

### CHAPTER III.

#### FURNITURE AND EQUIPMENT.

63. The standardisation of R.A.F. ground equipment to be suitable for all types of aircraft and also to fulfil all requirements is a difficult matter, owing to the introduction of new types of aeroplanes and new methods, but all equipment is under constant review with the object of modernising and, whenever possible, rendering it of universal application. Items of equipment are introduced and standardised from time to time as occasion warrants, under authority of an Air Ministry Order. Air Publication 1086 gives a priced vocabulary of all Air Ministry stores, including all rigging equipment.

64. Many items of equipment now in service are extemporised or are obsolescent, and no further purchases or renewals of these items will be made. The items of equipment described in this chapter are those which appertain to rigging only and are those which are standardised, or about to be standardised, and which will replace existing equipment as renewals become necessary. Proprietary articles or items peculiar to a particular type of aircraft are not mentioned.

**Bench, Carpenters.** Stores Ref. 4A/6.

65. This bench is intended for squadron or flight use, and is capable of being rapidly dismantled and reassembled. A woodworker's vice is fitted in addition to the usual planing stops, etc.

**Bench, fitters.** Stores Ref. 4A/7.

66. The construction of this bench is similar to that of the carpenter's bench, but has a level and thicker top. Attached to the bench is a fitter's vice, Stores Ref. 1c/2609, or an armourer's vice, Stores Ref. 1c/2620, in accordance with the use for which the bench is intended.

**Boards, aeroplane serviceability.** Stores Ref. 4A/449.

67. These boards consist of a binder for Form 535, with an attached flap. The flap is arranged to turn over so as to exhibit either "S" or "U" on both sides of the board. The boards are hung on to the aircraft immediately a defect is noted or reported in accordance with the instructions for maintenance and inspection of aircraft, K.R. & A.C.I., para. 702.

**Chocks, aeroplane wheel, wood, general purposes.** Stores Ref. 4A/193.

68. The ordinary standard wooden chock for station use is shown in fig. 12. It is to be constructed by units.

TABLE I.

A.P. 1086.		G Stores D.I.S. No.	A.M.W.O. or A.M.T.O.	Description.	Remarks.
Section No.	Ref. No.				
4A	6	25	T.O. 69/26	Benches, carpenter.	
4A	7	16	T.O. 69/26	Benches, fitters.	
4A	449		W.O. 25/29	Boards, aeroplane serviceability.	
4A	545 to 568			Block, tackle ..	Various sizes to take 1½ in. to 4 in. Cord- age.
4A	193	25	T.O. 69/26	Chocks, aeroplane Wheels, wood. G.P.	
4A	520		T.O. 204/28	Chocks, aeroplane Wheels, Metal, col- lapsible.	
4A	450		W.O. 25/29	Desks, flight.	
4A				Jacks, lifting ..	Various types.
4A	259			Ladders, extension	14 ft. to 32 ft.
4A	86	104		Ladders, flat top ..	6 ft.
4A	91	103		Ladders, shelf ..	10 ft.
4A	98	102		Ladders, swing back, 6 ft.	
4A	97	112		Ladders, swing back, 8 ft.	
4A	95	115		Ladders, swing back, 12 ft.	Flat top.
4A	94	110		Ladders, swing back, 14 ft.	Flat top.
4A	333	61	T.O. 169/26	Mats, centre section.	
4A	412		T.O. 205/28	Skates, side tracking, tail.	
4A	413		T.O. 205/28	Skates, side tracking, with chock wheel.	
4A				Tackles differential	Various sizes from 5 cwt. to 10 ton.
4A	440	154	T.O. 634/30	Trolley, aerodrome.	
4A	149	272/4		Trestles, rigging ..	16 ft. 10 in.
4A	411	140	T.O. 71/29	Trestle, tail.. ..	Adjustable, 3 ft. 8 in. to 5 ft., tripod pattern.

**Chocks, aeroplane wheel, metal (collapsible).** Stores Ref. 4A/520.

69. These chocks are made as light as possible and in the form shown in fig. 12, in order that they may, when necessary, be carried on the aircraft in flight. This type of chock is intended mainly for use abroad.

**Tackle, differential, 1 ton (fixed).** Stores Ref. 4A/739.

70. Several types of lifting tackles and cranes other than the one enumerated above are in use at various units. The lifting tackle shown in fig. 12 is the ordinary type of chain gear and needs no description. In addition to the present standard types, there is a new tripod type which may be standardised shortly. It is shown in fig. 14, and described in para. 90.

