

Description of the U.S. Army transport cart, model of 1876 / by D.L. Huntington and George A. Otis, exhibited in the yard.

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International Exhibition of 1876.

HOSPITAL

OF

Medical Department, United States Army.

J. J. WOODWARD,

Assistant Surgeon, U. S. A.,

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

No. 6.

DESCRIPTION

OF THE

U. S. ARMY MEDICAL TRANSPORT CART,

MODEL of 1876:

BY

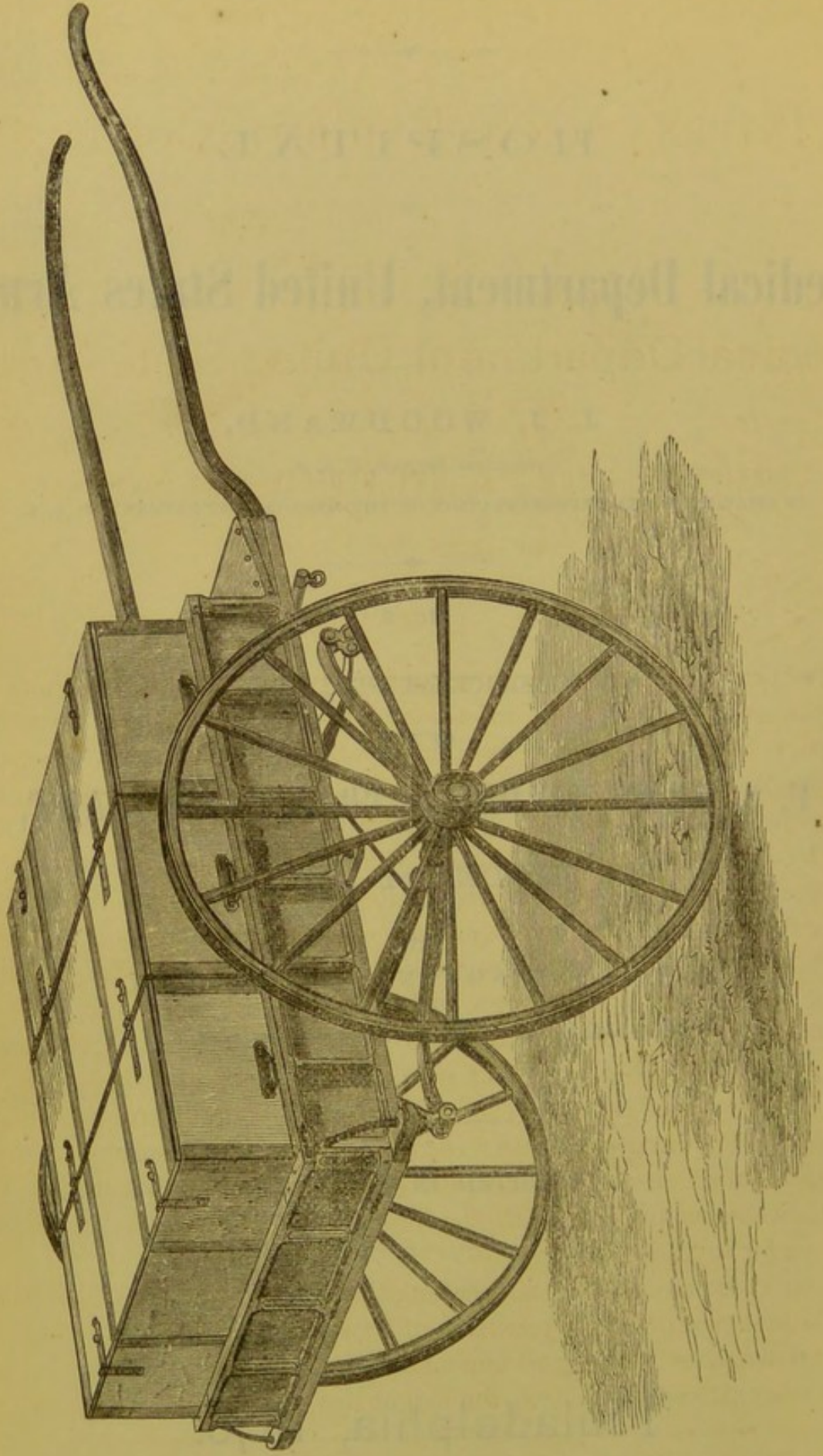
D. L. HUNTINGTON, *Assistant Surgeon U. S. A.*

AND

GEORGE A. OTIS, *Assistant Surgeon U. S. A.*

EXHIBITED IN THE YARD.

Philadelphia, 1876.



U. S. A. MEDICAL TRANSPORT CART, MODEL OF 1876.

INTERNATIONAL EXHIBITION OF 1876.

HOSPITAL

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Medical Department, United States Army.

DESCRIPTION OF THE U. S. ARMY MEDICAL TRANSPORT CART,

MODEL OF 1876.

THE principal means of transport for field medical and hospital supplies employed in the Union armies in the late civil war were the ordinary wagons of the supply trains, ambulance wagons, the medicine wagons of Perot and of Dunton, the regulation army medicine wagons, and panniers designed for transport by pack-animals, but usually carried by the most available wheeled vehicles. For the last ten years, field parties of troops engaged in hostile operations against the savages of the Plains, or of the mountainous western region, have carried their medical supplies either in the regulation medicine wagons, drawn by six mules, or in chests or panniers, placed in the ordinary wagons of the supply train. The necessity of some convenient means for the rapid transport of a limited supply of medical and hospital stores, such as might be required in emergencies by a small body of troops, became apparent. Scouting parties and escorts to exploring or surveying expeditions required an outfit of hospital appliances for immediate use, yet could not be encumbered with the large medicine wagons that carried supplies for brigades.

Under these circumstances, recalling that Paragraph 1330 of the Army Regulations permitted the provision of "two-wheeled transport carts for hospital supplies" for small commands,* although the provision had never been carried into effect, the exigencies of the late war having de-

* *United States Army Regulations of 1861*, with an Appendix, containing the Changes and Laws affecting Army Regulations and Articles of War to June 25, 1863, Washington, 1863, p. 317.

manded more bulky means of transport, the Surgeon General decided to have built an experimental one-horse, two-wheeled, medical transport vehicle, to serve, if it should prove satisfactory, as a model for the construction of others, for issue to troops likely to be engaged in the field. This proposition having been approved by the Secretary of War, the Surgeon General indicated certain indispensable requisites to be observed in regard to the dimensions, weight, and strength of the proposed vehicle, and instructed Assistant Surgeon G. A. OTIS, the medical officer on duty with a Board of Officers convened to recommend a pattern of ambulance wagon for army use, to confer with the commandant of Watervliet Arsenal, Brevet Brigadier General P. V. HAGNER, Ordnance Department, and to prepare specifications for such a hospital transport cart. The specifications submitted were as follows:

MEDICAL TRANSPORT CART.

REQUISITES.

1st. To be large enough to carry three (3) boxes for stores, each 18 inches wide, 36 inches long, and 18 inches high.

