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PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in or relating to Military Equipments.

We, THE MILLS EQUIPMENT COMPANY LIMITED, Manufacturers, and ALBERT ALEXANDER LETHERN, Designer, all of 72, Victoria Street, Westminster, London, S.W., do hereby declare the nature of this invention to be as follows:

This invention relates to military equipments and has for its object to effect certain improvements in equipments of known type with a view to enabling an equipment to be constructed in the first instance for the use of cavalry or infantry which will be capable of conversion or adaptation for other uses as occasion may require, also to permit various forms of equipment to be built up from standard parts.

The equipment forming the subject of the present invention is based primarily on the main features embodied in the prior British Patents Nos. 28812 of 1906 and 23586 of 1911. As previously constructed equipments of this nature have usually been made up in the first instance in a form suitable to the particular purpose for which they were intended to be used as for instance equipments for the use of infantry or cavalry or officers of either branch of the service, and while owing to the construction and arrangement of the parts it was possible to effect some modifications in the disposition of the various members forming the whole equipment there has not been present in these earlier constructions such a standardization of the parts that it was possible to construct from these parts different types of equipment without structural modifications or other substantial alterations. Also such known equipments could not be adapted to varying uses as for instance where a cavalryman was employed dismounted and required to have his equipment arranged as for infantry work. In the present equipment these defects are remedied and an equipment produced which can be modified in the various ways indicated.

The improved equipment comprises as a basis an arrangement of belt, main cartridge carriers and shoulder straps or braces such as is already known and described in the Specifications of the prior Patents above referred to and more particularly No. 23,586 of 1911. The belt in that construction is composed of a back portion the ends of which are adjustably connected to two cartridge carriers which form the front part of the belt and can be joined at the front of the wearer.

The shoulder straps or braces are connected by buckles or slides to the back portion of the belt and after crossing over each is attached to the upper part of a cartridge carrier by a buckle or slide. The ends of these braces extend below the belt and carriers so as to be available for attachment of articles if desired.

According to this invention these basic parts of the equipment are of standard dimensions and provided with standard fittings and accessories so that articles

[*Price 6d.*]

such as a haversack, water bottle or the like can be attached thereto or mounted thereon in various positions according to the requirements of the wearer without reconstruction of the equipment or the employment of parts or members which do not find a place in the standard parts. Further, in order to provide for cavalry use where it is desirable to sling the rifle over the shoulder, a device disposed on or adjacent to the upper part of one of the cartridge carriers is provided for the purpose of attaching the rifle sling thereto in a manner which enables the weight to be taken and partly balanced by the cartridge carrier so that there is no pressure by the rifle sling across the chest while the rifle itself is held against a pad or the like disposed to one side of the back part of the belt in such a manner that it can readily be freed when required for use but is normally prevented from inconvenient movement. The water bottle can be mounted on the outside of the haversack and the latter slung from a shoulder strap and fixed to the belt in such a way that it can be released and though not entirely freed from the equipment yet available so that it can be drawn from under the wearer's arm into a position where access can be readily had to the water bottle. Alternatively the water bottle can be separated from the haversack and slung in the same way as the haversack but on the opposite side. A similar attachment to a shoulder strap and to the belt is employed so as to permit of the bottle being freed for access. Either the haversack or the bottle in this case would occupy the position in which the rifle when slung would lie to one side against the lower part of the wearer's back. Obviously in such an arrangement, however, the rifle could not then be slung without altering the position of one of these articles. Such arrangements as these are particularly suited for cavalry use but if desired the waterbottle and haversack can be separately suspended from the belt on opposite sides as for infantry use. Yet further if a knapsack is required this can be applied to the standard equipment without difficulty and in such a manner that it can readily be mounted on the equipment or detached therefrom after the manner described in the Specification of Application for British Letters Patent No. 10,893 of 1915.

The equipment permits of additional cartridge carriers being mounted if desired on the belt while a bayonet frog can also be carried on the back portion of the belt. Further if it is desired to adapt the equipment for officers' use the cartridge carriers may be removed and replaced by a revolver holster, ammunition pockets, a case for field glasses and pockets for carrying a compass and other articles or yet again these fittings or some of them may be replaced by pockets or pouches adapted to carry medical necessaries. Thus on the members forming a basis such as described it is possible by standardization of the parts and suitable arrangements of the connections and details of construction to make up equipments in various forms or to modify the disposition of the articles carried on the equipment as primarily made up so as to meet various requirements and conditions.

The construction of the improved equipment may now be described in detail.

As already mentioned the basis of the equipment is comprised by two cartridge carriers which are attached to the ends of the belt strip so as to together make up the complete belt, the cartridge carriers being separable from the belt portion. Each carrier conveniently comprises a known arrangement of three cartridge pockets on a backing the pockets being arranged two or more on the belt line and one or more above them. The front portion of each cartridge carrier is provided with a fastening member attached to the carrier or its backing by sewing or otherwise. This member preferably comprises a frame composed of two parallel members connected at their ends and having towards one end an eye preferably formed square and towards the other end a somewhat flattened broad hook of the same approximate width as the eye. These fastening members are formed similar except that the hook of one member is turned in one direction while the hook of the other member is turned in the opposite direction and thus when the members are attached to the cartridge carriers and the latter are in place the

hook of one member is in a position to engage the square eye of the other member so that interlocking of these devices is effected and a convenient fastening is provided for the front ends of the belt.

On the upper part of each cartridge carrier is mounted an attachment device formed conveniently of three parallel members connected at their ends one of these members preferably being rather shorter than the other and thus forming two flattened eyes of different lengths. The device is attached to the cartridge carrier by a broad strap passing through the wider eye of the device while through the narrower eye is passed a short strap which is sewn or rivetted in place or otherwise fixed. The other end of this short strap carries a buckle or slide of the following form. This slide comprises two parallel members connected at their ends and a third parallel member which is mutilated by a central portion being removed thus forming two inwardly directed fingers or hooks. This device is similar to one already extensively used in equipments of this kind as a buckle or slide without tongue. In the improved construction however this slide has mounted on it a stud of suitable shape and is provided with a flattened eye. The end of the brace strap is passed through this buckle and adjustably held thereby and thus connected to the upper part of the cartridge carrier leaving the eye and stud free for other uses which will be referred to hereafter.

The rear end of each brace passes through a slide or buckle attached by a short strap to the back portion of the belt. One of the braces has attached to it by sewing or otherwise at a suitable point in its length and in its back portion a strip of material forming a loop of such dimensions that the other brace can pass freely through this loop. This is at the point where the braces cross on the back of the wearer and keeps them in place while permitting free play of these braces one with relation to the other. Each brace is conveniently formed broader about its middle portion where it passes over the shoulder of the wearer and on this broader portion are formed or mounted one or more loops of such width as to permit of the free passage there-through of a strap of less width than that part of the brace. To one end of this strap is attached a metal fitting having a keyhole slot in it adapted to engage the stud already described as being carried on the slide or fitting mounted at the upper part of each cartridge carrier. The arrangement is such that the forward end of this strap can be thus attached to or disconnected from the upper part of the cartridge carrier and when freed this strap can slide through the loop or loops on the brace. One or both braces is thus provided with a sliding strap. In place of the fitting having a keyhole slot the forward end of this sliding strap may have a flattened hook adapted to engage the eye mentioned as being provided near the stud on the slide carried by the upper part of the cartridge carrier.

At a suitable point in the back portion of the belt and preferably adjacent to the point of attachment of one of the braces is placed a fitting having a key-hole slot in it this fitting being carried on a short strap so as to hang downward. Two such devices are preferably disposed one on each side of the back portion of the belt. Adjacent to one or both of these devices a flattened metal eye of suitable dimensions is attached to the belt. These fittings are all employed for purposes to be hereinafter described. On the back portion of the belt and towards one side thereof there is mounted a pad or plate against which the rifle can be held when slung on the shoulder. This pad serves to prevent chafe and is conveniently formed of a strip of material faced with fibre, leather or other suitable substance, the back of the pad or plate being provided with loops through which the belt is passed. At one end of this pad there is mounted a slide or buckle and through this slide is passed one end of a strap which is conveniently faced or lined as to part of its inner side with material adapted to take the wear of chafe of the rifle against which it lies. The other end of this strap carries a hook of the following construction which is adapted to engage a flattened metal eye rivetted or otherwise securely attached to the rear portion of the adjacent cartridge carrier. This is that carrier which lies on the right hand

of the front of the wearer the rifle being usually slung over the left shoulder with the butt pendant behind the right hip. The hook in question is formed of a single piece of wire of suitable thickness doubled on itself to form a flat loop and then twisted so as to connect the two parts together. The two ends of the wire thus extend at right angles to the flat loop and being slightly separated the end of each is curved into the form of a hook, the two hooks being oppositely directed and lying side by side. There is thus formed a spring hook composed of two separable members between which the eye which the hook is intended to engage can be passed, the hooks being sprung apart in the process. When the eye is engaged it is impossible to disengage the hook except by suitable manipulation thereof so as to bring the hooks into a position such that they can be drawn away from and permit the passage between them of the eye. By means of this device the rifle can be securely strapped against the side and back of the wearer but readily released when required for use. The rifle sling is conveniently provided with some device such as a pendant strip which when the sling is placed over the shoulder permits the rifle to be connected to the stud or eye on the upper part of the left hand cartridge carrier thus leaving the sling free to pass loosely over the chest of the wearer.

The haversack is provided at its rear upper corners with two slides or buckles and two tabs or short straps. On its under side preferably about the centre is fixed a stud. On the front edge of the flap cover are two short tabs or straps which lie one over the other, of these the undermost is adapted to engage a slide or buckle mounted on the face of the outer or front wall of the haversack. The haversack itself may be constructed in various ways but is conveniently built up of a broad strip of suitable material folded so as to form the front and back walls and the flap or cover. A narrow strip of the same material is then attached along the bottom and carried up to form the ends or sides, the ends of the narrow strip being then directed inwards to form inturned flaps which lie beneath the cover and partly over the mouth of the haversack so as to assist in retaining the contents in place. These flaps are preferably sewn along one edge to the cover of the haversack so as to obviate having to fold them in before closing the haversack. With this arrangement when the cover is lifted the flaps also lift partially with it and conversely when the cover is closed the flaps automatically go back into place. The second tab or short strap on the front edge of the cover serves as one of the means for attaching and mounting the waterbottle carrier on the haversack. In one form this carrier is in the main similar to a known type and comprises straps which pass round the waterbottle and under it. One of these straps which passes from one side of the waterbottle to the other round and under its base carries at each end a slide or buckle. At the bottom of the skeleton carrier is mounted another slide or buckle. The latter when the bottle is to be mounted on the haversack engages the uppermost short strap or tab above described as being provided on the front edge of the haversack cover. Slides on the ends of the side straps of the waterbottle carrier are adapted to engage the tabs on the upper corners of the haversack so that the water bottle is then mounted on the flap of the haversack in such a way that access can be readily had to the contents of the haversack since when the cover is opened the waterbottle is lifted with it. On the other hand the waterbottle itself is equally available for use.

That strap forming part of the skeleton bottle carrier which passes round the centre of the bottle is conveniently reinforced or thickened at two opposite points where most sharply curved so as to stiffen the strap and cause the carrier to tend to maintain its shape and remain open when the bottle is removed. This facilitates replacing the bottle. On the bottom of the carrier is arranged a stud adapted to engage one of the key-hole slotted members mounted on the back portion of the belt when the bottle is arranged in one of the positions hereafter described.

Supposing the above described members are to be arranged to form an equip-

ment suitable for a cavalryman the waterbottle is mounted on the haversack in the manner described and the latter is attached to the equipment in the following way. One of the slides or buckles on the upper back portion of the haversack is engaged by a short strap which projects rearwardly from the upper part of the left hand cartridge carrier. The other buckle or slide on the haversack is engaged by the rear end of one of the narrow straps which lies over a shoulder strap or brace and passes through the loops thereon this being the brace which runs across the right shoulder of the wearer. The other end of this sliding strap is attached in the manner described to the stud at the top of the right hand cartridge carrier. The stud at the bottom of the haversack is engaged by the key-hole slotted member pendant from the left hand back portion of the belt. The haversack and waterbottle are thus firmly carried at the back of the wearer towards the left hand side. If it is required to have access to the haversack or waterbottle the stud at the bottom of the haversack is first disengaged from the key-hole slotted member and then the front end of the sliding strap passing over the right shoulder is released. It is then possible to draw the haversack and waterbottle forward beneath the left arm, though the haversack still remains suspended from the short strap which connects it to the left hand cartridge carrier. The haversack can subsequently be replaced by pulling on the sliding shoulder strap and again fastening the end thereof after which the stud beneath the haversack is once more engaged by the member pendant from the back of the belt. With this arrangement of the equipment the rifle can be slung with the sling strap passing over the left shoulder the weight being taken and balanced to a considerable extent by the left hand cartridge carrier in the manner already described. The rifle is held firmly against the back of the wearer towards the right hand side by the strap with hook device which passes round the rifle and holds it against the chafing pad or plate. When the breech or butt end of the rifle is thus held a certain amount of the weight thereof is taken by the belt at this point owing to the rifle being kept close to the body and not being allowed to swing freely. In this way the total weight of the rifle may be considered to be distributed between the shoulder of the wearer, the cartridge carrier on the left hand side in the front and the belt on the right hand side at the back.