**Desks, flight.** Stores Ref. 4A/450.

71. Flight desks are to be made up locally to the dimensions given in Air Ministry Weekly Order 25 of 1929. They are for use as notice boards and also in connection with the service-ability board, maintenance forms, etc.

**Jacks, lifting.**

72. A number of types of jack are in service which have been standardised for use under special conditions but are not of universal utility. These jacks are listed in Air Publication 1086 in Sections 2 and 4. In addition to these jacks, there are two new types which may be standardised shortly; these will be more universal in character and may replace some of the existing types as renewals become necessary. The new type of jack is described in paras. 87 and 89 and illustrated in fig. 13.

**Mats, centre section.** Stores Ref. 4A/333.

73. During overhaul, inspection, refuelling and other similar operations, it is necessary to guard against injury to the fabric and structure. For this purpose special mats are supplied which can be placed in any position desired and there secured. The mats consist of a series of wooden slats which are attached to large squares of canvas. A similar type of mat is used for the protection of seaplane floats under similar conditions.

**Skates, side tracking, wheel and tail.** Stores Ref. 4A/413 and 412.

74. Side tracking skates are required when it is necessary to move an aeroplane sideways in a restricted space. Both types of skates are provided with castoring wheels, and the wheel type of skate is also provided with hinged chocks either end, which can be swung over and in that position act as ramps, as shown in fig. 12.

**Trestles, rigging.**

75. A large variety of different types of fixed wooden rigging trestles now in service have been made up locally to standard designs or to suit special circumstances. A number

of these trestles will be obsolete upon the introduction of the new type of adjustable steel trestle described in paras. 80 to 84. The hinged ladder type of rigging trestle with staggered rungs, Stores Ref. 4A/149, which is used for supporting planks during rigging operations, will remain as a standard item of equipment, and is shown in fig. 11.