2d. The weight of the finished cart, with wheels and empty boxes, must not exceed 600 lbs., and have strength of frame sufficient to withstand a load of 800 lbs.

3d. The cart-wheels must be interchangeable with the hind wheels of the new ambulance wagon.

SPECIFICATIONS.

WHEELS. The wheels will be 4 feet 2 inches high (without tires;) the hubs (of best elm) $6\frac{1}{2}$ inches in diameter at centre, $5\frac{1}{2}$ inches at butt, and $4\frac{1}{2}$ inches at the point, by 9 inches in length; butt with iron bands on each end mortised for sixteen (16) spokes. Size of mortise $1\frac{5}{8}$ inches by 9-16 inch with a $\frac{7}{8}$ inch dish. Spokes (best seasoned hickory) $1\frac{1}{4}$ inches by $\frac{5}{8}$ inch (hub tenon) felloe tenon, round $\frac{3}{4}$ inch in diameter; felloes (best hickory) $1\frac{5}{8}$ inches, two (2) pieces for each wheel; tire (best charcoal iron) $1\frac{1}{2}$ inches wide, by $\frac{3}{8}$ inch thick, fastened on with eight (8) tire-bolts in each wheel; two (2) felloe-plates in each wheel over joints.

AXLE. Of best quality refined iron $1\frac{1}{2}$ inch square for 7 inches from each collar-washer, the remainder rounded. Collar-washer $2\frac{5}{8}$ inches in diameter, $\frac{3}{8}$ inch thick; wheel-boxes of best quality foundry iron, $7\frac{1}{2}$ inches long, $1\frac{1}{2}$ inches in diameter, 7-16 inch thick at butt; $1\frac{3}{8}$ inches in diameter, and 5-16 inch thick at point, with two (2) lugs, 2 inches long, $\frac{1}{2}$ inch high. Oil-chamber, 2 inches long, 1-16 inch deep, to commence $2\frac{1}{2}$ inches from the butt. Weight of box, not less than $4\frac{3}{4}$ lbs. each. Axle to be arranged to track five feet from centre to centre of wheels.

BODY. Outside length $57\frac{1}{8}$ inches, width $40\frac{1}{4}$ inches, height 8 inches. Inside length $54\frac{7}{8}$ inches, width 38 inches, height 6 inches. Frame, of oak, consisting of two (2) exterior side-sills and two (2) end cross-bars, size $1\frac{1}{4}$ by $2\frac{1}{2}$ inches. Centre cross-bar 2 inches by $\frac{3}{4}$ inch, and two (2) interior cross-bars, at half distance between the centre and the ends, 2 inches by $\frac{3}{4}$ inch; all cross-bars, except the tail-bar, are mortised into the side-sills, and are even with them at bottom; the tail-bar is mortised to receive the sill-tenons. The tenons of the end bars are of one-third thickness; those of the interior bars are of half the thickness. The floor planks will

be ash, $\frac{1}{2}$ inch thick, and level with the top of the side-sills. The upper rails are $1\frac{1}{8}$ inches by 1 inch, and extend over the sides and front, and are vertical. The side panels of the body are of ash, screwed, each side, to six (6) single studs and to a front double corner stud; the front panel of the body, also of ash $\frac{1}{2}$ inch thick, is screwed, in like manner, to three (3) single studs and the double corner studs, to which the sides are attached. These studs are all tenoned into the side-sills and upper rails. The studs are 5 inches long; the single ones $\frac{3}{4}$ inch by 1 inch, and chamfered at their exterior corners between the sill and upper rail. The double corner studs are made from square pieces $1\frac{7}{8}$ by $1\frac{1}{2}$ inches. The sides and front of the body are stayed by upright rods and flat angle-irons about the front corners and the sides, also, by upright and brace-rods at the rear. The ends of the rear cross-bar and the centre-bar project $4\frac{1}{2}$ inches beyond each side to receive lower ends of these braces. The tail-board is framed of $\frac{3}{8}$ inch (panel) boards of ash, screwed to five (5) studs $\frac{3}{4}$ by 1 inch, mortised into a top and bottom rail 1 inch by $1\frac{1}{8}$ inches. The length of tail-board extends even with the exterior of the sides. The tail-board will be hung to the rear cross-bar by three light hinges, to stand even with the end of bar when upright, and will be held closed by means of hooks attached to the sides, and hooking into eyes attached to the irons on the upper rail of the tail-board.

SPRINGS. Two (2) side half-springs, perpendicular to the axle, and clipped beneath it, connected in front by a cross-spring. The side-springs are to be 48 inches long, of English No. 3 oil-tempered steel, of five (5) leaves, 2 inches wide. The cross-spring, of the same number of leaves, of the same width and thickness and 38 inches long, or of sufficient length to connect the side-springs. The eye will be of double thickness, and have eye-bolts 7-16 of an inch. The spread of the springs should be as slight as will keep the body off the axle. The cross-spring will be bolted to an iron cross-piece, which is bolted to the shafts and side sills. The side-springs will be clipped beneath the axle, by pairs of clips, screwed by nuts, with brass spring-blocks. Behind, the side-springs will be bolted to the sills by iron V-pieces, as may be found most convenient. India-rubber buffers may be interposed over the clips of the side-springs to the axle.

THE SHAFTS are made of ash, $1\frac{3}{4}$ by $2\frac{1}{4}$ inches, separated 22 inches in front, and $30\frac{1}{2}$ inches at the foot-board. They will be somewhat curved, so as to carry the body nearly level, or with a slight inclination downwards at the rear. They are bolted to the body through the front-cross bar and the forward interior bars, being also locked by mortises $1\frac{1}{4}$ inches deep at each bolt. A foot-board 4 feet long 8 inches wide and 1 inch thick, of oak, is bolted to the top of the side-sills, which extend 8 inches in front of the body, to receive the foot-board. The bolts also pass through triangular blocks placed between the foot-board and the sills, and also on the shafts, which give a suitable inclination to the board.

SWINGLE-TREE AND SPLINTER-BAR. The draft is made from the axle by means of two (2) wrought-iron rods $\frac{1}{2}$ inch in diameter, bolted under the foot-board to an oaken splinter-bar, to which the swingle-tree is attached. The swingle-tree will conform to that used in the ambulance wagon.

CHESTS. There will be three (3) chests, interchangeable, and consequently of uniform dimensions, viz., 36 inches long, 18 inches wide, 18 inches high. They will be made of half-inch boards of walnut or ash, and firmly framed, and secured against splits or strains by light steel straps and angle braces. The bottoms of the boxes will be covered with sheet zinc, and the tops by cow-hide. The under corners will be supplied with strong castors, and at the middle of each end there will be strong iron folding-handles, which must not project more than half an inch when folded

down. The chests will open from above by hinged lids, and will be secured, each, by two suitable bolts and locks equidistant from either end.

SLIDE-BOARD. A slide-board, to lower the boxes from the cart to the ground, will be carried on iron loops attached underneath the body, so that when drawn to the rear, to be used as a slide, the hooks at the front end will hold by the rear loops, and when not wanted for use this board will slide back on its loop, and be secured by a thumb-screw.