If the rifle is not to be slung, the waterbottle, in place of being mounted on the outside of the haversack in the manner described above, may be separated from the haversack and disposed on the opposite side of the back of the wearer against the belt in the same way as the haversack. If so arranged the waterbottle is connected by one of the slides or buckles with which it is provided at its upper part to the rear end of one of the straps which slides over a shoulder strap, this connection being the same as that employed for suspending one corner of the haversack. The other upper buckle or slide of the waterbottle carrier is connected to a short strap which extends rearwardly from the upper part of the cartridge carrier on the side where the bottle is disposed. This connection is again similar to that employed for the forward corner of the haversack. Finally the stud on the underside of the bottle carrier is engaged with one of the key-hole slotted members provided for this purpose on the back portion of the belt. The suspension of the waterbottle is thus identical with that employed for the haversack when arranged for cavalry use and the bottle can be partially released so that it can be drawn forward under the arm of the wearer in the same manner as a similar operation can be performed with the haversack as above set forth.

If now a cavalryman is dismounted and it is desired to arrange his equipment as for an infantryman, the rifle can be removed and carried in the usual way. The haversack and waterbottle may then be detached from the equipment and slung one on either side of the wearer in the following way. As already mentioned the ends of the brace straps extend beyond their points of attachment in the front to the cartridge carriers and in the rear to the back portion of the belt. These ends of the brace members can thus be utilised to engage the slides

or buckles mounted on the upper parts of the haversack and waterbottle carrier respectively. According as it may be convenient the waterbottle may be thus slung at the right hand side and the haversack at the left hand side or conversely.

If the equipment is to be made up primarily for the use of an infantryman the device for strapping the rifle to the back right hand portion of the belt can be removed. The haversack and waterbottle are then slung from the ends of the brace members in the manner described. A knapsack of the kind described in the Specification of the prior application for British Letters Patent No. 10,893/15 may then be mounted on the equipment the carrying straps being connected at their forward portions to the studs on the upper parts of the cartridge carriers if the knapsack is provided with key-hole slotted fittings for this purpose. Alternatively if as preferred the knapsack carrying straps are provided with hooks these hooks can engage the flat eyes formed on the members which carry the studs and are mounted on the upper parts of the cartridge carriers. If desired a cavalryman when dismounted and after rearrangement of his haversack and waterbottle as above described can carry a knapsack in this manner as the necessary connections are provided on his equipment. Yet further if the infantryman requires accommodation for additional cartridges the necessary pockets can be mounted on the back portion of the belt behind the main cartridge carriers. For example a pocket of suitable type and dimensions is provided with one or more loops or other attaching devices on its back and through these loops the back portion of the belt is passed. The pocket thus lies preferably immediately behind the main cartridge carrier. A bayonet frog of suitable type can also be carried on the belt by passing the latter through loops on the frog which then lies on the left hand side adjacent to the main cartridge carrier, and between it and the extra pocket if the latter is used.

In the case of an infantry form of the equipment the sliding straps which lie on the braces are not required and these can be drawn out of the retaining loops and either not supplied with the equipment when made up for this purpose or retained for use if it is desired to adapt or modify the equipment in other ways in the manner described.

Yet again if the equipment is to be arranged for the use of officers the haversack and waterbottle can be slung as already mentioned from the ends of the brace members or carried as for a cavalryman. The cartridge carriers however in this case are replaced by fittings suitable for an officer. For instance a pistol holster is arranged on a suitable backing with a pocket adapted to hold pistol ammunition above it. This member has the necessary belt connection and front fastening device and takes the place of the left hand cartridge carrier and is provided at its upper part with the slide or buckle having the stud and eye as described in the case of the cartridge carrier. The right hand cartridge carrier is replaced by two superimposed pockets mounted on a suitable backing the upper and smaller pocket being adapted to contain a compass or other like article and a larger one below to contain field glasses. The backing on which these pockets are mounted is arranged as the cartridge carrier which it replaces so as to be connected to the back portion of the belt and thus make up the whole belt. This pocket member also has a front fastening device and the connections for the shoulder straps similar to the cartridge carrier. Should the officer require to carry a knapsack this can be superimposed in exactly the same way as the private's knapsack the necessary attachment devices being present.

In place of the waterbottle carrier being in skeleton form it may be constructed somewhat as a bottomless bucket having a strap across the bottom which prevents the bottle from falling out. This bucket may be made up of a strip of material of suitable width strengthened along one edge and folded round with the ends joined conveniently by a strap which runs down the seam across the open lower end and up the other side. Two tabs on the upper edge carry slides or buckles while on the opposite face is a stud. This waterbottle carrier may be slung from the equipment in the following way. The forward end of the left

hand brace strap is passed through one of the buckles on the carrier. A short strap is provided having at one end a key-hole slotted member adapted to engage the stud on the outside of the waterbottle carrier. This strap is carried thence rearwards through one of the flat loops or eyes mounted as already described on the back portion of the belt at its lower edge and adjacent to the pendant key-hole slotted member already mentioned as being disposed there. The end of the strap is then carried forward again and through the second buckle on the waterbottle carrier. By disengaging the key-hole slotted member from the stud on the carrier the bottle is freed to the extent necessary to enable it to be drawn forward when it can be removed from the carrier for use. When returned and in place the bottle is prevented from undue movement while being slung in a convenient position.

The waterbottle carrier in this form may if preferred be disposed on the right hand side and mounted in a similar manner. The arrangement can then be the same as that previously described for cavalry use where the waterbottle carrier in skeleton form and the haversack were separated. To attach the bucket form of carrier a short strap must be mounted on the right hand cartridge carrier so as to project rearwardly from its upper part, the waterbottle carrier being attached thereto. The bottle carrier is connected rearwardly to the flattened eye or ring on the right hand rear part of the belt by the strap already described as provided with a key-hole slotted member. This strap passes from the carrier through this eye and back to the stud on the bottle carrier. The stud in this form of the bottle carrier may conveniently be so disposed, for instance in a mid-position, so that it is equally available for engaging the key-hole slotted member on the end of the strap whether the bottle is arranged on the right or on the left hand side of the wearer.

The equipment and the various parts thereof may all or some of them be constructed of woven fabric, leather or other suitable material. Preferably all the parts are constructed of woven fabric the straps being of standard widths together with the slides and buckles so that these straps will be interchangeable. Preferably all the strap portions are of the same width except the wider middle parts of the shoulder straps or braces. The portions which are permanently attached to each other may be fastened together by sewing, rivetting or otherwise as found convenient but a feature of the construction is that the equipment is as a whole built up of parts which can all be readily separated or assembled and in their separated forms are of simple standard construction. Thus in the event of one portion requiring renewal or replacement this can be easily and quickly effected.

Dated this 23rd day of June, 1916.

KILBURN & STRODE,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements in or relating to Military Equipments.

We, THE MILLS EQUIPMENT COMPANY LIMITED, Manufacturers, and ALBERT ALEXANDER LETHERN, Designer, all of 72, Victoria Street, Westminster, London, S.W., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to military equipments and has for its object to effect certain improvements in equipments of known type with a view to enabling an

equipment to be constructed in the first instance for the use of cavalry or infantry which will be capable of conversion or adaptation for other uses as occasion may require, also to permit various forms of equipment to be built up from standard parts.

The equipment forming the subject of the present invention is based primarily on the main features embodied in the prior British Patents Nos. 28,812 dated 18th December 1906 and 23,586 dated 25th October 1911 granted jointly to the present applicant company. As previously constructed equipments of this nature have usually been made in the first instance in a form suitable to the particular purpose for which they were intended to be used as for instance equipments for the use of infantry or cavalry or officers of either branch of the service, and while owing to the construction and arrangement of the parts it was possible to effect some modifications in the disposition of the various members forming the whole equipment there has not been present in these earlier constructions such a standardization of the parts that it was possible to construct from these parts different types of equipment without structural modifications or other substantial alterations. Also such known equipments could not be adapted to varying uses as for instance where a cavalryman was employed dismounted and required to have his equipment arranged as for infantry work. In the present equipment these defects are remedied and an equipment produced which can be modified in the various ways indicated.

The improved equipment comprises as a basis an arrangement of belt, main cartridge carriers and shoulder straps or braces such as is already known and described in the Specifications of the prior British Patents above referred to and more particularly No. 23,586 of 1911. The belt in that construction is composed of a back portion the ends of which are adjustably connected to two cartridge carriers which form the front part of the belt and can be jointed at the front of the wearer.

The shoulder straps or braces are connected by buckles or slides to the back portion of the belt and after crossing over each is attached to the upper part of a cartridge carrier by a buckle or slide. The ends of these braces extend below the belt and carriers so as to be available for attachment of articles if desired.

According to this invention these basic parts of the equipment are of standard dimensions and provided with standard fittings and accessories so that articles such as a haversack, water bottle or the like can be attached thereto or mounted thereon in various positions according to the requirements of the wearer without reconstruction of the equipment or the employment of parts or members which do not find a place in the standard parts. Further, in order to provide for cavalry use where it is desirable to sling the rifle over the shoulder a device disposed on or adjacent to the upper part of one of the cartridge carriers is provided for the purpose of attaching the rifle sling thereto in a manner which enables the weight to be taken and partly balanced by the cartridge carrier so that there is no pressure by the rifle sling across the chest while the rifle itself is held against a pad or the like disposed to one side of the back part of the belt in such a manner that it can readily be freed when required for use but is normally prevented from inconvenient movement. The water bottle can be mounted on the outside of the haversack and the latter slung from a shoulder strap and fixed to the belt in such a way that it can be released and though not entirely freed from the equipment yet available so that it can be drawn from under the wearer's arm into a position where access can be readily had to the water bottle. Alternatively the water bottle can be separated from the haversack and slung in the same way as the haversack but on the opposite side. A similar attachment to a shoulder strap and to the belt is employed so as to permit of the bottle being freed for access. Either the haversack or the bottle in this case would occupy the position in which the rifle when slung would lie to one side against the lower part of the wearer's back. Obviously in such an arrangement, however, the rifle could not then be slung without altering the position of

one of these articles. Such arrangements as these are particularly suited for cavalry use but if desired the water bottle and haversack can be separately suspended from the belt on opposite sides as for infantry use. Yet further if a knapsack is required this can be applied to the standard equipment without difficulty and in such a manner that it can readily be mounted on the equipment or detached therefrom after the manner described in the Specification of the British Patent No. 10,893 dated 27th July 1915 granted jointly to the present applicant Company.

The equipment permits of additional cartridge carriers being mounted if desired on the belt while a bayonet frog can also be carried on the back portion of the belt. Further if it is desired to adapt the equipment for officers' use the cartridge carriers may be removed and replaced by a revolver holster, ammunition pockets, a case for field glasses and pockets for carrying a compass and other articles or yet again these fittings or some of them may be replaced by pockets or pouches adapted to carry medical necessaries. Thus on the members forming a basis such as described it is possible by standardization of the parts and suitable arrangements of the connections and details of construction to make up equipments in various forms or to modify the disposition of the articles carried on the equipment as primarily made up so as to meet various requirements and conditions.

The construction of the improved equipment may now be described in detail with reference to the accompanying drawings in which,

Figure 1 illustrates one form of the improved equipment displayed or spread out to show the exterior appearance.

Figure 2 is a similar view but showing the inner side of the equipment.

Figure 3 is an exterior view of the belt portion only showing certain modifications.

Figure 4 shows an alternative fitting for the belt when employed for the use of an officer.

Figure 5 shows the companion alternative fitting to that illustrated in Figure 4.

Figure 6 is a perspective view of a part of the equipment showing the manner of releasing the haversack and water bottle for the purpose of giving access to them.

Figure 7 shows a part of the belt with an alternative arrangement for carrying the water bottle.

Figure 8 illustrates by itself the device for holding the rifle to the back of the belt.

Figure 9 is a perspective view of a detail.

Figure 10 is a perspective view showing the structure of the haversack.

Figure 11 is a perspective view of a knapsack such as is intended to be employed with the improved equipment.

Like letters indicate like parts throughout the drawings.

The basis of the equipment is comprised by two cartridge carriers A, which are attached to the ends of the belt strip so as to make up together the complete belt, the cartridge carriers being separable from the belt portion B. Each carrier conveniently comprises a known arrangement of three cartridge pockets on a backing the pockets being arranged two or more on the belt line and one or more above them. The forward edge or portion of each cartridge carrier is provided with a belt fastening member attached to the carrier or its backing by sewing or otherwise. This member preferably comprises as shown in Figures 1, 2 and 3 a frame composed of two parallel members $C\,C^1$ connected at their ends and having towards one end an eye C^2 preferably formed square and towards the other end a somewhat flattened broad hook C^3 of the same approximate width as the eye. These fastening members are formed similar except that the hook C^3 of one member is turned in one direction while the hook of the other member is turned in the opposite direction and thus when the

members are attached to the cartridge carriers and the latter are in place the hook C^3 of one member is in a position to engage the square eye C^2 of the other member so that interlocking of these devices is effected and a convenient fastening is provided for the front ends of the belt.