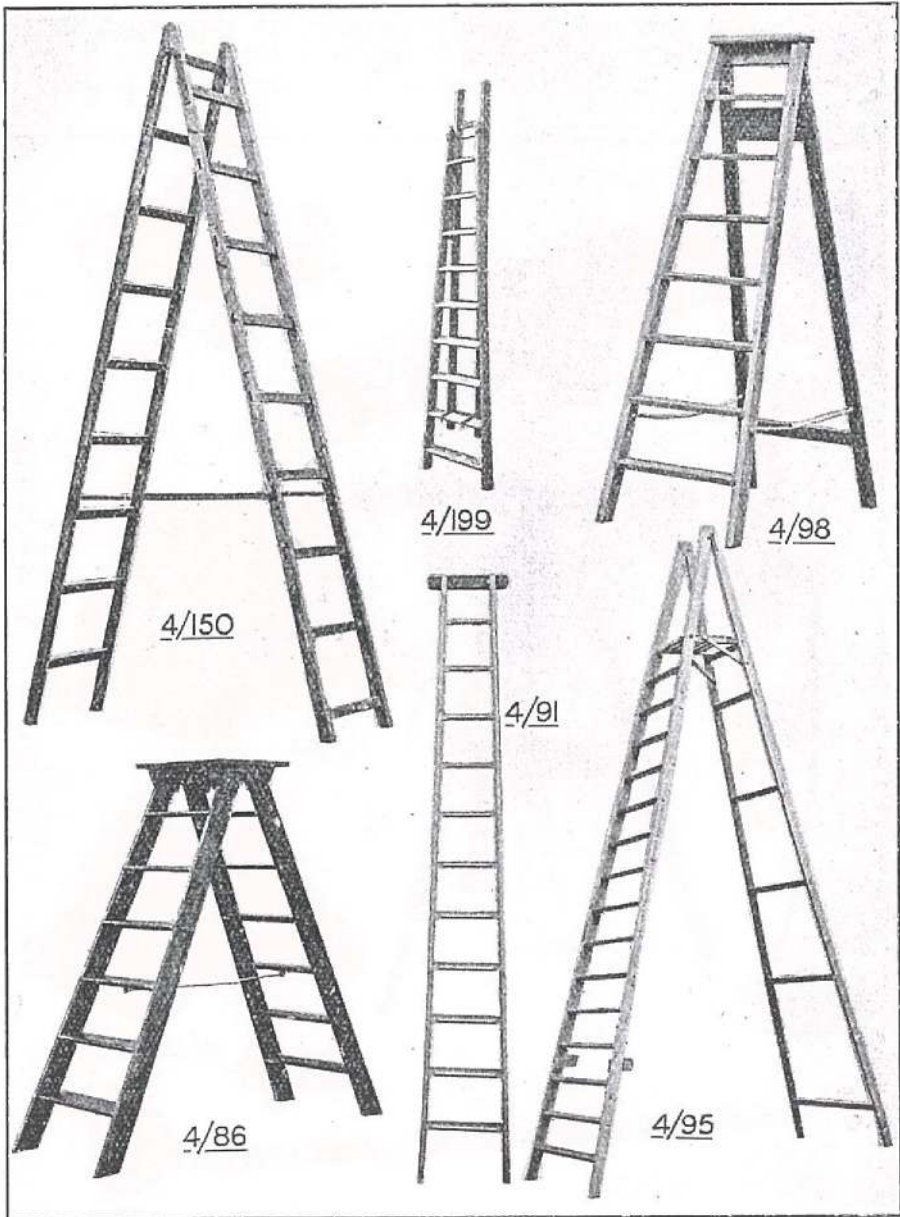


FIG. 11.—Ladders.

### Ladders.

76. The standard types of ladders used by R.A.F. units are enumerated in table I, and illustrated in fig. 11. There are several sizes of each type, particulars of which are given in Air Publication 1086, section 4A.

**Trestles (adjustable, tripod type, tail).** Stores Ref. 4A/411.

77. This trestle is of great assistance for supporting the tail end of the fuselage when in rigging position. As will be seen from fig. 12, the trestle is all-metal, with the exception