TARPAULIN. A canvas cover, about $6\frac{1}{2}$ by 5 feet, will be provided with eyelets at the four corners, to be secured to suitable adjustable fastenings to the four corner studs.

PAINTING. The cart will be painted of the color and finish of caissons and other ordnance carriages, the iron work black. The letters "U. S.," four inches high, will be painted at the centre of each side panel. Near the front end of each side panel a stencil mark will be placed with the inscription, in small characters, Transport Cart
U. S. A.
Med. Dept.

The cart was constructed in accordance with the foregoing specifications, at Watervliet Arsenal, West Troy, under the direction of Brevet Brigadier General P. V. HAGNER, U. S. A., and was delivered at the Surgeon General's Office, in Washington, January 15, 1876, and inspected and approved.

It remained that the three chests, designed to contain respectively surgical instruments and appliances, medicines and hospital stores, mess furniture and utensils, should receive their outfit.

By direction of the Surgeon General, the fitting up and furnishing of the medicine and mess chests belonging to the medical transport cart has been entrusted to Assistant Surgeon D. L. HUNTINGTON, U. S. A. In carrying out this work, the endeavor has been made to select from the standard supply table of the Medical Department such medicines, stores, appliances, and utensils as experience has proved to be useful and necessary for the ordinary emergencies of field service, and to arrange them compactly and conveniently.

As the supply table has been strictly conformed to in the preparation of the list for furnishing these chests, it will be possible to refurnish them from the stores usually found at even the more remote frontier posts. Under the circumstances ordinarily attendant upon scouts, expeditions, and marches, it is believed that the quantity and variety of the supply furnished will be abundantly adequate for a force of not less than five hundred troops for a period of three months. The medicine chest has been divided by means of accurately fitting trays into five divisions, the trays subdivided into spaces and compartments for the disposal of medicines, appliances, etc., and, so far as possible, these spaces and compartments have been constructed with reference to the average size and form of the original package or article furnished for

the Medical Department, so that the chest may be readily and quickly filled from any dispensary.

MEDICINE CHEST.—The medicine chest is furnished with five trays covered by accurately fitting lids. The trays are of black walnut and are seventeen and a half inches long, sixteen and three-quarter inches wide and vary in depth and in their subdivisions.

All the trays are readily raised by apertures for the fingers cut near the upper edges of the ends and not represented in the cuts.

Tray No. 1 is five inches in depth and is subdivided into three compartments as indicated in the accompanying cut (FIG. 2.) One compartment is intended for stationery, the two others for miscellaneous articles, as enumerated in the subjoined list :

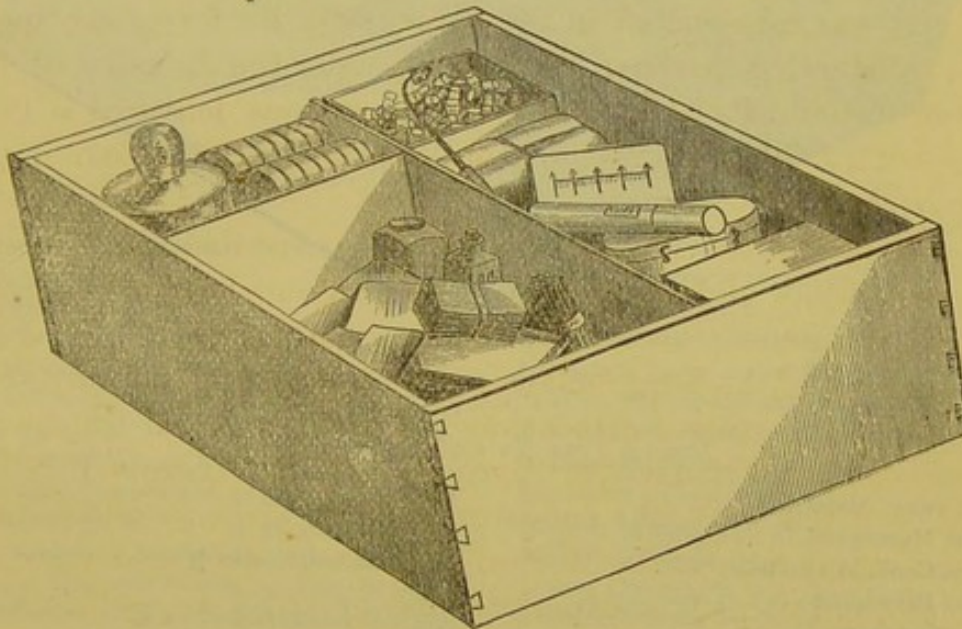


FIG. 2.—Tray No. 1 of Medicine Chest.

COMPARTMENT A contains—

Paper, cap, ruled, Quire 1.
 Paper, Quarto-post, ruled, Quire 1.
 Paper, note, ruled, Quire 1.
 Envelopes, official, large, No. 25.
 Envelopes, official, small, No. 25.
 Inkstand, traveller's, filled, No. 1.
 Pencils, lead, Faber's, No. 2, No. 6.
 Pens, Gillott's steel, No. 12.
 Penholders, No. 6.
 Ink, carmine, bottles, 1.
 Mucilage, bottles, 1
 Elastic rubber-bands, doz. 1.
 Pocket register for patients, No. 1.

COMPARTMENT B contains—

Pill Tile, 8 by 6, No. 1.
 Probang, No. 1.
 Ichthyocolla plaster, in case, yards, 1.
 Fountain syringe in case, No. 1.
 Assorted corks, box, 1.
 Pill Boxes, paper, No. 1.
 Matches, in tin box, boxes 1.

COMPARTMENT C contains—

Brass Spirit Lamp, with wicking, No. 1.
 Hard Rubber penis syringe, No. 1.
 Tape measure, No. 1.
 Suspensory Bandages, No. 6.
 Needle-case, filled, No. 1.
 Pins, papers 1.
 Tape, Roll 1.

Tray No. 2, of the same dimensions as tray No. 1, is subdivided into forty-one compartments as indicated in the annexed woodcut (FIG. 3), and is intended for medicines and such pharmaceutical appliances as are necessary to fit out a temporary dispensary for the field.