On the upper part of each cartridge carrier is mounted an attachment device A^1 formed conveniently of three parallel members connected at their ends one of these members preferably being rather shorter than the other and thus forming two flattened eyes of different lengths. The device is attached to the cartridge carrier by a broad strap A^2 (Figure 2) passing through the wider eye of the device while through the narrower eye is passed a short strap A^3 which is sewn or rivetted in place or otherwise fixed. The other end of this short strap carries a buckle or slide of the following form. This slide which is shown separately in Figure 9, comprises two parallel members D D^1 connected at their ends and a third parallel member which is mutilated by a central portion being removed thus forming two inwardly directed fingers or hooks D^2. This device is similar to one already extensively used in equipments of this kind as a buckle or slide without tongue. In the improved construction however this slide has mounted on it a stud D^3 of suitable shape and is provided with a flattened eye D^4. The end of the brace strap is passed through this buckle and adjustably held thereby and thus connected to the upper part of the cartridge carrier A leaving the eye D^4 and the stud D^3 free for other uses which will be referred to hereafter.

The rear end of each brace passes through a slide or buckle B^1 attached by a short strap B^2 to the back portion B of the belt. Both straps B^2 may be sewn or otherwise permanently connected to the belt as shown in Figure 3 or as in the arrangement illustrated in Figures 1 and 2 only the buckle B^1 which lies towards the left hand side of the back part B of the belt is thus connected thereto while in the case of the other buckle B^1 on the right hand side the strap B^2 is formed as a loop through which the belt B is passed. One of the braces E has attached to it by sewing or otherwise at a suitable point in its length and in its back portion a strip E^1 of material forming a loop of such dimensions that the other brace can pass freely through this loop. This is at the point where the braces cross on the back of the wearer and keeps them in place while permitting free play of these braces one with relation to the other. Each brace E is conveniently formed broader about its middle portion where it passes over the shoulder of the wearer and on this broader portion of one or each brace are formed or mounted one or more loops E^2 of such width as to permit of the free passage therethrough of a strap F of less width than that part of the brace. To one end of this strap is attached a metal fitting F^1 having a key-hole slot in it adapted to engage the stud D^3 already described as being carried on the slide or fitting D mounted at the upper part of each cartridge carrier A. The arrangement is such that the forward end of this strap F can be thus attached to or disconnected from the upper part of the cartridge carrier A and when freed this strap can slide through the loop or loops E^2 on the brace E. One or both braces is thus provided with a sliding strap. In place of the fitting F^1 having a key-hole slot the forward end of this sliding strap F may have a flattened hook adapted to engage the eye D^4 mentioned as being provided near the stud D^3 on the slide D carried by the upper part of the cartridge carrier.

At a suitable point in the back portion B of the belt and preferably adjacent to the point of attachment of one of the braces E is placed a fitting B^3 having a key-hole slot in it this fitting being carried so as to hang downward on a short strap which may be the same strap B^2 which carries the buckle B^1. Two such devices are preferably disposed on on each side of the back portion of the belt as shown in Figures 2 and 3. Adjacent to one or both of these devices a flattened metal eye B^4 of suitable dimensions is attached to the belt B. These fittings are all employed for purposes to be hereinafter described. On the back por-

tion B of the belt and towards one side thereof there is mounted a pad or plate G against which the rifle can be held when slung on the shoulder. This pad, which is shown separately in Figure 8, serves to prevent chafe and is conveniently formed of a strip of material faced with fibre, leather or other suitable substance, the back of the pad or plate being provided with loops G^1 through which the belt B is passed. At one end of this pad there is mounted a slide or buckle G^2 and through this slide is passed one end of a strap G^3 which as clearly indicated in Figure 8 is conveniently faced or lined as to part of its innerside with material adapted to take the wear or chafe of the rifle against which it lies. The other end of this strap G^3 carries a hook G^4 of the following construction which is adapted to engage a flattened metal eye H rivetted or otherwise securely attached to the rear portion of the adjacent cartridge carrier A. This is that carrier which lies on the right hand of the front of the wearer the rifle being usually slung over the left shoulder with the butt pendant behind the right hip as shown in Figure 1. The hook in question is formed of a single piece of wire of suitable thickness doubled on itself to form a flat loop G^5 and then twisted as at G^6 so as to connect the two parts together. The two ends of the wire thus extend at right angles to the flat loop G^5 and being slightly separated the end of each is curved into the form of a hook G^4, the two hooks being oppositely directed and lying side by side. There is thus formed a spring hook composed of two separable members between which the eye H which the hook G^4 is intended to engage can be passed, the hooks being sprung apart in the process. When the eye is engaged it is impossible to disengage the hook except by suitable manipulation thereof so as to bring the hooks into a position such that they can be drawn away from and permit the passage between them of the eye. By means of this device the rifle can be securely strapped against the side and back of the wearer in the manner shown in Figure 1 but readily released when required for use. The rifle sling J is conveniently provided with some device such as a pendant strip J^1 which forms part of the sling and when the latter is placed over the shoulder permits the rifle to be connected by a key-hole slotted member J^2 on the pendant strip J^1 to the stud or eye D^3 on the upper part of the left hand cartridge carrier A thus leaving the sling J free to pass loosely over the chest of the wearer.

The haversack K which is shown separately in Figure 10 is provided at its rear upper corners with two slides or buckles K^1 and two tabs or short straps K^2. On the front edge of the flap cover K^3 are two short tabs or straps K^4 K^5 which lie one over the other, of these the undermost K^4 is adapted to engage a slide or buckle K^6 mounted on the face of the outer or front wall of the haversack. The haversack itself may be constructed in various ways but is conveniently built up of a broad strip of suitable material folded so as to form the front and back walls and the flap or cover. A narrow strip K^7 of the same material is then attached along the bottom and carried up to form the ends or sides, the ends K^8 of the narrow strip being then directed inwards to form inturned flaps which lie beneath the cover K^3 and partly over the mouth of the haversack so as to assist in retaining the contents in place. These flaps K^8 are preferably sewn along one edge to the cover of the haversack at or near what may be termed the hinge line of the cover so as to obviate having to fold them in before closing the haversack. With this arrangement when the cover K^3 is lifted the flaps K^8 also tend to lift partially with it and are free to be lifted along their outer edges and conversely when the cover is closed the flaps automatically go back into place. On the under side of the haversack preferably about the centre is fixed a stud K^9. The second tab or short strap K^5 on the front edge of the cover K^3 serves as one of the means for attaching and mounting the water bottle carrier on the haversack. In one form this carrier is in the main similar to a known type and comprises straps which pass round the waterbottle and under it. One of these straps L which passes from one side of the waterbottle to the other round and under its base carries at each end a slide or buckle L^1. At the

bottom of the skeleton carrier is mounted another slide or buckle L^2. The latter when the bottle is to be mounted on the haversack K engages the uppermost short strap or tab K^5 above described as being provided on the front edge of the haversack cover K^3. The slides L^1 on the ends of the side straps L of the waterbottle carrier are adapted to engage the tabs K^2 on the upper corners of the haversack (see Figures 1 and 6) so that the waterbottle is then mounted on the flap K^3 of the haversack in such a way that access can be readily had to the contents of the haversack since when the cover is opened the waterbottle is lifted with it. On the other hand the waterbottle itself is equally available for use.

That strap L^3 forming part of the skeleton bottle carrier which passes round the centre of the bottle is conveniently reinforced or thickened at two opposite points where most sharply curved so as to stiffen the strap and cause the carrier to tend to maintain its shape and remain open when the bottle is removed. This facilitates replacing the bottle. On the bottom of the carrier near the buckle L^2 but not appearing in the drawings is arranged a stud adapted to engage one of the key-hole slotted members B^3 mounted on the back portion B of the belt when the bottle is arranged in one of the positions hereafter described.

Supposing the above described members are to be arranged to form an equipment suitable for a cavalryman the waterbottle is mounted on the haversack K in the manner described and shown in Figure 1 and the haversack is attached to the equipment in the following way. One of the slides or buckles K^1 on the upper back portion of the haversack is engaged by a short strap A^4 which projects rearwardly from the upper part of the left hand cartridge carrier A. The other buckle or slide K^1 on the haversack is engaged by the rear end of one of the narrow straps F which lies over a shoulder strap or brace E and passes through the loops E^2 thereon this being the brace which runs across the right shoulder of the wearer. The other end of the sliding strap F is attached in the manner described to the stud D^3 at the top of the right hand cartridge carrier (see Figure 1). The stud K^9 at the bottom of the haversack is engaged by the key-hole slotted member B^3 pendant from the left hand back portion of the belt (see Figure 2). The haversack and waterbottle are thus firmly carried at the back of the wearer towards the left hand side. If it is required to have access to the haversack or waterbottle the stud K^9 at the bottom of the haversack is first disengaged from the key-hole slotted member B^3 and then the front end of the sliding strap F passing over the right shoulder is released from the stud D^3. It is then possible to draw the haversack K and waterbottle forward beneath the left arm into the position shown in Figure 6 though the haversack still remains suspended from the short strap A^4 which connects it to the left hand cartridge carrier A. The haversack can subsequently be replaced by pulling on the sliding shoulder strap F and again fastening the end thereof by engaging the member F^1 with the stud D^3 after which the stud K^9 beneath the haversack is once more engaged by the member B^3 pendant from the back of the belt B. With this arrangement of the equipment the rifle can be slung with the sling strap J passing over the left shoulder the weight being taken and balanced to a considerable extent through the pendant strip J^1 by the left hand cartridge carrier A in the manner already described. The rifle is held firmly against the back of the wearer towards the right hand side by the strap G^3 with hook device G^4 which passes round the rifle and holds it against the chafing pad or plate G. When the breech or butt end of the rifle is thus held a certain amount of the weight thereof is taken by the belt at this point owing to the rifle being kept close to the body and not being allowed to swing freely. In this way the total weight of the rifle may be considered to be distributed between the shoulder of the wearer, the cartridge carrier A on the left hand side in the front and the belt B on the right hand side at the back.

If the rifle is not to be slung, the waterbottle, in place of being mounted on the outside of the haversack K in the manner described above and shown in Figures 1 and 2, may be separated from the haversack and disposed on the

opposite side of the back of the wearer against the belt B in the same way as the haversack. If so arranged the waterbottle is connected by one of the slides or buckles L^1 with which it is provided at its upper part to the rear end of one of the straps F which slides over a shoulder strap E, this connection being the same as that employed for suspending one corner of the haversack. This strap F is not shown in the drawings but is similar in every way to the strap F illustrated in Figures 1 and 2 and passes through loops E^2 disposed on the brace E which passes over the left shoulder. The other upper buckle or slide L^1 of the waterbottle carrier is connected to a short strap which extends rearwardly from the upper part of the cartridge carrier on the side where the bottle is disposed. This strap which is not shown in the drawings is similar to the strap A^4 and the method of connection is the same as that employed for the forward corner of the haversack. Finally the stud on the underside of the bottle carrier is engaged with one of the key-hole slotted members B^3 provided for this purpose on the back portion B of the belt. The suspension of the waterbottle is thus identical with that employed for the haversack when arranged for cavalry use and the bottle can be partially released so that it can be drawn forward under the arm of the wearer in the same manner as a similar operation can be performed with the haversack as above set forth and shown in Figure 6.

If now a cavalryman is dismounted and it is desired to arrange his equipment as for an infantryman, the rifle can be removed and carried in the usual way. The haversack K and waterbottle may then be detached from the equipment and slung one on either side of the wearer in the following way. As already mentioned the ends of the brace straps E extend beyond their points of attachment in the front to the cartridge carriers A and in the rear to the back portion B of the belt. These ends E^3 of the brace members can thus be utilised to engage the slides or buckles K^1 and L^1 mounted on the upper parts of the haversack K and waterbottle carrier respectively. According as it may be convenient the waterbottle may be thus slung at the right hand side and the haversack at the left hand side or conversely.

If the equipment is to be made up primarily for the use of an infantryman the device G G^3 G^4 for strapping the rifle to the back right hand portion of the belt B can be removed. The haversack and waterbottle are then slung from the ends E^3 of the brace members E in the manner described. A knapsack M such as shown in Figure 11 which is of the kind described in the Specification of the British Patent No. 10,893 of 1915 may then be mounted on the equipment the carrying straps M^1 being connected at their forward portions to the studs D^3 on the upper parts of the cartridge carriers A if the knapsack is provided as shown in Figure 11 with key-hole slotted fittings M^2 for this purpose. Alternatively if as preferred the knapsack carrying straps are provided with hooks in place of the members M^2 these hooks can engage the flat eyes D^4 formed on the members D which carry the studs D^3 and are mounted on the upper parts of the cartridge carriers A. If desired a cavalryman when dismounted and after rearrangement of his haversack and waterbottle as above described can carry a knapsack in this manner as the necessary connections are provided on his equipment.

If the infantryman requires accommodation for additional cartridges the necessary pockets can be mounted on the back portion B of the belt behind the main cartridge carriers A. For example as shown in Figure 3 a pocket N of suitable type and dimensions is provided with one or more loops or other attaching devices on its back and through these loops the back portion B of the belt is passed. The pocket N thus lies preferably immediately behind the main cartridge carrier A. A bayonet frog O of suitable type can also be carried on the belt B by passing the latter through loops on the frog which then lies on the left hand side adjacent to the main cartridge carrier A, and between it and the extra pocket N if the latter is used as shown in Figure 3.

In the case of the infantry form of the equipment the sliding straps F which lie on the braces E are not required and these can be drawn out of the retaining

loops E^2 and either not supplied with the equipment when made up for this purpose or retained for use if it is desired to adapt or modify the equipment in other ways in the manner described.