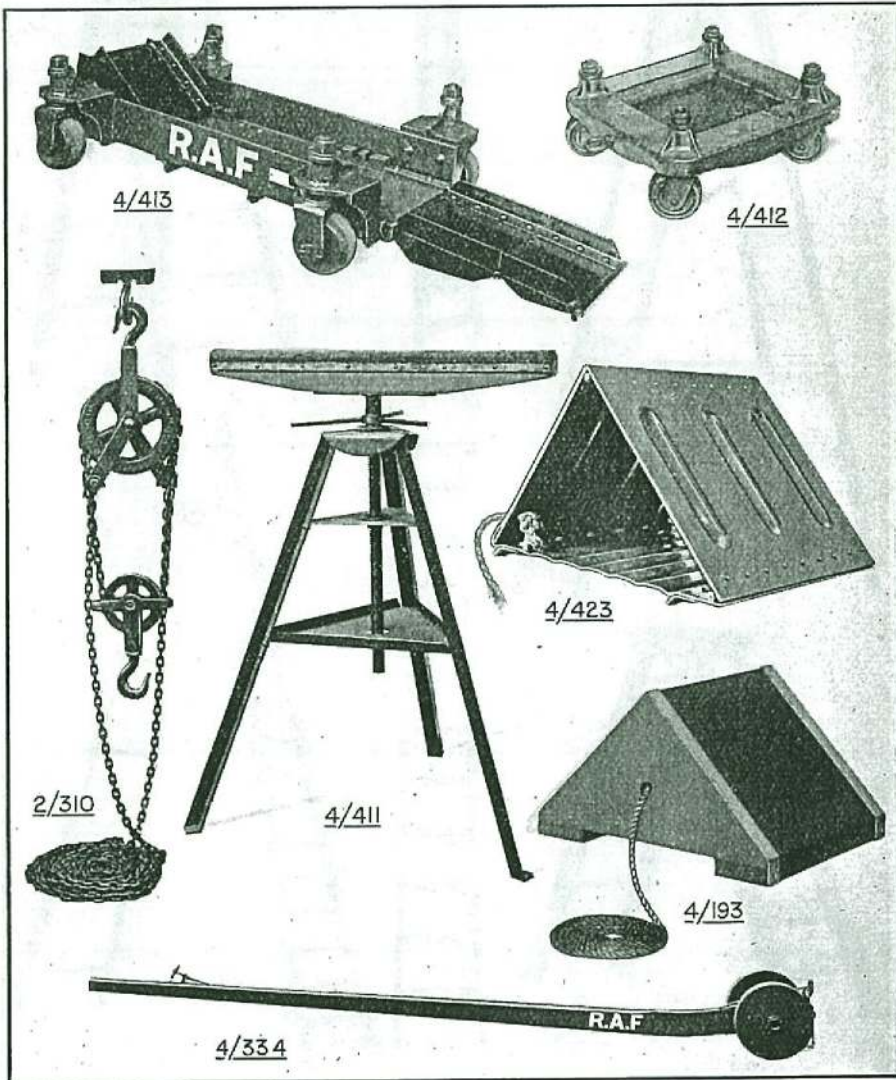


FIG. 12.—Miscellaneous standard equipment.  
(For 2/310 above read 4/739.)

of the felt-covered ash bearer bar. It consists of three legs connected at the top by a sheet steel plate taking an adjustable ram, and braced by another steel plate about half-way down, made in the form of a tray. The trestle has an adjustable height range of from 3 ft. 8 in. to 5 ft. and will deal satisfactorily with loads up to 500 lb.

#### **Trolleys, tail skid and aerodrome.**

78. Several patterns of tail skid trolleys are in service, the type used depending upon conditions of usage and the weight and type of aeroplane. One of the existing standard tail skid trolleys for land stations is the lever type, shown in fig. 12. The type of trolley used on aircraft carriers is usually the scoop type, but here again special trolleys are often required for the particular aircraft being handled. In addition to the types which have been mentioned, there are two new types being produced which will probably be standardised at an early date, and are intended to supersede existing types. These trolleys are described in paras. 85 and 86 and illustrated in fig. 13. An aerodrome trolley, Stores Ref. 4A/440 (G. Stores 154), has been standardised for carrying night-flying equipment. The trolley has four wheels, the front two of which are steerable, and a wooden top platform suitably boxed to take the equipment. In its original form the trolley was fitted with aero wheels, but in the later approved pattern the "Trojan" pneumatic-tyred wheels are used.

### **NEW EQUIPMENT.**

79. In addition to the standard equipment listed in Air Publication 1086, there are a number of new items of ground equipment which will be introduced as soon as the necessary investigations have been made to ensure the utmost serviceability and universal application. The new types of equipment are described below, but units are not to indent for any of these items until they have been introduced by an Air Ministry Order.

#### **Trestles, jacking, universal.**

80. The small wooden types of fixed trestle, of which there are a number of different kinds in use, will be replaced eventually by an adjustable steel type shown at E, fig. 13. It is intended that these trestles shall be issued in component parts, but all having the same form of jacking heads. This

form of trestle has the advantages that all the parts are interchangeable, and that it can be easily dismantled when not in use, and therefore is easily packed away or transported. If necessary, the existing legs can be replaced by legs of any reasonable length desired which are cut off from standard angle iron, drilled, and attached to the jacking heads. These trestles, when used on an aircraft carrier, will be fitted with detachable friction pad feet.

81. Given below is the trestle assembly table, which states the dimensions and parts required for making up trestles of various heights and widths.

TABLE II

No.	Height.		Width.		Legs.	Cross Stays.	Bottom Rails.	Diagonal Stays.
	Ft.	In.	Ft.	In.				
1	2	3	2	7	C	None	D	E
2	3	0	1	9	D	C	C	E
3	3	0	3	2	D	C	E	F
4	3	7	2	7	E	C	D	F
5	3	7	4	1	E	C	F	G
6	3	7	5	2	E	C	G	H
7	4	5	3	2	F	D	E	G
8	4	5	6	0	F	D	H	I
9	5	5	3	2	G	E	E	H
10	6	3	4	1	H	F	F	I

82. The length between bolt holes of various members equivalent to the letters given are :—

TABLE III.

C.	D.	E.	F.	G.	H.	I.
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
1 8 $\frac{13}{16}$	2 7 $\frac{3}{16}$	3 1 $\frac{1}{2}$	4 0 $\frac{13}{16}$	5 1 $\frac{9}{16}$	6 0 $\frac{1}{16}$	7 3

83. The height given is the minimum height when using a 4 in. by 2 in. ash cross bar. An angle iron of the same dimensions as the bottom rail may be used in place of the wooden cross bar if required. In this case the minimum heights given will be reduced by about 3 in. The range of adjustment of the jacking head is 12 in.

