and *substitute* :—

Amdt. 1A
Dec., 1941

25	I	2.9-mm. or 0.114-in.	2.5-mm. or 0.098-in.	Q.F. 40-mm. Mks. I and III guns.	New gauge.
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26
Regns.
2106

Table 5, column 2.

For " 20 " substitute :—

Amdt. 1A
Dec., 1941

With Q.F. ordnance normally maintained in instant	270
readiness with striker cocked	<u>Guns</u>
Other Q.F. ordnance	<u>172</u>

Against " Guns, sub-calibre, Q.F." and entries thereunder insert " 20 "

*Against " Ordnance, Q.F. 40-mm., Mk. I Striker ".
For " 10 " substitute " 22 "*

By Command of the Army Council,

THE WAR OFFICE,
10th December, 1941.