Yet again if the equipment is to be arranged for the use of officers the haversack and waterbottle can be slung as already mentioned from the ends E^3 of the brace members E or carried as for a cavalryman for instance as shown in Figures 1 and 2. The cartridge carriers A however in this case are replaced by fittings suitable for an officer. For instance as shown in Figure 4 a pistol holster P is arranged on a suitable backing Q with a pocket R adapted to hold pistol ammunition above it. This member has the necessary belt connection Q^1 and front fastening device C and takes the place of the left hand cartridge carrier A, and is provided at its upper part with a slide or buckle D having the stud D^3 and eye D^4 as described in the case of the cartridge carrier. The right hand cartridge carrier is replaced by two superimposed pockets S and T mounted on a suitable backing Q as shown in Figure 5. The upper and smaller pocket S is adapted to contain a compass or other like article while a larger one T below will contain field glasses. The backing Q on which these pockets are mounted is arranged as the cartridge carrier which it replaces so as to be connected to the back portion B of the belt and thus make up the whole belt. This pocket member also has a front fastening device C and the connection D for the shoulder straps E similar to the cartridge carrier. Should the officer require to carry a knapsack such as M this can be superimposed in exactly the same way as the private's knapsack the necessary attachment devices being present.

In place of the waterbottle carrier being in skeleton form it may be constructed somewhat as a bottomless bucket L^3 having a strap across the bottom which prevents the bottle from falling out. Such a device and the method of using it is shown in Figure 7. This bucket may be made up of a strip of material of suitable width strengthened along the upper edge and folded round with the ends joined conveniently by a strap L^4 which runs down the seam across the open lower end and up the other side. Two tabs on the upper edge carry slides or buckles L^5 while on the opposite face is a stud L^6. This waterbottle carrier may be slung from the equipment in the following way. The forward end E^3 of the left hand brace strap E is passed through one of the buckles L^5 on the carrier. A short strap L^7 is provided having at one end a key-hole slotted member L^8 adapted to engage the stud L^6 on the outside of the waterbottle carrier. This strap L^7 is carried thence rearwards through one of the flat loops or eyes B^4 mounted as already described on the back portion B of the belt at its lower edge and adjacent to the pendant key-hole slotted member B^3. The end of the strap L^7 is then carried forward again and through the second buckle L^5 on the waterbottle carrier. By disengaging the key-hole slotted member L^8 from the stud L^6 on the carrier the bottle is freed to the extent necessary to enable it to be drawn forward when it can be removed from the carrier for use. When returned and in place the bottle is prevented from undue movement while being slung in a convenient position.

The waterbottle carrier in this form may if preferred be disposed on the right hand side and mounted in a similar manner. The arrangement can then be the same as that previously described for cavalry use where the waterbottle carrier in skeleton form and haversack were separated. To attach the bucket form of carrier L^3 a short strap must be mounted on the right hand cartridge carrier so as to project rearwardly from its upper part, the waterbottle carrier being attached thereto. This strap would be similar to the strap A^4 and is arranged and used in a similar manner being passed through one of the slides L^5. Through the other slide is passed the rearward end of a sliding strap F which is then arranged to pass over the left shoulder. If provided as is preferable with a stud on the bottom portion of the strap L^4 this stud is engaged with the key-hole slotted member B^3 on the belt. The bottle is then held on the right hand side in the same way as the haversack is arranged on the left side as

described and shown in Figures 1 and 2. Alternatively if it is desired to suspend the bottle when in the carrier L^3 on the right side instead of on the left as shown in Figure 7 it is connected rearwardly to the flattened eye or ring B^4 on the right hand rear part of the belt by the strap L^7. This strap passes from the carrier L^3 through this eye B^4 and back to the stud L^6 on the bottle carrier. The stud in this form of the bottle carrier may conveniently be disposed for instance in a mid-position, on the strap L^4 and not to one side thereof as in Figure 7 so that it is equally available for engaging the key-hole slotted member L^8 on the end of the strap L^7 whether the bottle is arranged on the right or on the left hand side of the wearer.

The equipment and the various parts thereof may all or some of them be constructed of woven fabric, leather or other suitable material. Preferably all the parts are constructed of woven fabric the straps being of standard widths together with the slides and buckles so that these straps will be interchangeable. Preferably all the strap portions are of the same width except the wider middle parts of the shoulder straps or braces E. The portions which are permanently attached to each other may be fastened together by sewing or rivetting or otherwise as found convenient but a feature of the construction is that the equipment is as a whole built up of parts which can all be readily separated or assembled and in their separated forms are of simple standard construction. Thus in the event of one portion requiring renewal or replacement this can be easily and quickly effected.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a military equipment the combination with a basic structure composed of a belt piece detachably connected at each end to a cartridge carrier or like alternative member and having crossed braces detachably connected at the back to the belt piece and at the front to the upper parts of the cartridge carriers or other members, of attaching members such as the stud D^3 and eye D^4 on the buckle D, straps A^4, slotted metal devices B^3, rings B^4, eye H, and sliding straps F with slotted metal devices F^1, all of which together with the ends E^3 of the braces and standard accessories such as a haversack, water bottle carrier, rifle holding device, extra cartridge pockets and bayonet frog enable an equipment to be made up on the same basic structure either for an officer, for a trooper or for a private and to be modified for cavalry or infantry use.

2. In a military equipment the combination with a basic structure as claimed in Claim 1 of a haversack constructed as described with flaps such as K^8 beneath the cover and having mounted on the edge of the cover flap K^3 short straps such as K^4 K^5 and further having attached to its upper corners at the back buckles or slides such as K^1 and short straps such as K^2 the haversack being capable of attachment to the main equipment in the alternative ways described and arranged if necessary to have the water bottle carrier detachably mounted on it as set forth.

3. In a military equipment the combination with a basic structure as claimed in Claim 1 of a pad such as G with detachable strap G^3 provided at one end with a spring hook G^4 the whole constituting a device which can be detachably mounted on the belt piece of the equipment for the purpose of holding the rifle when slung over the shoulder as set forth.

4. In a military equipment the combination with a basic structure as claimed in Claim 1 of a water bottle carrier such as L^3 L^4 having attached to its upper part buckles or slides such as L^5 and mounted on its side a stud L^6 with or without another stud mounted on its bottom, and a strap L^7 provided with a slotted metal device L^8 mounted at one end thereof, the carrier being so formed that it can be mounted or slung on the equipment in alternative ways so as to permit of ready access thereto when the bottle is to be removed as set forth.

5. In a military equipment the combination with a basic structure as claimed in Claim 1 and a haversack as claimed in Claim 2 of a skeleton water bottle carrier having buckles or slides such as L^1 mounted on the ends of a strap L, a buckle or slide L^2 mounted at the lower part of the carrier and a stud mounted at its base and the whole arranged so that it can be detachably disposed on the cover flap K^3 of the haversack or alternatively separately mounted on or suspended from the equipment as set forth.

6. In a military equipment the combination with a basic structure as claimed in Claim 1 of slides or buckles D D^1 D^2 each having a stud D^3 and an eye D^4 and mounted on the upper part of a cartridge carrier or of a like accessory as for officers' use, the stud D^3 being adapted to engage key-hole slotted metal pieces such as F^1 mounted on the sliding straps F, or M^2 mounted on the knapsack carrying straps, or such as J^2 on the end of a rifle sling J, while the eye D^4 is available to engage hook members which may be employed in place of the slotted members M^2 or J^2 as set forth.

7. In a military equipment of the kind described the combination with a belt composed of a belt piece such as B detachably connected towards its ends to cartridge carriers such as A or alternatively to accessory pockets such as P, R or S, T made up on backings for officers' use, of end fastening devices such as C, C^1, C^2, C^3 mounted on the cartridge carriers or like alternative members, and two short straps such as B^2 each carrying at one end a slide or buckle such as B^1 and at the other end a metal slotted piece such as B^3 and a ring B^4, the straps B^2 for these fittings being either both permanently attached to the belt portion B or one so attached and the other mounted on a loop so as to slide on the belt portion as set forth.

8. The combination and arrangement of parts constituting the complete military equipment as described and illustrated in the accompanying drawings.

9. The complete haversack constituting an accessory part of the described military equipment and the means for mounting it on this equipment and the means for mounting a water bottle on the haversack as described and illustrated in Figures 1, 2, 6 and 10 of the accompanying drawings.

10. The complete pad and strap device constituting an accessory part of the described military equipment which device together with the eye H serves to hold the rifle to the back of the belt as described and illustrated in Figures 1, 2 and 8 of the accompanying drawings.

11. The buckle or slide device constituting a fitting on the described military equipment as described and illustrated in Figure 9 of the accompanying drawings.

Dated this 4th day of December, 1916.

KILBURN & STRODE,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1917.

[This drawing is a reproduction of the original on a reduced scale.]

Fig. 1.

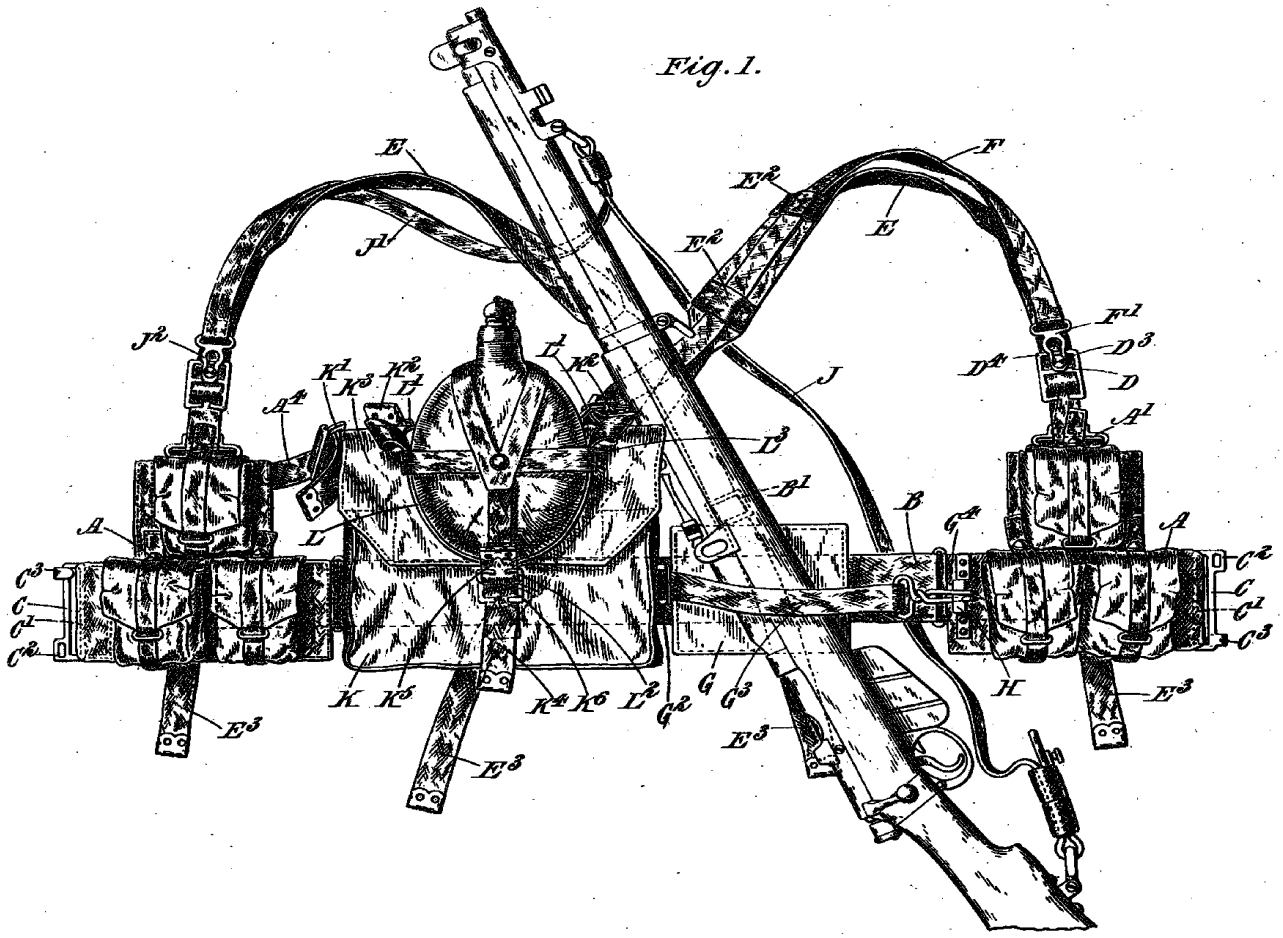
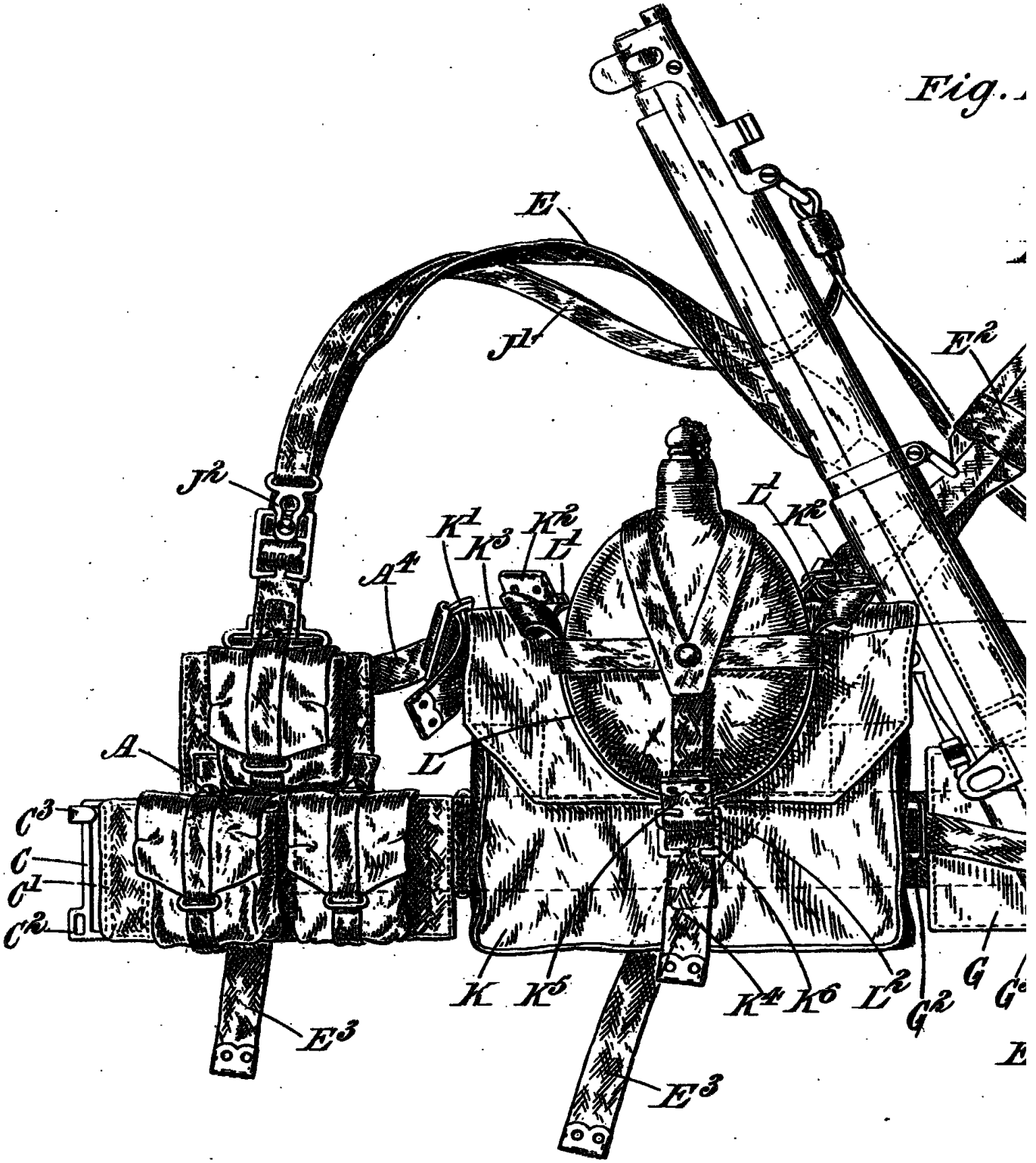