84. The loads these trestles will sustain, using the 4 in. by 2 in. ash cross bar, are dependent upon the type of load, and are approximately as follows :—

TABLE IV.

Size of Trestle.	Load Concentrated in Centre.	Load Equally Distributed	Load Divided between 2 Supports.
	lb.	lb.	lb.
1	1,500	3,000	13,500
2	2,240	4,480	12,320
3	1,120	2,240	12,320
4	1,500	3,000	11,200
5	1,000	2,000	11,200
6	900	1,600	11,200
7	1,120	2,240	10,000
8	675	1,350	10,000
9	1,120	2,240	8,900
10	1,000	2,000	7,040

#### Power tail trolley.

85. Power-driven tail trolleys will shortly be available for use with aircraft of the heavier types. There will be two sizes issued similar in general outline to that shown in fig. 13C, which is a photograph of the smaller size. The trolley is motor-driven, and has caterpillar wheels near the lifting arm and a castoring wheel at the opposite end of the trolley near the control handle, as will be seen by reference to the illustration.

#### Trolley, tail skid, hand.

86. Trials are being made with a view to producing for Service use a small hand-operated caterpillar tail trolley of the type shown in fig. 13D. This trolley is suitable for loads up to about 600 lb., and should, therefore, be suitable for all the smaller types of aircraft.

#### Jacks, high lifting.

87. In many instances where suitable lifting tackle is not available, there is a considerable waste of time owing to the height to which the aeroplanes have to be lifted, necessitating in many cases the use of duplicate jacks and packing blocks. To obviate this, a high lifting jack similar to that shown in fig. 13F will shortly be available for issue.

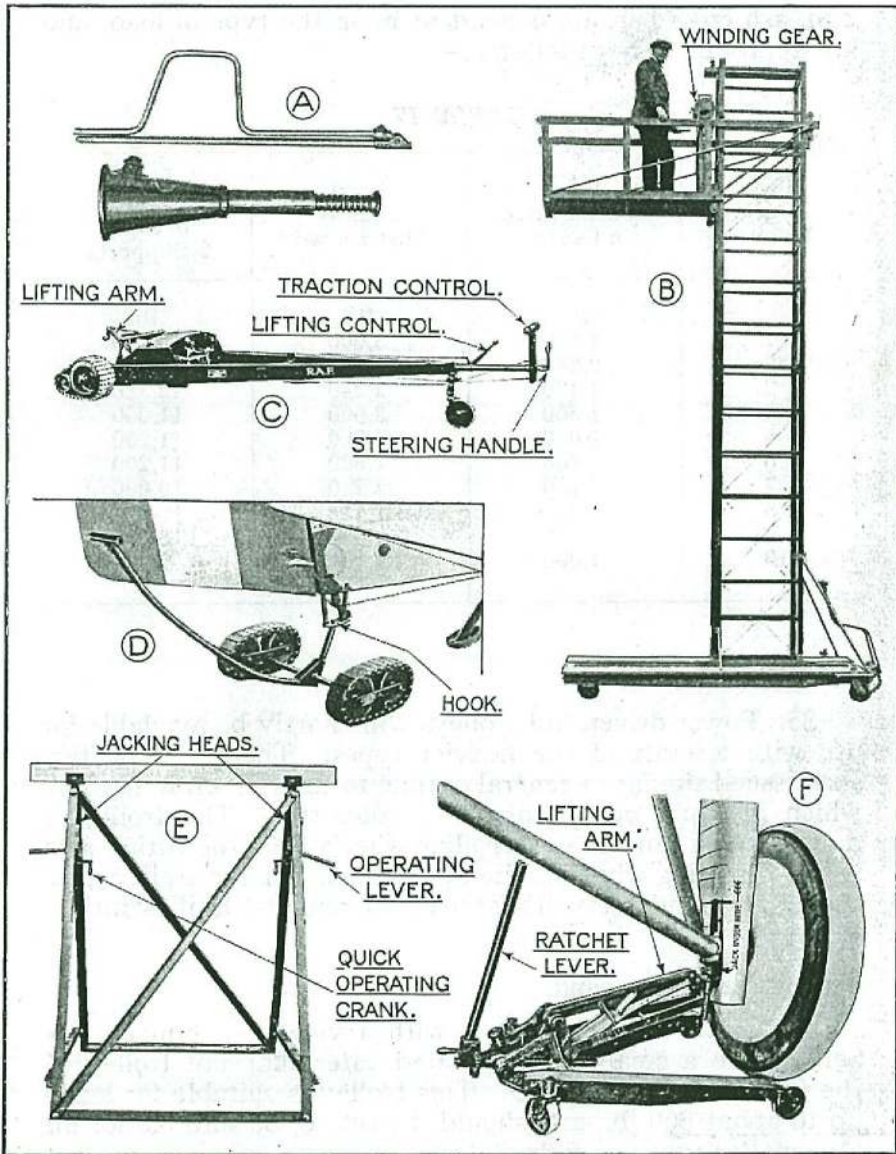


FIG. 13.—New equipment.