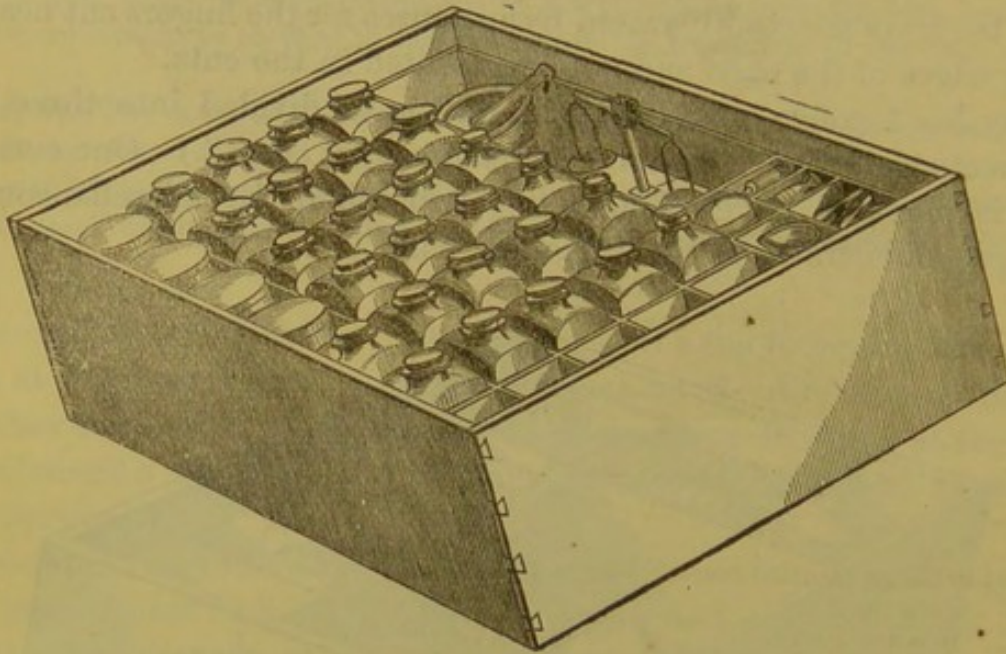


FIG.—3. *Tray No. 2 of Medicine Chest.*

THIS TRAY CONTAINS—

Extractum Hyoscyami, in 1 oz. pots, oz. 2.	Zinci Sulphas, oz. 2.
Extractum Conii, in 1 oz. pots, oz. 2.	Zinci Oxidum, oz. 4.
Extractum Belladonnæ, in 1 oz. pots, oz. 2.	Morphiæ Sulphas, oz. $\frac{1}{4}$
Sodæ Bicarbonas, oz. 6.	Cupri Sulphas, oz. 1.
Ipecacuanhæ pulvis, oz. 4.	Argentî Nitras, (fused) oz. 1.
Pilulæ Extracti Colocynth, Comp. (gr. } No. 500	Bismuthi Subnitras, oz. 4.
iii,) et Ipecacuanhæ, gr. ss. }	Collodion, oz. 2.
Pilulæ Catharticæ Compositæ, No. 600.	Glycerina, oz. 4.
Pilulæ Opii, No. 500.	Ferri Perchloridum, oz. 1.
Pilulæ Opii et Camphoræ, No. 500.	Tinctura Catechu, oz. 4.
Piluliulæ Quæ Sulphatis (3 grains each) No. 600.	Porcelain Table, and Teaspoon, No. 1.
Pilulæ Hydrargyri, oz. 8.	Minim Glass, No. 1.
Acidum Tannicum, oz. 4.	Hypodermic Syringe, No. 1.
Calomel.	Prescription Scales and weights in case, No. 1.
Acidum Salicylicum, oz. 4.	Mortar and pestle, Wedgewood, 3 inch, No. 1.
Chloral Hydrate, oz. 4.	Spatulæ, (large and small,) No. 2.
Rhei pulvis, oz. 4.	Stethoscope, No. 1.
Acaciæ pulvis, oz. 4.	Scarificator, No. 1.
Plumbi Acetas, oz. 4.	Scissors, No. 1.
Potassæ Permanganas, oz. 4.	Medicine Glass and Case, No. 1.
	Corkscrew, No. 1.

The small half spaces, represented as unoccupied in the cut (Fig. 3), are left for the convenience of packing any small articles which may be considered of importance.

Tray No. 3 is six inches in depth, the other dimensions are similar to the preceding. The bottles used in both trays are eight, four, and two ounce tincture and saltmouths.

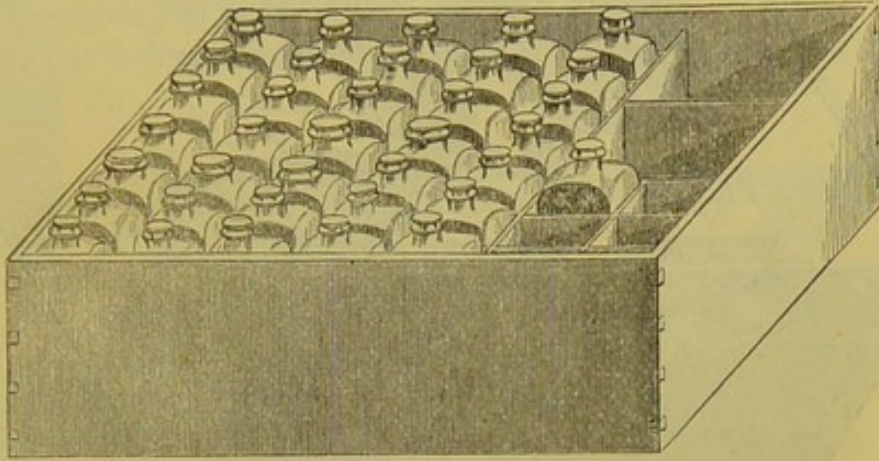


FIG. 4.—Tray No. 3 of Medicine Chest.

Linimentum (as per Standard Supply Table) oz. 8	Potassii Iodidum, oz. 8.
Aquæ Ammoniæ oz. 8.	Pulvis Ipecacuanhæ et opii, oz. 8.
Spiritus ætheris nitrici, oz. 8.	Quiniæ Sulphas, oz. 8.
Tinctura ferri chloridi, oz. 8.	Extractum Ergotæ Fluidum, oz. 4.
Extractum gentianæ fluidum, oz. 8.	Extractum Ipecacuanhæ Fluidum, oz. 4.
Tinctura Opii, oz. 8.	Spiritus Ætheris Compositus, oz. 4.
Chloroformum, oz. 8.	Acidum Carbolicum, crystals, oz. 4.
Oleum Terebinthinæ, oz. 8.	Acidum Aceticum, oz. 4.
Tinctura Opii Camphorata, oz. 8.	Linimentum Cantharides, oz. 4.
Oleum Ricini, oz. 8.	Acidum Sulphuricum, oz. 4.
Spiritus Ammoniæ Aromaticus, oz. 8.	Acidum Nitricum, oz. 4.
Extractum Zingiberis fluidum, oz. 8.	Liquor Potassæ, oz. 4.
Cough Mixture (per Standard Supply Table) oz. 8.	Cupping Glasses, No. 6.
Tinctura Aconiti Radicis, oz. 8.	Clinical Thermometer in case, No. 1.
Potassæ Chloras, oz. 8.	Urinometer in case, No. 1.
Potassii Bromidum, oz. 8.	Spaces for powders.

Tray No. 4, of the same length and breadth as the preceding, and eight inches deep, is not subdivided into compartments, and is designed for an assortment of miscellaneous articles. Its arrangement is represented by a wood cut on the next page (Fig. 5.)

THE TRAY CONTAINS:—

Unguentum Hydrargyri, Cans 1.	Vials, prescription, assorted, doz. 1.
Ceratum Simplex, Cans 1.	Trusses, single, No. 2.
Extractum Nucis Vomiceæ, oz. 1.	Hard Rubber Syringe, 12 oz., No. 1.
Castile Soap, lbs. 1.	Sponge, fine pieces, doz. ½.
Brown Soap, lbs. 2.	Portfolio, No. 1.
Candles, Sperm, lbs. 4.	Towels, doz. 1.
Candlesticks, No. 2.	Muslin, yards 6.
Nutmegs, oz. 2.	Red flannel, yards 2.
Sinapisms prepared, p'k'ge 1.	