Fig.



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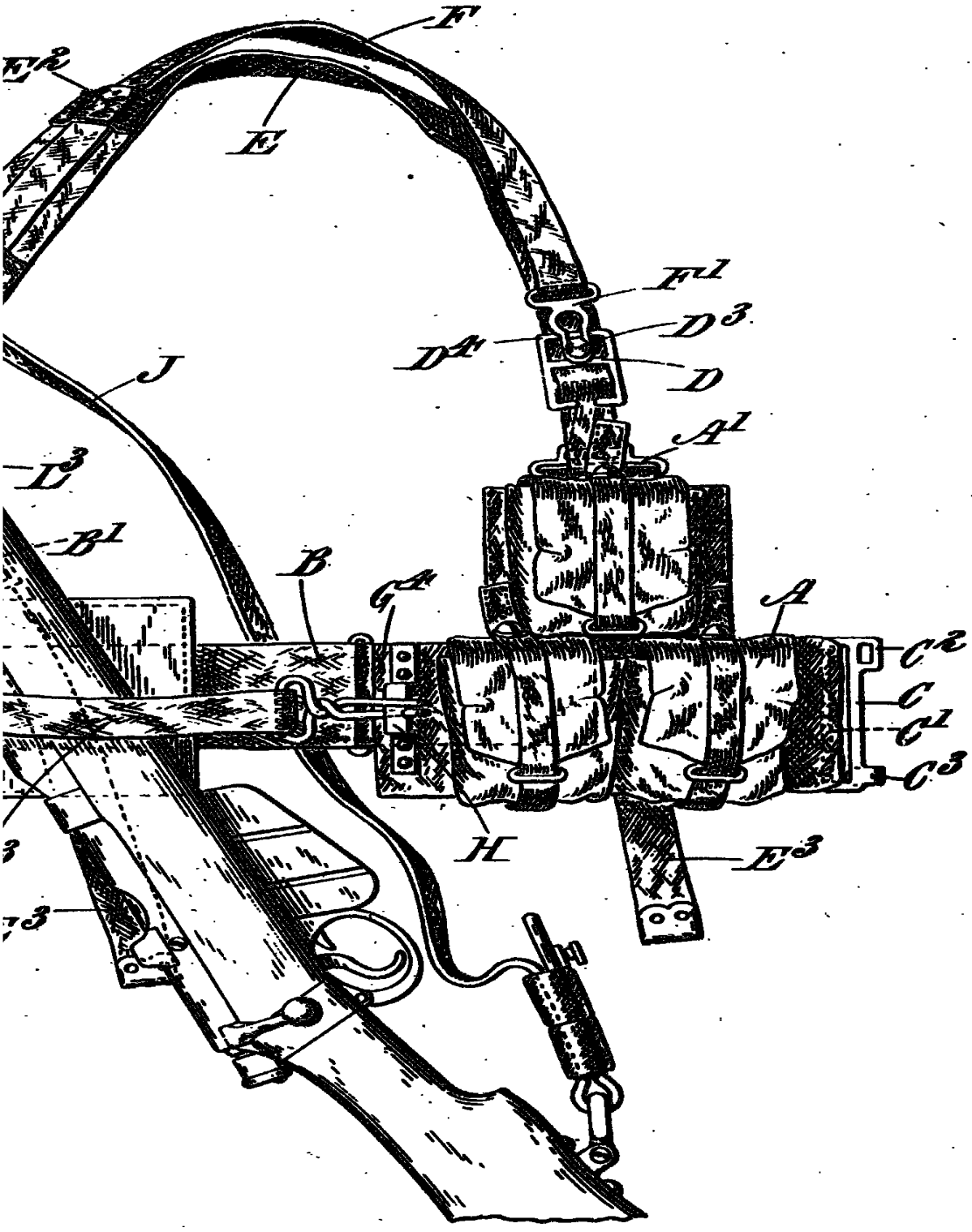

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Fig. 2.

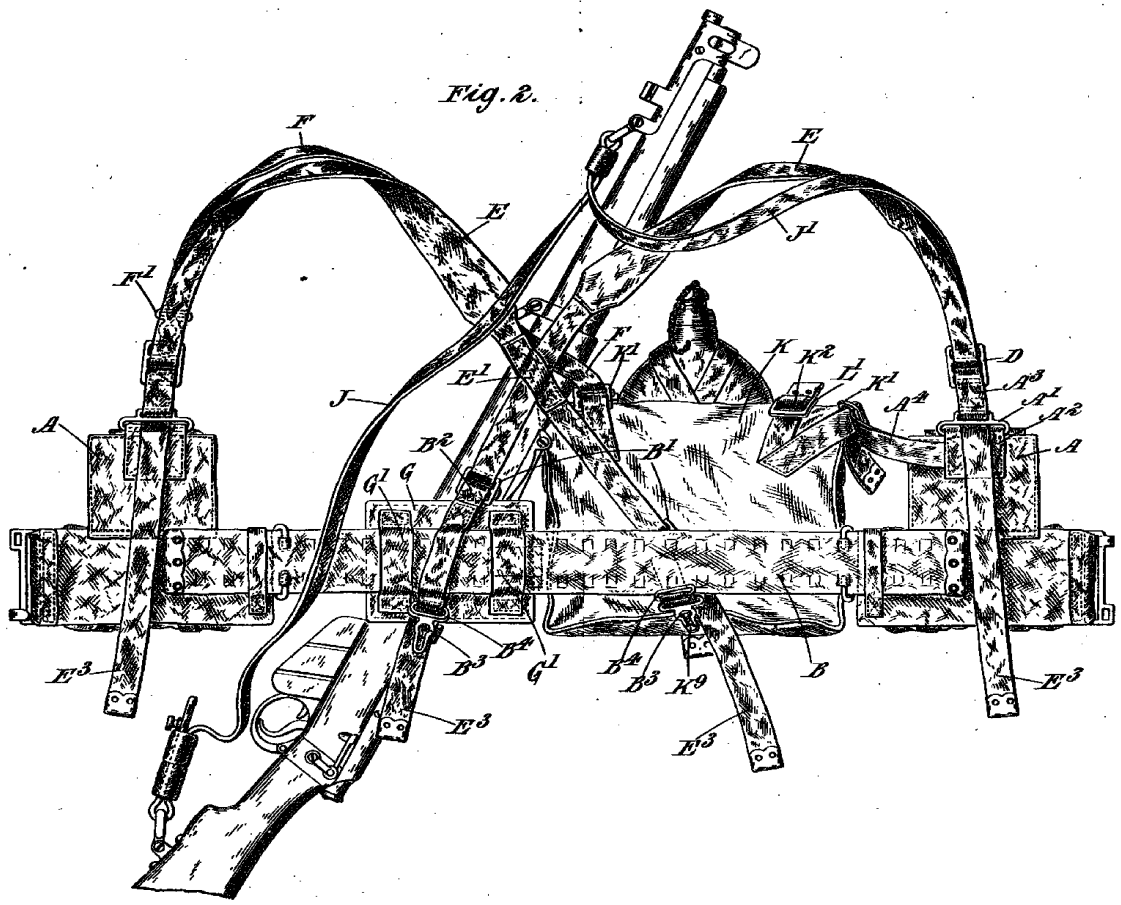
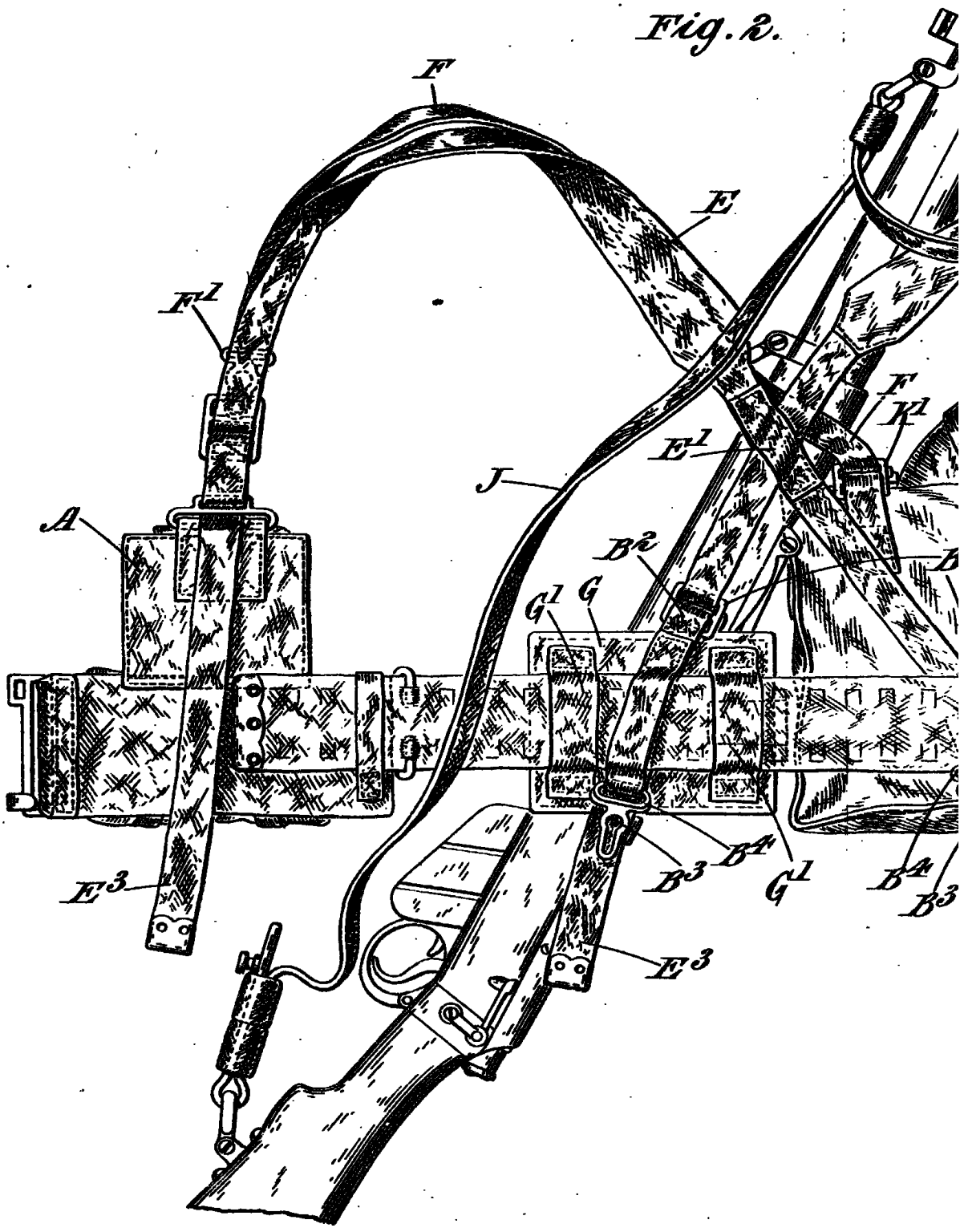
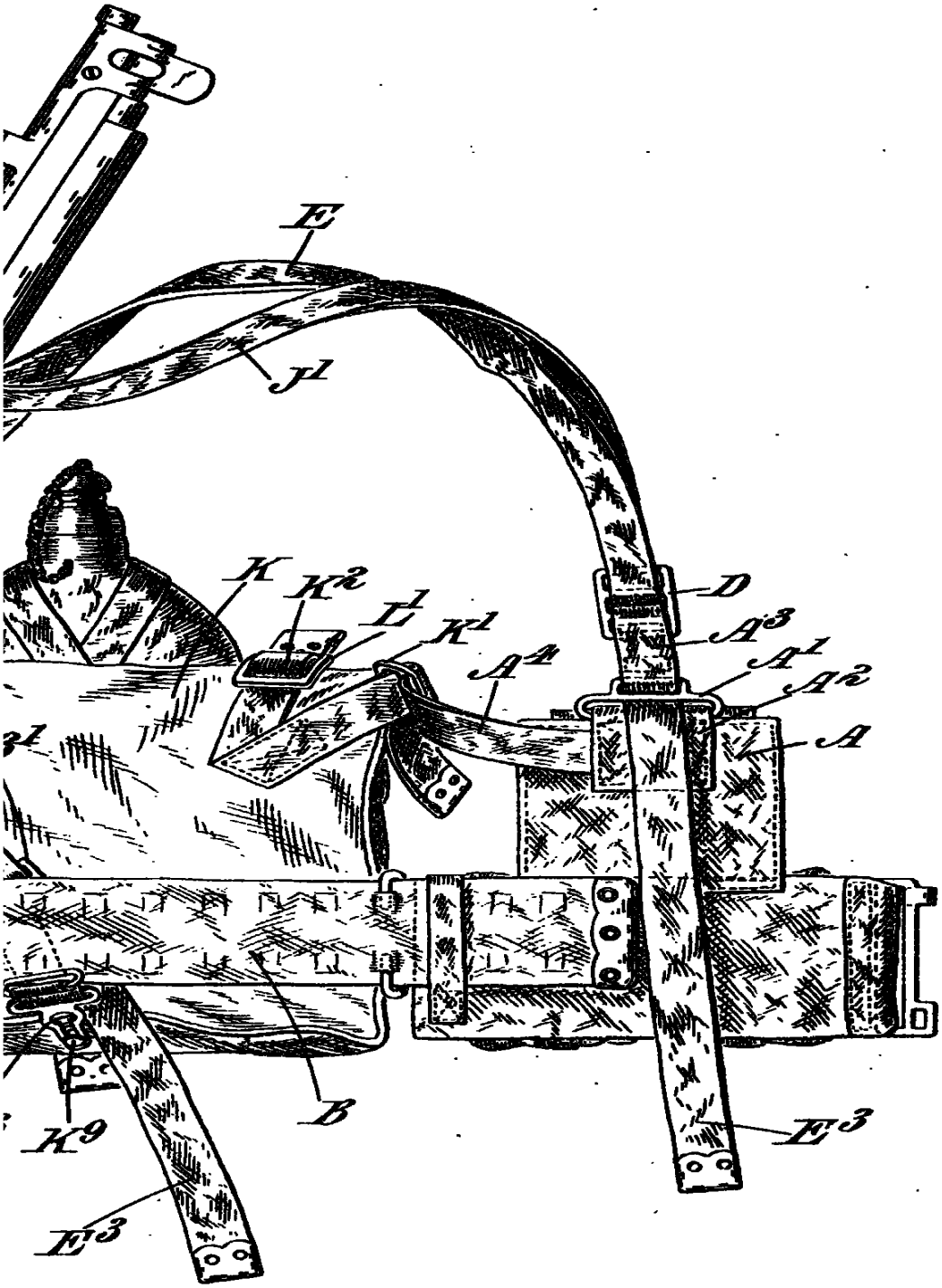