### Ladders, tower.

88. When large aircraft are being dealt with, there are often occasions when it is necessary to examine the upper planes, or perform similar operations necessitating a self-supporting ladder of rather larger dimensions than is the standard equipment at most stations. The type of ladder

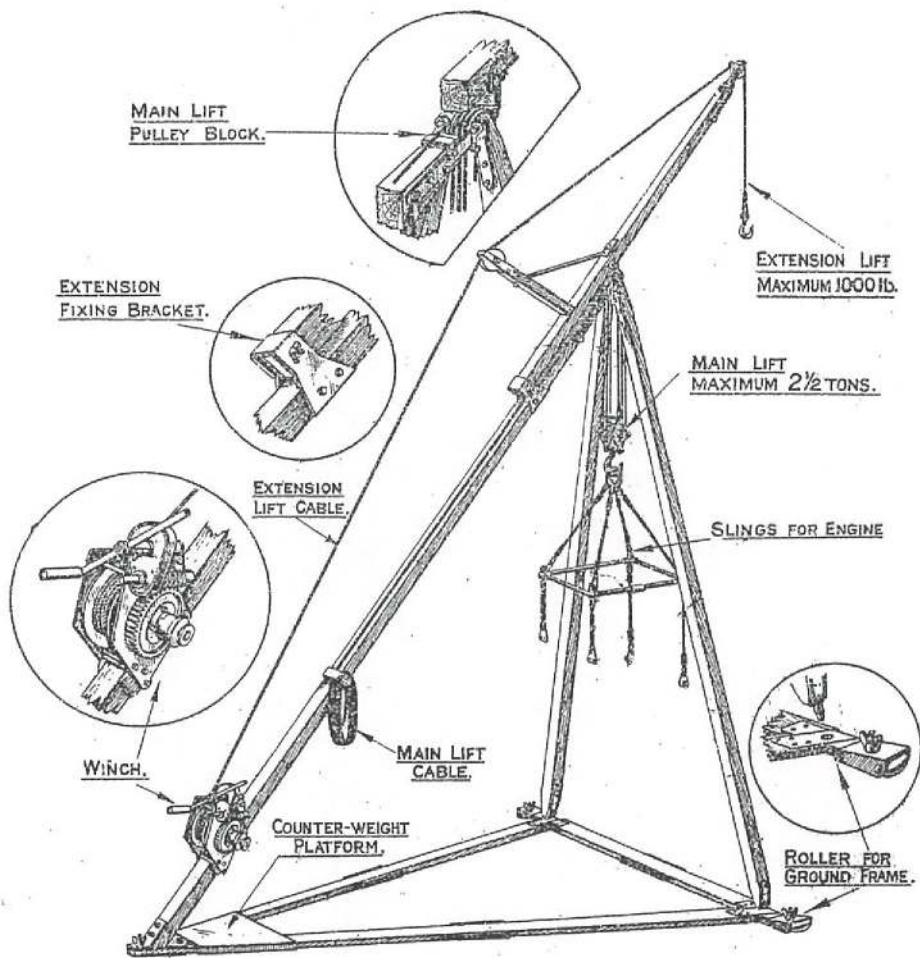


FIG. 14. SHEER LEGS.