For a list of the contents of tray No. 4, see the preceding page.

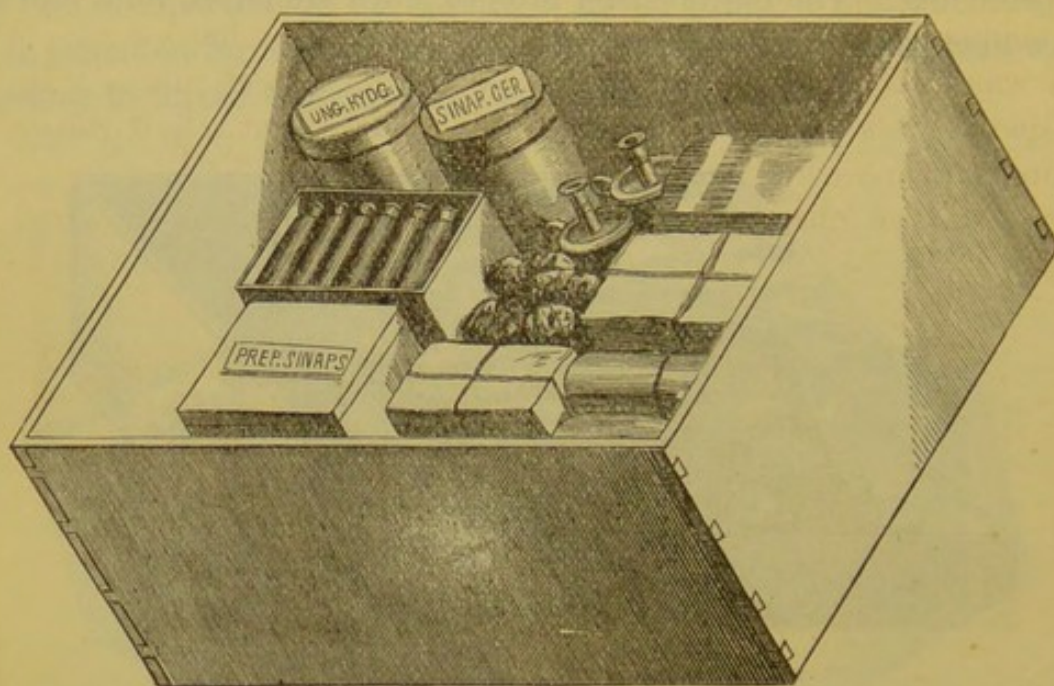


FIG. 5.—Tray No. 4 of Medicine Chest.

Tray No. 5, of the same superficial dimensions as the others and eight inches deep, is devoted to hospital stores.

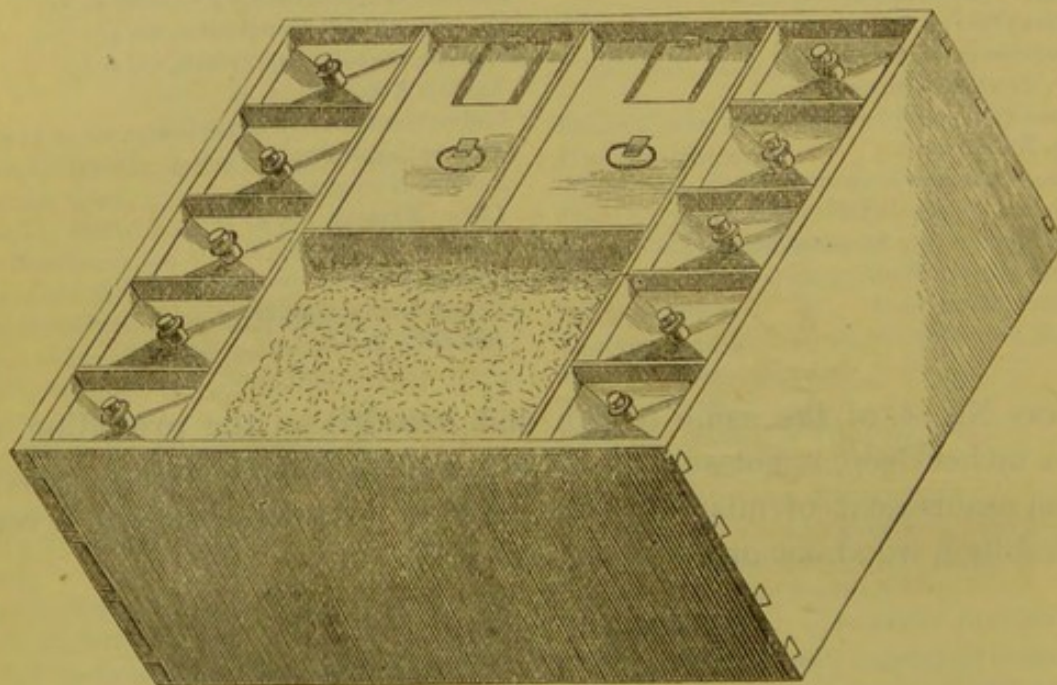


FIG. 6.—Tray No. 5 of Medicine Chest.

THE TRAY CONTAINS—
 Spiritus Vini Gallici, oz. 24.
 Spiritus Frumenti, oz. 24.
 Spiritus Rectificatus, oz. 24.
 Oleum Olivæ, oz. 12.
 Syrupus Scillæ, oz. 12.

One tin can for Magnesiæ Sulphas.
 One tin can for Pulvis Lini.
 One tin can for White Sugar.
 Two spaces left to be filled at discretion.

MESS CHEST.—The mess chest has been furnished with such utensils as are commonly on hand at every post, and is intended to supply the wants of a temporary field hospital for twelve patients. It has a set of three black walnut trays, each twelve inches wide and sixteen inches long, fitting one above another. The remainder of the chest is left vacant for packing the larger utensils.

Tray No. 1 is four inches in depth and is subdivided as shown in the diagram, (FIG. 7.)

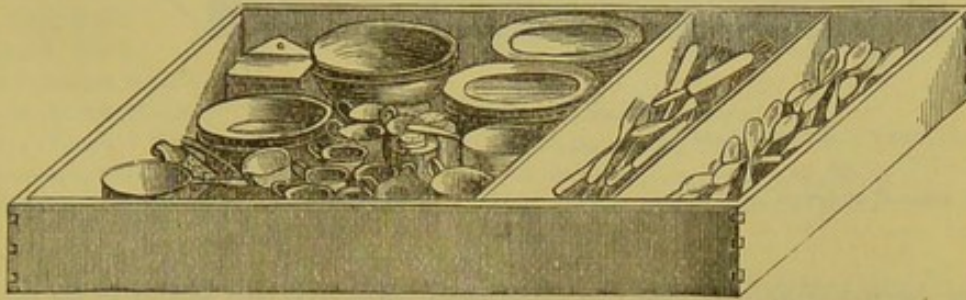


FIG. 7.—Tray No. 1, of Mess Chest.