Fig. 2.





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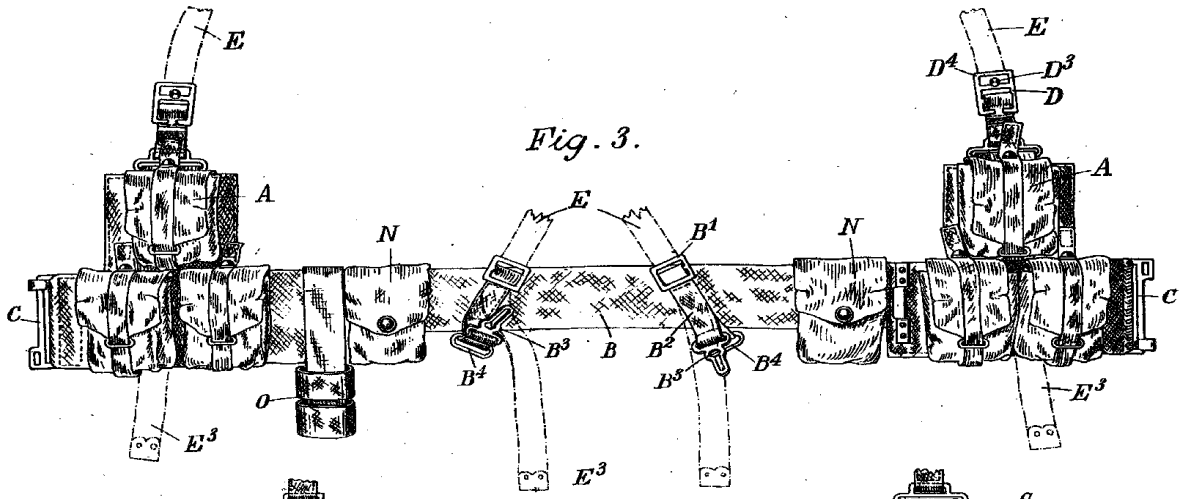


Fig. 3.

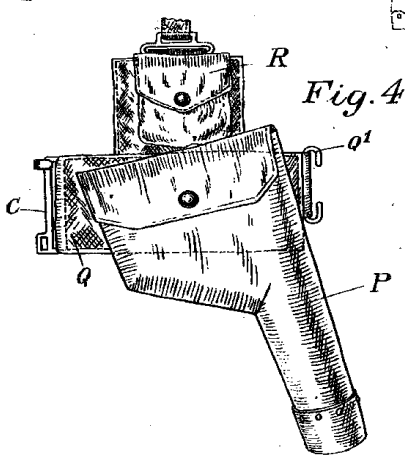


Fig. 4.

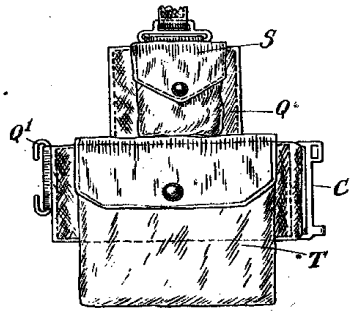


Fig. 5.

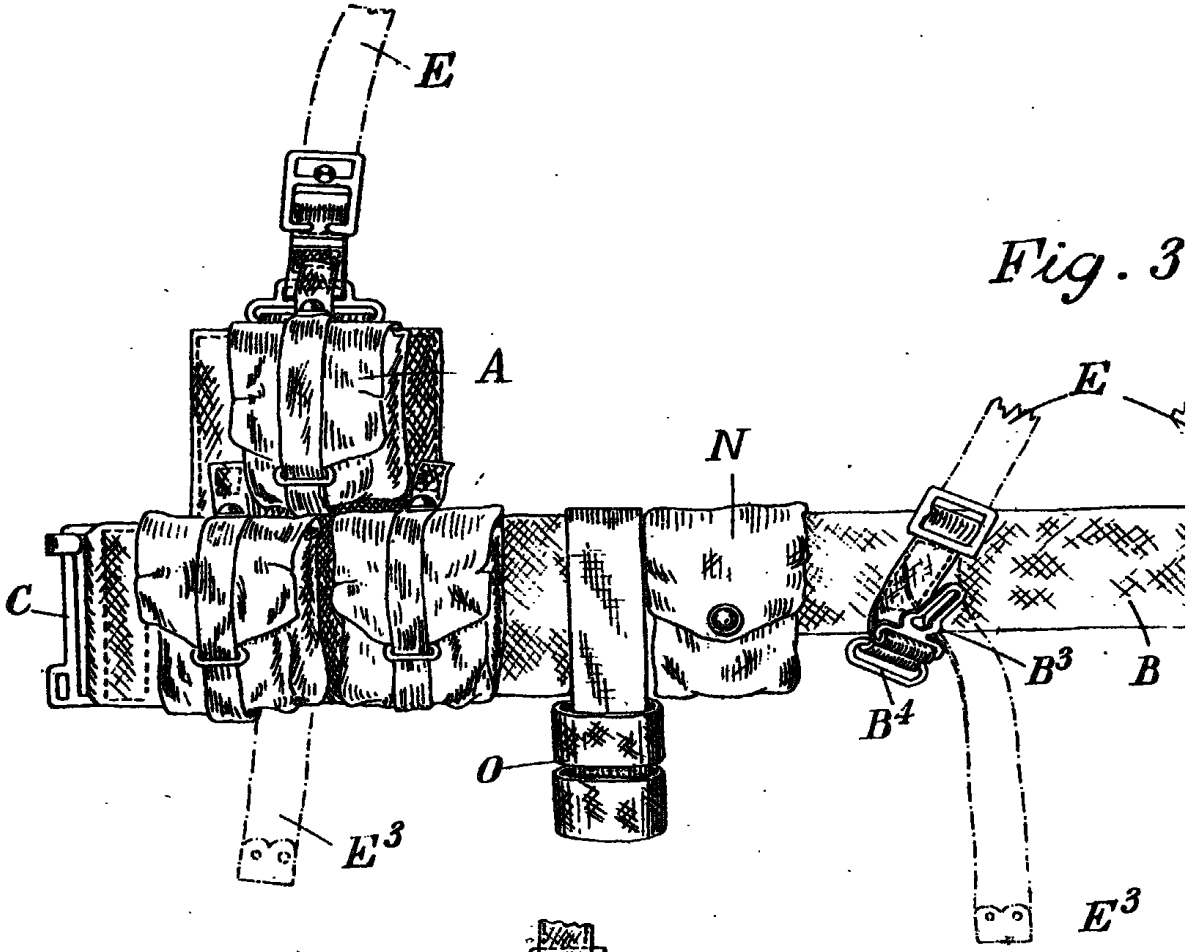


Fig. 3

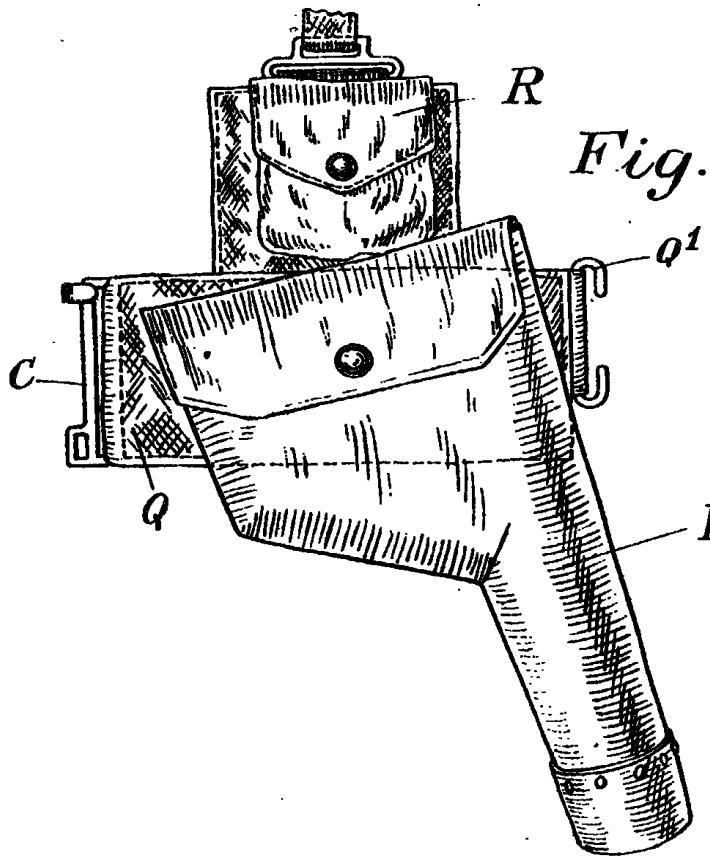


Fig. 4.