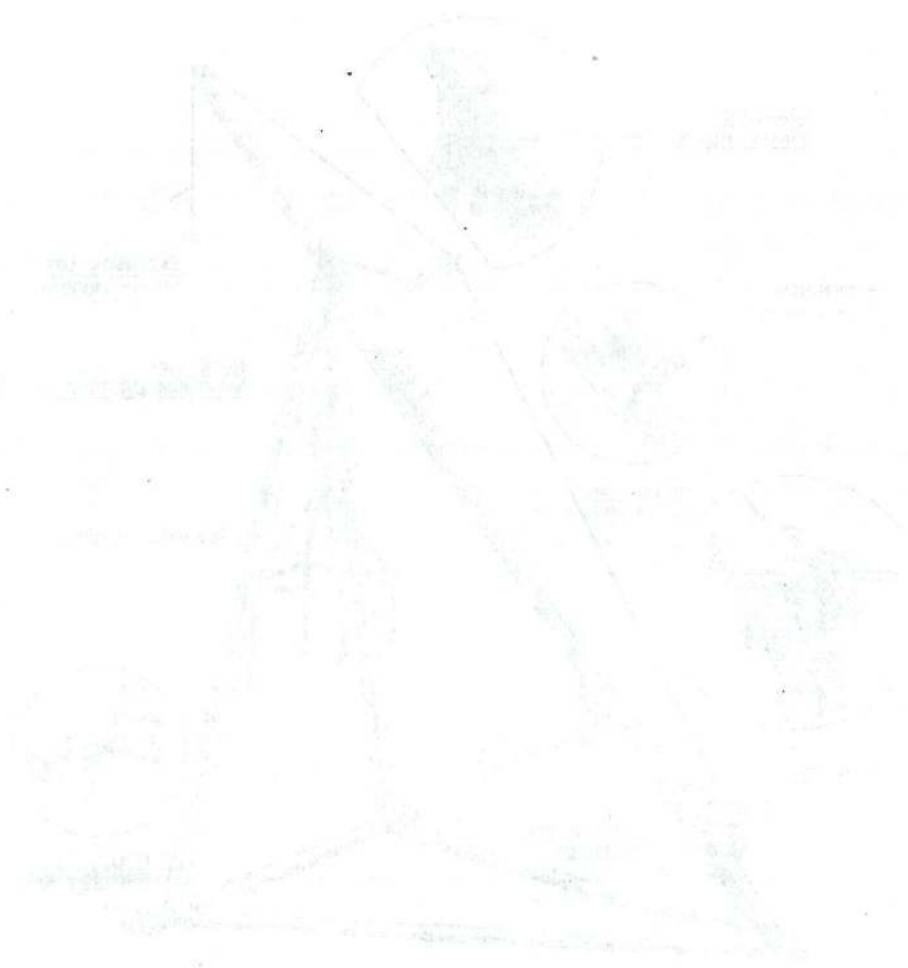


Diagram of a mechanical assembly

which it is proposed to standardise for this purpose is illustrated at B, fig. 13. As indicated, the ladder consists of a vertical, square-section, braced structure, with a hand-operated platform which can be raised to any desired height by means of the winding gear shown. The tower ladder is suitably mounted on a trolley.

#### **Jacks, lifting, universal, two-ton.**

89. The two-ton screw jack shown at A, fig. 13, is a new type which may shortly be introduced into the Service for general purposes. This jack is similar in principle to many existing types, and therefore requires no description. As shown, a detachable, cranked operating handle, hinged in the centre with a universal joint, is supplied for raising the jack. The weight with handle is between 11 and 12 lb., and it is therefore sufficiently light to be carried on an aeroplane in flight. Special attachments are needed when used for aircraft purposes.

#### **Sheer legs.**

90. Light and handy forms of tripod lifting tackles are now being tried out with the object of standardising this form of crane for Service use. In one type, all the members constituting the tripod are of wood, and, as will be seen from fig. 14, the main lifting tackle operates from the apex of the tripod; but for lifting smaller loads to a greater height a wooden arm extends beyond the apex and carries a pulley over which one end of an auxiliary lifting cable runs. The other end of this cable passes over a pulley on a kingpost and down to the drum of the winding gear. When using the extension arm, the crane is capable of lifting 1,000 lb. Another type is constructed entirely of metal, and is suitable for conveyance by air. This type is of simple design and construction, and consists of two splayed legs carrying a braced jib at the apex. The jib is made from tubular material, and is suspended from a central kingpost, with tie rods between the kingpost and the ends of the jib. To one end of the jib is attached the block lifting tackle, and to the other end is connected a back stay and two side stays. The back stay is secured to a picket stake and the two side stays to the lower ends of the legs. The construction, which is mainly of duralumin, allows of a weight of 1,000 lb. being lifted through a maximum distance of approximately 18 ft. The total weight is approximately 180 lb.

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