THIS TRAY CONTAINS—

Knives, table, No. 12.	Nutmeg grater, No. 1.
Knives, carving, No. 1.	Plates, tin, doz. 1.
Forks, table, No. 12.	Pepper box, No. 1.
Forks, carving, No. 1.	Salt box, No. 1.
Spoons, table, No. 12.	Tin case for matches, No. 1.
Spoons, tea, No. 12.	

Tray No. 2 of the mess chest is five inches in depth, and, designed for cans and packages of various sizes, is not divided into compartments.

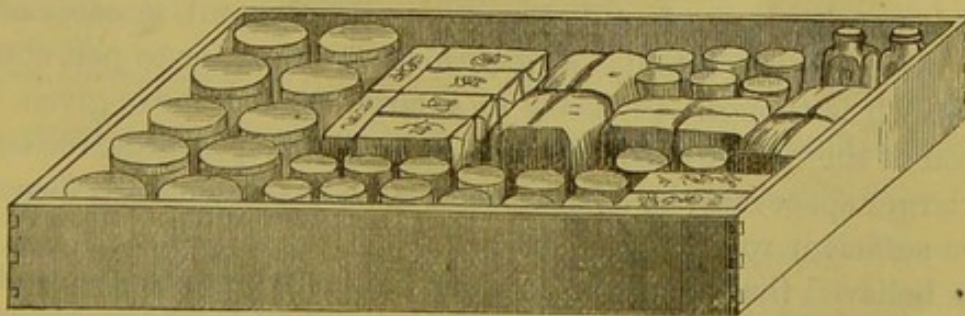


FIG. 8.—Tray No. 2, of Mess Chest.

This tray is intended to be packed with extract of beef in cans or jars, condensed milk in cans, farina in papers, corn-starch in papers, and any other article of nourishment or comfort for the sick which may be regarded as necessary by the medical officer.

Tray No. 3, six inches deep, is divided into compartments and furnished with tin cans, as indicated in the subjoined cut, (FIG. 9.)

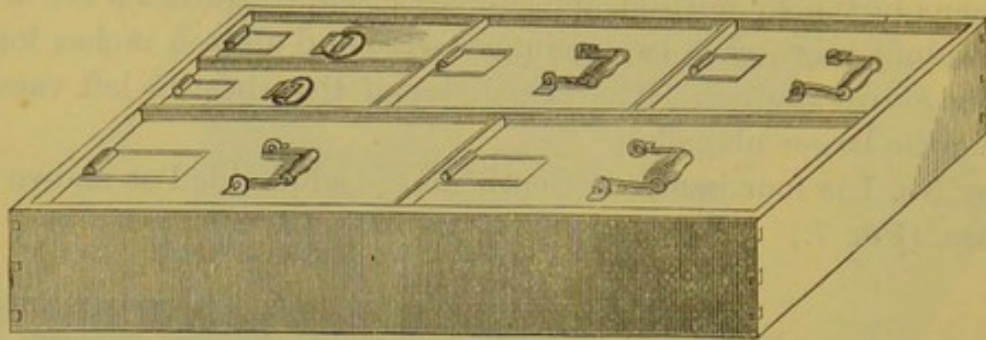


FIG. 9.—Tray No. 3, of Mess Chest.

THIS TRAY CONTAINS CANS FOR—

Butter,	Salt,
Coffee, ground or green,	Sugar,
Pepper,	Tea ; or for any other articles desired.

The large space in the chest unoccupied by the trays is to be packed with the following articles :

Basin, tin, washhand, No. 2.	Knives, butchers', No. 1.
Cleaver, No. 1.	Ladles, No. 1.
Cups, Britannia, No. 12.	Lantern, No. 1.
Cups, tin, (1 qt., 1 pt.,) No. 2.	Pans, frying, No. 1.
Dippers, assorted, No. 2.	Pans, sauce, No. 1.
Dishes, tin, No. 6	Pots, coffee, tin, No. 1.
Grater, large, No. 1.	Pots, tea, tin, No. 1.
Gridiron, No. 1.	Saws, butchers', No. 1.
Kettles, camp, covered, No. 1.	Steelyards, No. 1.
Kettles, tea, iron, No. 1.	Trays, tin, No. 1.

To secure the articles contained in the mess chest against injury by motion, it will be advisable to pack the spaces firmly with oakum, or some yielding and clean material. Oakum is mentioned from the fact that it is nearly always found at posts, is cleanly, and, in cases of emergency, may be taken into use as a surgical dressing, or to pad splints.

In case it is thought advisable to enlarge the list above given, by the addition of the "Norwegian Kitchen," or cooking apparatus, the contents of the larger space may, by a little practice, be so economically disposed as to give sufficient room for it.

It is believed that every thing which can contribute to the well being of the sick men of a small command in the field has been provided in these chests, so far as space would allow.

SURGICAL CHEST.—By direction of the Surgeon General, Assistant Surgeon G. A. OTIS, U. S. A., was charged with the outfit of the surgical chest. The objects held in view were to provide an adequate supply of restoratives, anæsthetics, instruments, and appliances for every primary dressing or operation needful and practicable in the field, and to eschew everything superfluous.

This chest contains, in the first place, a set of such carpenter's tools as are requisite for rough and ready work about a field hospital. These are packed in the uppermost of two black walnut trays, of the superficial dimensions of the interior of the chest, as follows :

LIST OF CARPENTER'S TOOLS IN TRAY NO. 1.

Hand Saws, (1 rip, 1 cross) No. 2.	Tool Chest (so called) or hollow handle } No. 1.
Key-hole Saw, No. 1.	fitted with brad-awls, etc., }
Hammer, claw, No. 1.	Square, Carpenter's, medium size, No. 1.
Hatchet, with hammer head, No. 1.	Compass, Carpenter's, medium size, No. 1.
Draw Knife, No. 1.	Tacks, papers, assorted sizes, No. 2.
Chisel, $\frac{3}{4}$ inch, No. 1.	Brads, medium size, Papers, 1.
Gouge, $\frac{1}{2}$ inch, No. 1.	Nails, shingle, lbs. 1, 8-penny, lbs. 2, 10-penny, lbs. 1.
Brace, and complete set of bits, No. 1.	Screws, assorted, lbs. 2.
Screw-driver, 8 inch, No. 1.	Plane, smoothing, short, No. 1.
Wire Pliers, 1 round, 1 flat, medium size, No. 2.	File, half round, medium size, No. 1.
Forceps, assorted, as used by gas-fitters, No. 3.	File, rat-tail, medium size, No. 1.
Screw or Monkey-wrench, medium size, No. 1.	Hone, No. 1.