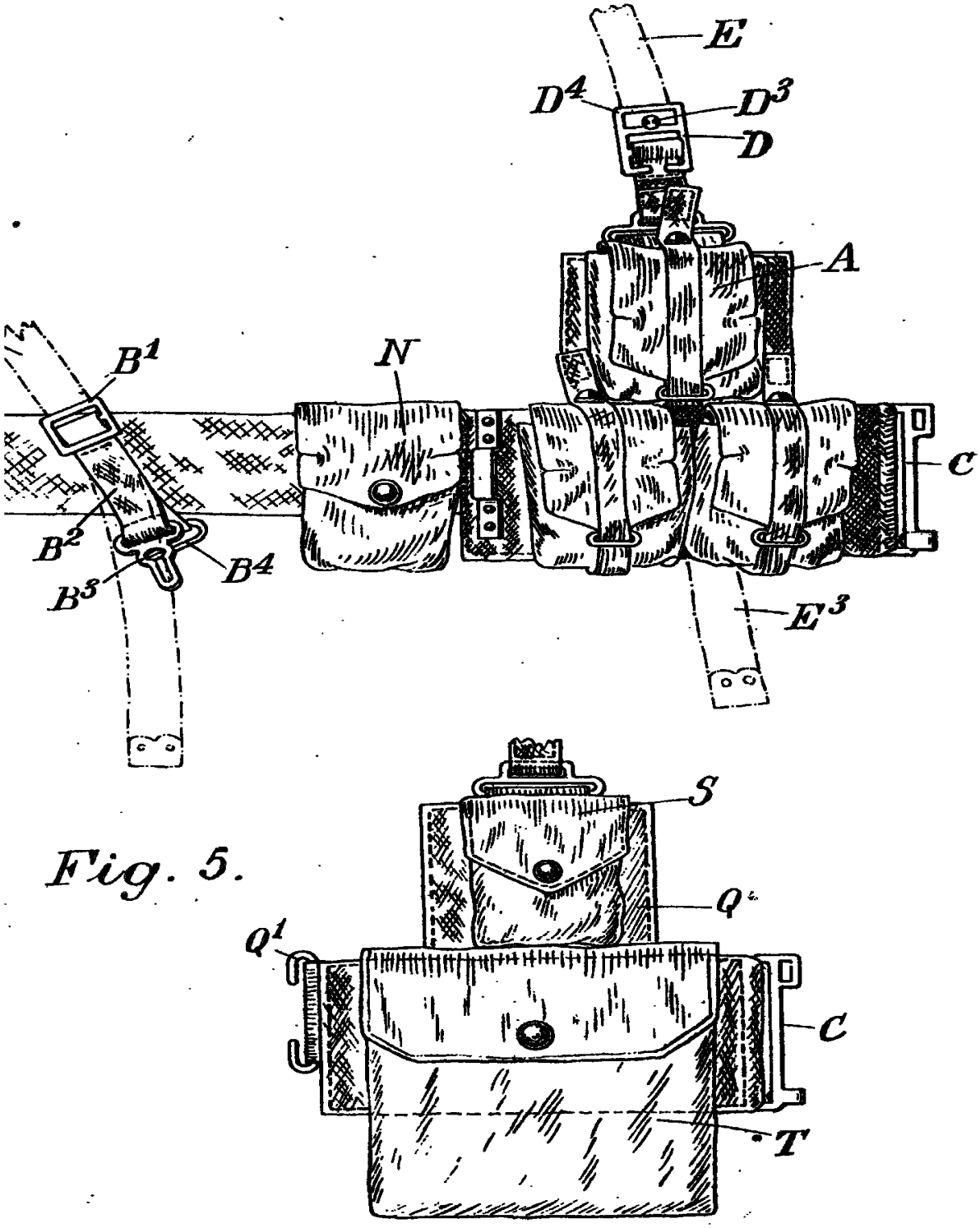
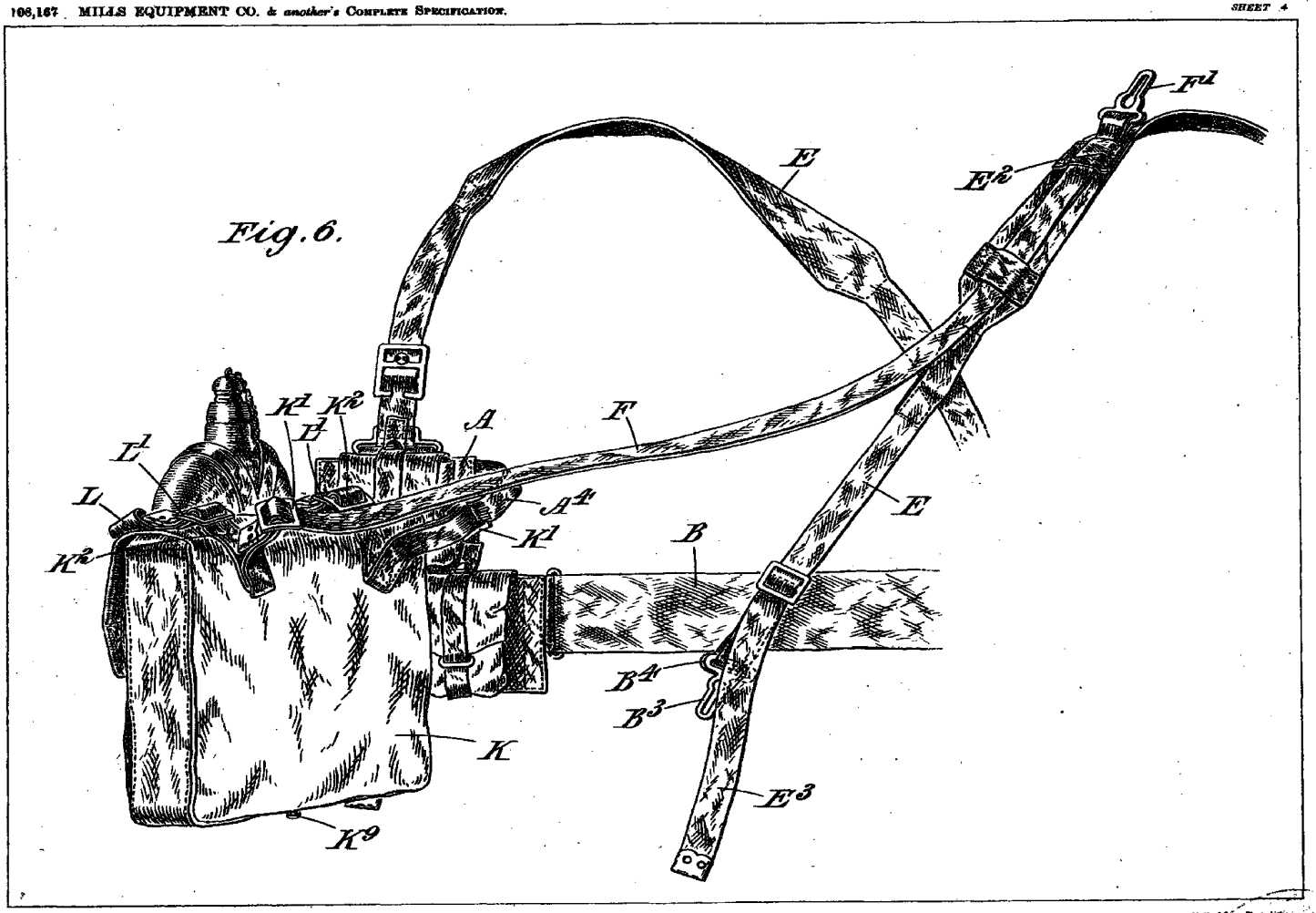


Fig. 5.



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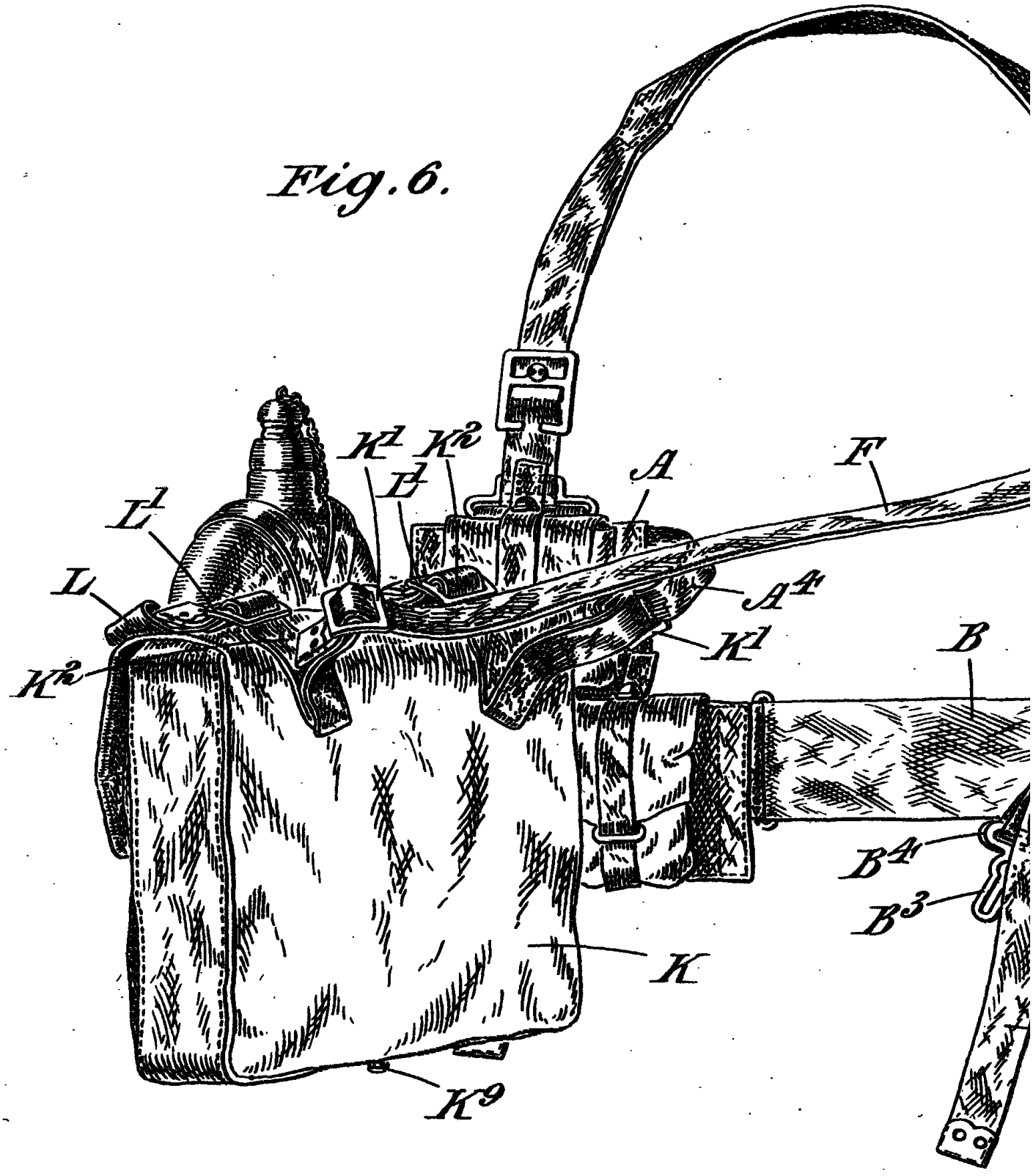

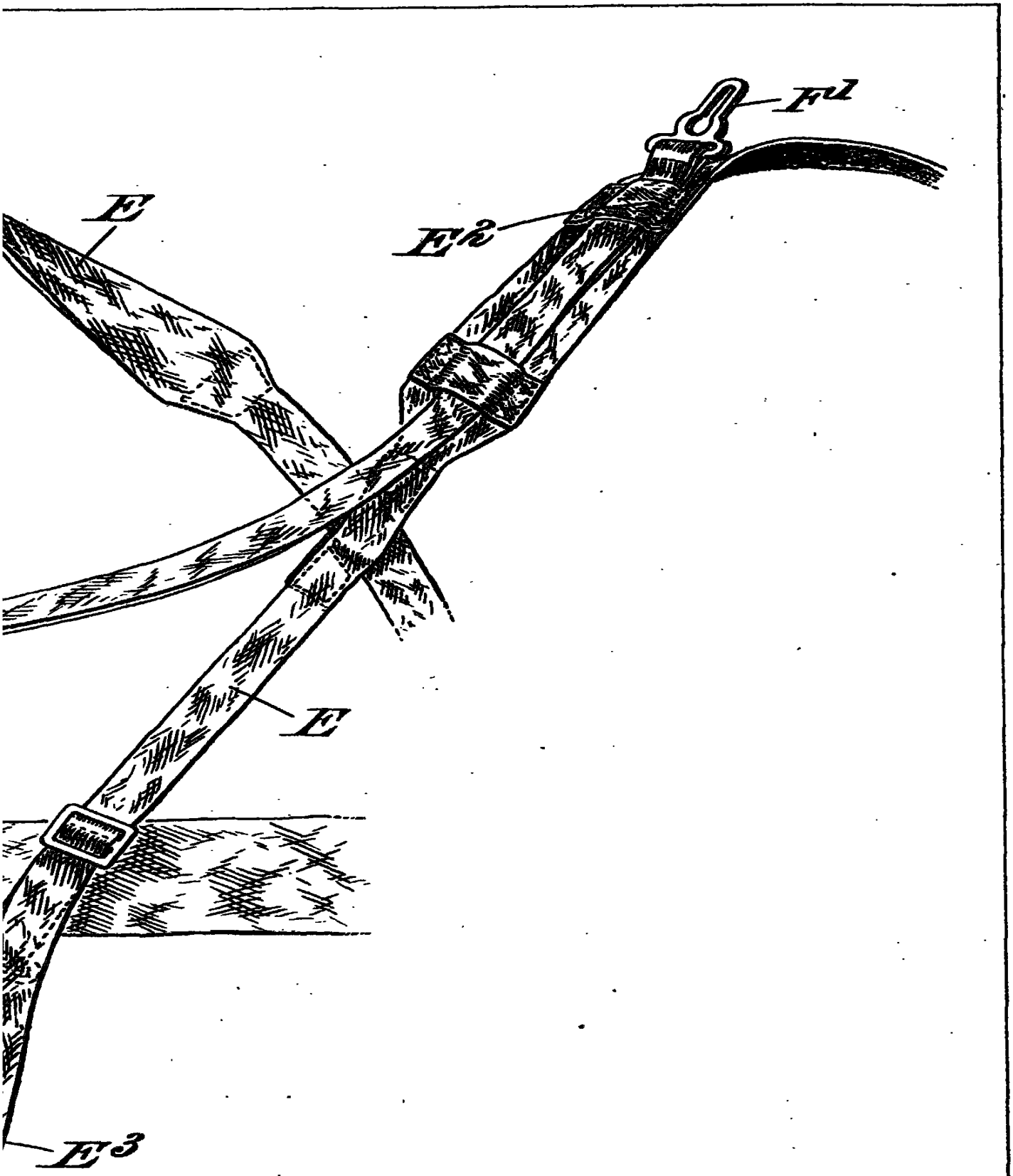

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SHEET 5.