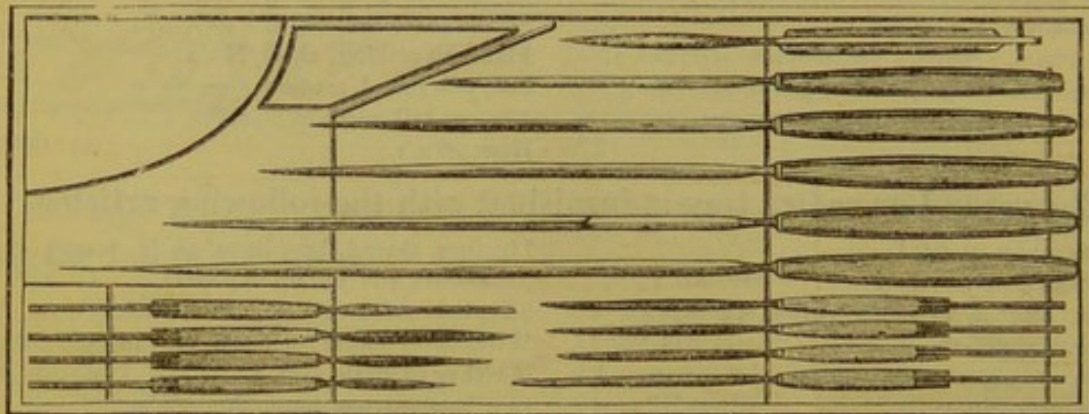
The second or centre tray is furnished with the following articles :

Candles, best sperm, lbs. 2.	Ligature, thread, best linen, 16 in. long, } oz. $\frac{1}{2}$.
Flint and tinder, and steel, in tin box, No. 1.	waxed, and put up in papers, }
Lamp, alcohol, Mauck's patent, in tin } No. 1.	Silk, best saddlers' or ligature, oz. 8.
heating vessel, }	Wire, silver suture, on spool, yds. 12.
Note-paper, commercial, quires, 3.	Whiskey in flask, pint, 1.
Penholders, No. 2.	1 oz. bottle strong liquor Ammonia.
Memorandum paper, block, 1.	1 box of 100 1 gr. Opium pills.
Pens, steel, No. 12.	1 leather covered 16 oz. flask Chloroform, with a shoulder sling.
Inkstand, traveller's, No. 1.	Wax, yellow, in paper, oz. 8.
Roller, bandages, muslin, 1 in. x 1 yd., } doz. 8.	Sponges, large, bleached, soft, bell, No. 2.
12; 2 in. x 3 yds., 24; 2, $2\frac{1}{2}$ ins. x 3 } yds., 24; 3 in. x 4 yds., 12; $3\frac{1}{2}$ in. x 5 } yds., 12; 4 in. x 6 yds., 6; 4 in. x 8 } yds., 6 }	Surgeon's sponge, best velvet, medium, assorted sizes, oz. 8.
Triangular compresses, large 50, small 50.	Splints, felt, (Ahl's,) set 1.
Wire gauge, for splints, yds. 1.	Splints, wire, anterior, (N. R. Smith's,) No. 3.
Adhesive plaster, in tin cases, yds. 10.	Suspensory bandages, No. 6.
Ichthyocolla plaster, in tin cases, yds. 4.	(Esophageal tube, No. 1.
Oil silk, yds. $2\frac{1}{2}$.	Brushes, for gypsum dressing, No. 2.
Lint, patent, best flax, in rolls, lbs. 4.	Matches, wax, cans 6.
	Matches, ordinary, package 1.

The third compartment or bottom of the chest is supplied as follows :

Candlesticks, No. 2.	Camel's hair brushes, in phial, No. 12.
Plaster of Paris, in tin cans, lbs. 10.	Wax tapers, boxes 2.
Chloroform, in tin can with screw stopper, lbs. 10.	Needles, sewing, assorted, 25.
Simple cerate, in can, lb. 1.	Cotton thread, spools 3.
Powdered mustard, in can, lb. 1.	Shears, for gypsum bandage, No. 1.
Twine, (stout,) 8 oz., finer, 8 oz.	Brass dressing pan, (army pattern,) No. 1.
Jack-knife, stout, with cork-screw, No. 1.	Drainage tubes, No. 6.
Spirits of camphor, oz. 16.	Napkins, for ophthalmia, doz. 1.
Elastic catheters, English, assorted, No. 6.	Roller bandages, flannel, (4 ins. x 6 yds.,) doz. 1.
Alcohol, oz. 32.	Towels, doz. $\frac{1}{2}$.
Binder's board, for splints, ($2\frac{1}{4}$ ins. x 12 ins. 6 pieces, 4 ins. x 17 ins., 6 pieces,) doz. 1.	Oakum, (q. s. to pack closely.)
Worsted binding, (1 in. x 6 yds.,) pieces 1.	Cotton, antiseptic, rolls 2.
Tape, stout linen, yds. 50	Cotton batting, (q. s. to fill vacant spaces.)
Green silk, for eye shades, yards $\frac{1}{2}$.	Steward's pocket case.*
	Compact field case.†

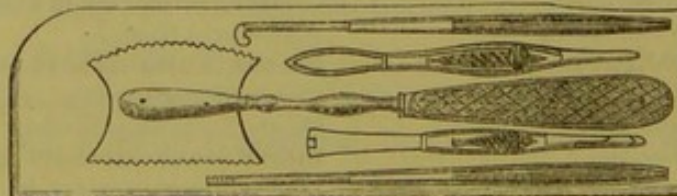
As the two cases of surgical instruments allowed medical officers as personal sets for capital and minor operations are, necessarily, large and inconvenient for field transportation, Dr. OTIS was instructed to select a set that should constitute a *Compact Field Case*, mentioned in the preceding list (†) as part of the contents of the bottom compartment of the Surgical Chest. It has been his endeavor to place in the case such instruments as are necessary for primary operations for traumatic cause, not reducing their size below the best models in order to pack them in a narrow compass, but securing economy of space by careful packing, and, in some cases, by making parts of instruments interchangeable.



TRAY No. 1.

FIG. 10.—Tray of the Compact Field Case fitting over the compartment A, contains 1 strong cartilage knife, 1 small amputating knife, 1 medium catling, 1 medium amputating knife, 1 large catling, 1 major amputating knife, 1 straight sharp pointed bistoury, 1 curved sharp pointed bistoury, 1 probe pointed curved bistoury, 1 long straight probe pointed bistoury, 1 tenaculum, 1 large scalpel, 1 small and 1 very small knife for dissections and ligations.

In a few instances, slight modifications, suggested by the experience of the war, have been introduced in well-known patterns of the armamentarium. With the skilful collaboration of Mr. STOHLMANN, of Tiemann & Co., it is believed that the effort to secure compactness, at least, has been remarkably successful. The drawings (Figs. 10, 11, 12) explain the arrangement of the case.



TRAY No. 2.

FIG. 11.—Tray of the Compact Field Case fitting into compartment B, contains 1 Hey's saw, 1 torsion forceps, 1 needle forceps, 1 artery-needle holder with 4 points and 1 key.

Two trays containing knives for amputations, excisions, and dissections, with artery needles and forceps and a Hey's saw, fit into the two

compartments of the case represented in FIGURE 12. The upper compartment, B, contains saws, probes, bullet-extractors, etc. The lower compartment, A, the tourniquet and large resecting instruments.