Fig. 7.

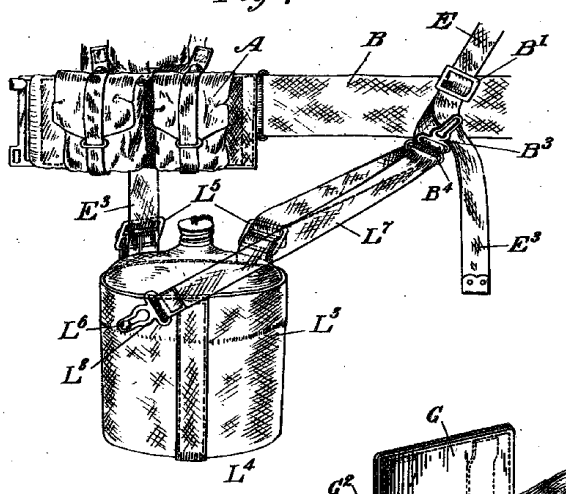
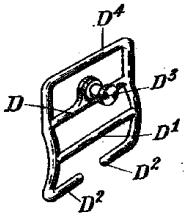


Fig. 9.



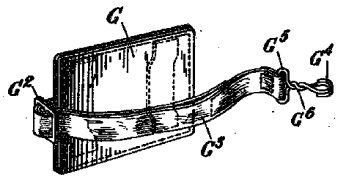


Fig. 8.

SHEET 6.

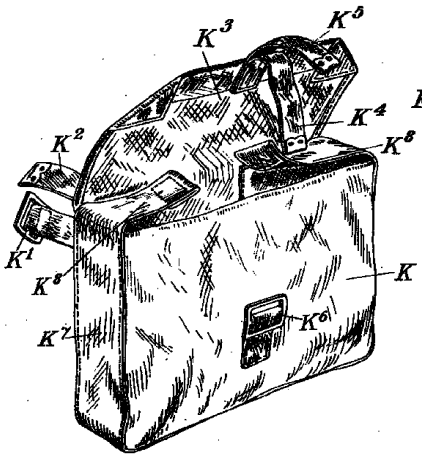
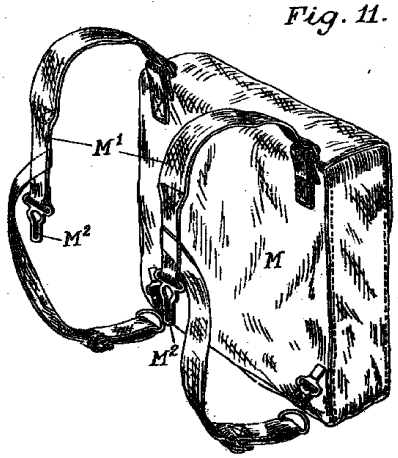


Fig. 10.

Fig. 11.



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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 7.

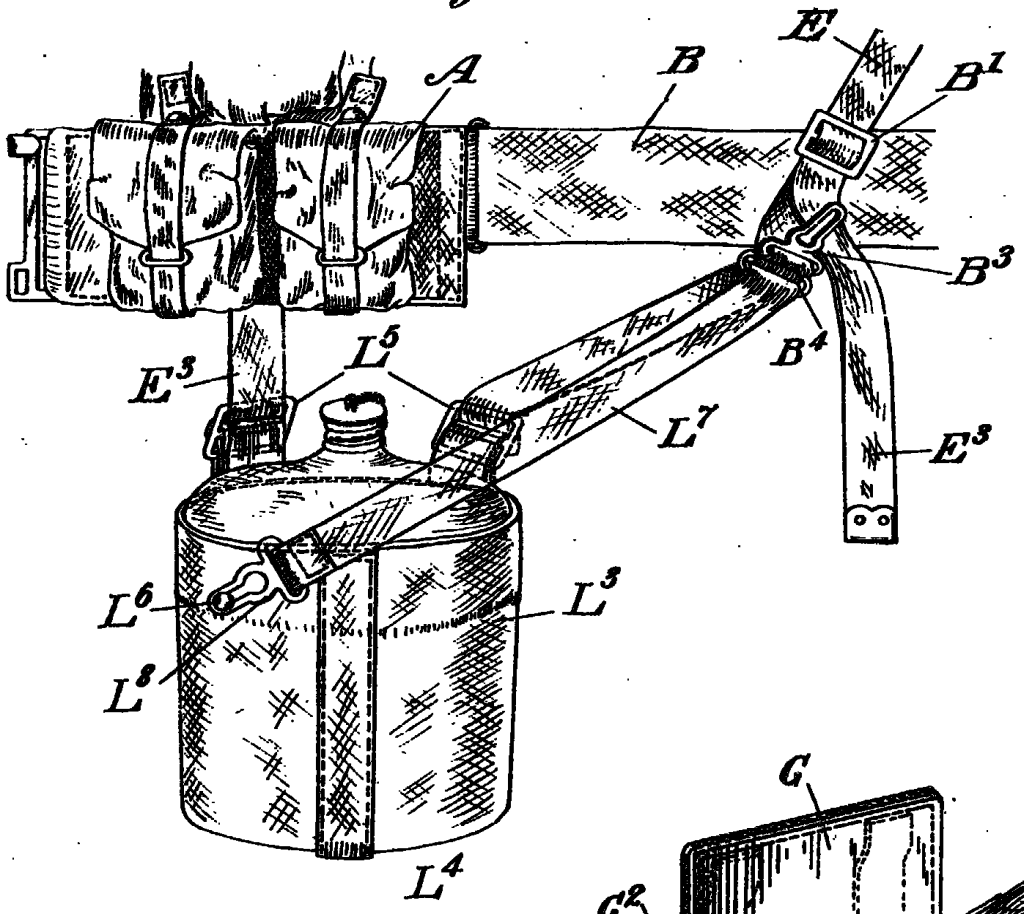
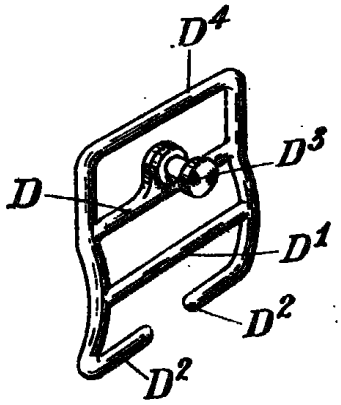


Fig. 9.



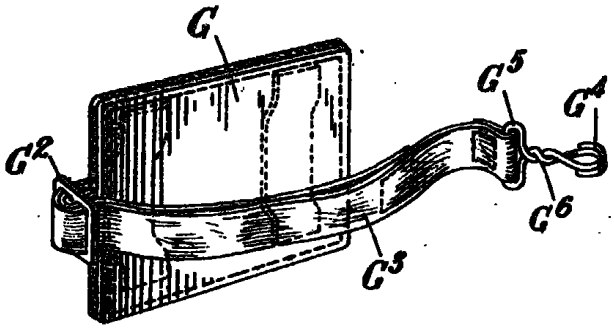


Fig. 8.

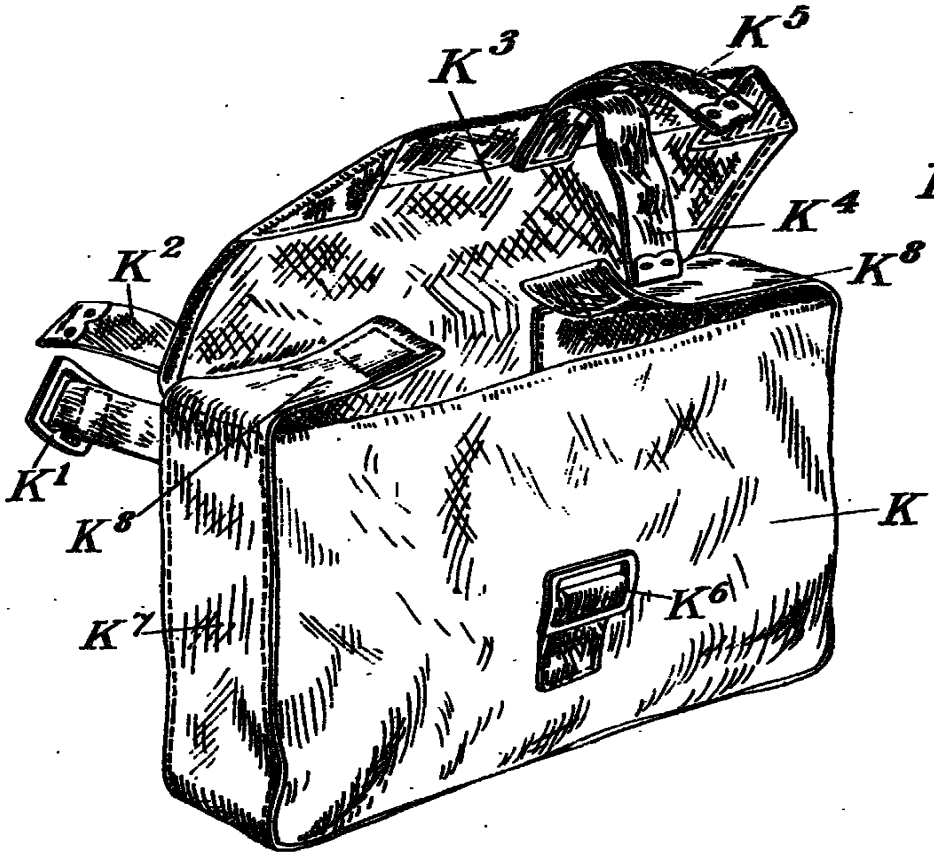
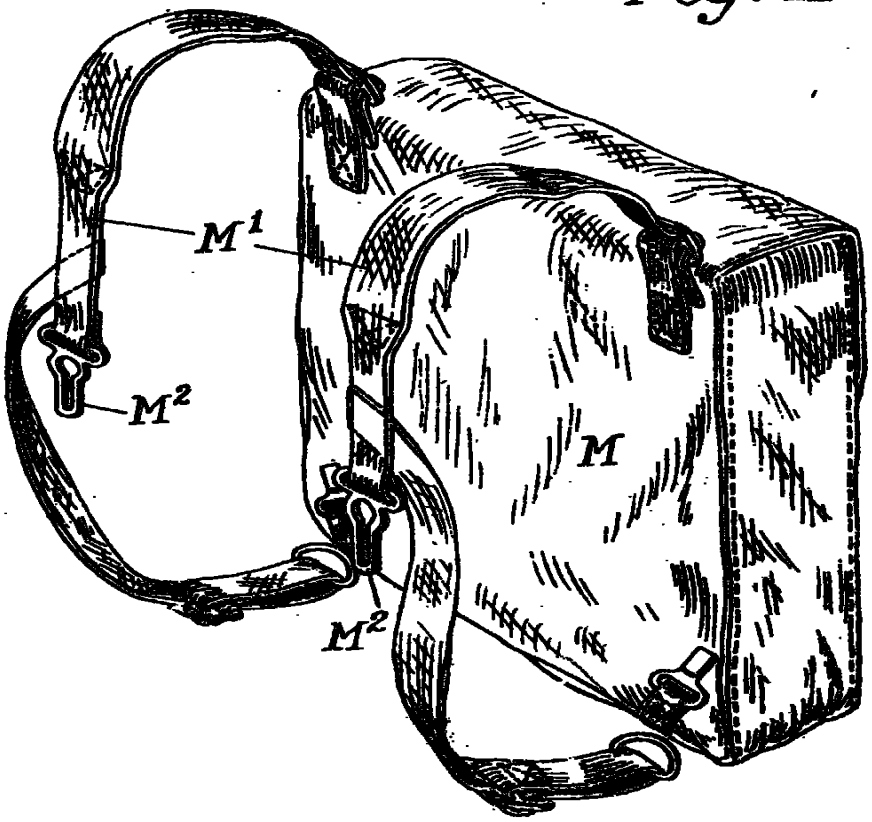


Fig. 10.

Fig. 11.



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