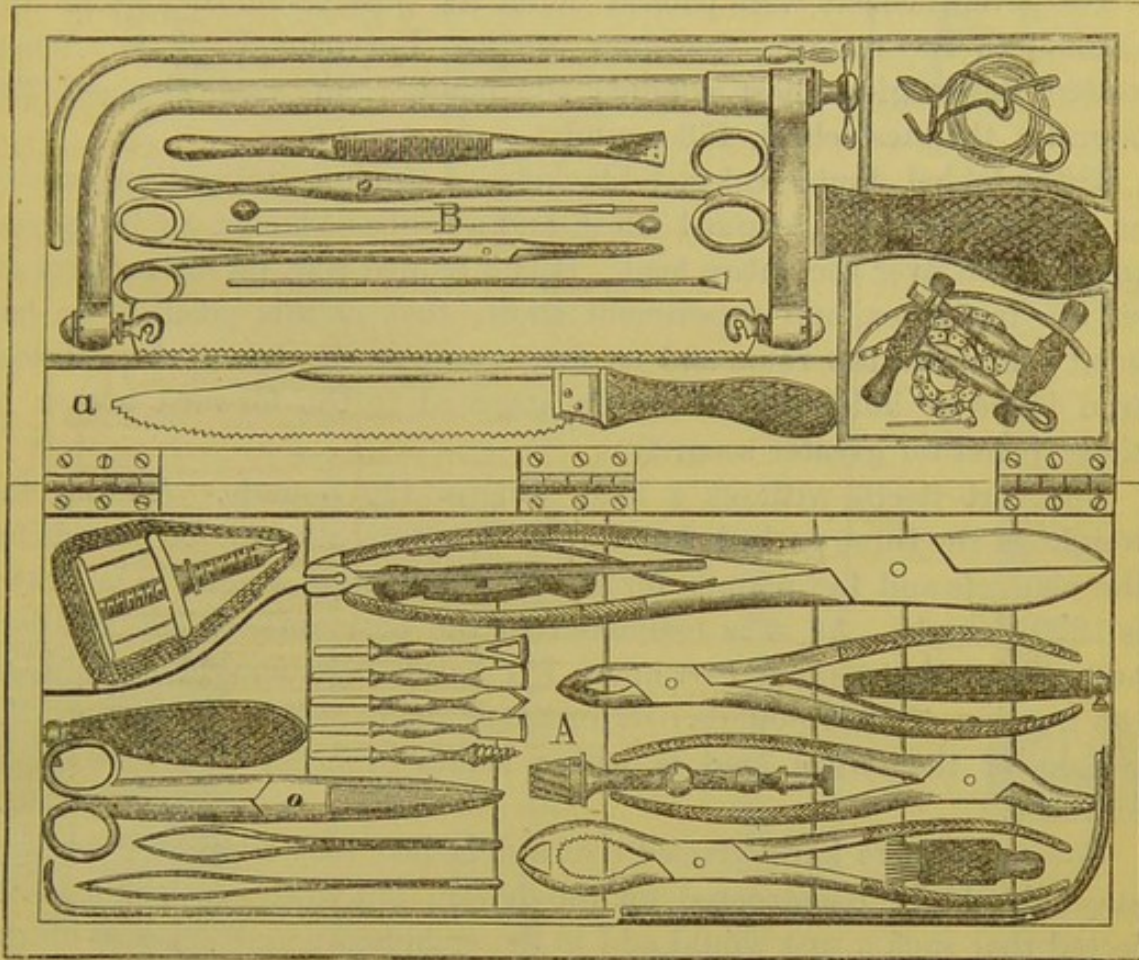


FIG. 12.—COMPACT FIELD CASE. *Compartment A* contains: 1 tourniquet, 1 large Liston's bone cutter, 1 gnawing forceps, 1 sequestrum forceps, 1 Lion forceps, 1 conical trephine, 1 trephine-brush, 2 German-silver retractors, 1 osteotome, handle with four points, 1 tire-fond, 1 Ollier's curved osteotome and chain saw conductor, 1 scissors, 1 dissecting forceps, 1 artery forceps, 1 silver grooved director. *Compartment B* contains: 1 major saw with 2 extra narrower blades, 1 movable back saw, 1 English No. 6 gum elastic catheter, 1 elevator, 1 bullet forceps, (model Gem'ig,) 1 bullet forceps, (model Tiemann,) 1 long articulated probe or *sonde de poitrine*, with 2 Nelaton or porcelain tips, and 1 burr-headed ball-searcher. In lower end tray, 1 chain-saw (model Charriere) with conducting needle; in upper end tray, 10 large serres-fines, 2 coils of annealed iron wire. In tray D, under movable-back saw, silk, linen and catgut ligatures, wax, silver suture wire, surgeon's curved needles, acupuncture pins, 2 silver probes.

To save the surgeon's pocket case of instruments, it was thought advisable to add a steward's pocket case, (*). This is of sheep's skin, in two folds, and holds a stout pair of scissors, a dissecting forceps, two probes, a spatula, a scalpel and bistoury folding in a shell-handle, a thumb-lancet, and, in a pocket, surgeon's needles, silk, etc.

The triangular compresses mentioned among the contents of the centre tray, are made by dividing diagonally a yard square of unsized muslin. One, in the package, is printed with Esmarch's illustrations of Mayor's system of scarf-bandaging. With these compresses are put up

fifty small compresses for primary application to fresh wounds, etc., consisting of a bit of lint and charpie, and a folded scrap of muslin; the whole enveloped in waxed paper.

The several chests were packed under the supervision of Lieutenant-Colonel C. SUTHERLAND, Assistant Medical Purveyor, U. S. A. When loaded, the surgical chest weighed 203 pounds; the medical chest, 226 pounds; the mess chest, 173 pounds.

Three folded double colored blankets, of the hospital pattern, are to be strapped on the forward chest, and a rubber blanket to be spread and secured over the entire load. It is intended that the driver may sit on the front box, and experiment shows that in this position he has good control of the reins and as firm a seat as the driver of a caisson. Iron loops or holdfasts have been attached to the forward braces of either panel for greater security.

The cart itself, without a load, weighs 420 pounds. Adding the weight of the three packed chests, or 602 pounds, allowing 50 pounds for the blankets and 148 pounds for the driver, the total weight to be drawn is 1220 pounds. As it is estimated by the best authorities (McAdam and others) that a stout cart-horse $15\frac{1}{2}$ hands high should be equal to the traction of 3200 pounds over ordinary roads at 3 miles an hour, the weight of the entire load is within limits even for long and rapid marches.

Several officers have advised that a detached seat supported by iron stays should be constructed for the driver; but to this it has been objected that such a seat would add to the complexity and expense of the vehicle, and make it more liable to be used for other purposes than that for which it is designed, and, principally, that such an arrangement would necessitate lowering the forward box and thus destroying the uniformity in the dimensions of the chests, which is an important feature in the plan.

This pattern of medical transport cart has not yet been tested in actual service; but the preliminary practical trials that have been made with it indicate that it will prove a convenient and important addition to the army field equipment.



