THE WELLCOME TROPICAL RESEARCH LABORATORIES.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

It is only ten years since the whole of the Sudan was a closed book to the outside world, being under the sway of ruthless barbaric Mahdism. To-day it is a country of increasing prosperity, and at the ancient capital of the Dervishes has been erected a magnificent pile of educational buildings, the Khartum College, a portion of which comprises an extensive and elaborately equipped tropical research laboratory. When the country was finally subdued, it was realized that the peculiar conditions prevailing, both climatic and geographical, rendered the territory a difficult one for the residence of the white man. It was the home of innumerable and mysterious diseases and infectious maladies, which rendered it untenable to the white man, and were also destructive among the ranks of the natives. Moreover, these maladies were peculiarly endemic to the country, and it was realized that the only possible method of reclaiming it for civilization was the investigation and solving of these problems upon the spot, by the most up-to-date scientific methods possible.

Scarcely had the last shots in the campaign been fired, when a movement was started for the foundation of an educational college on the site of the Mahdi's stronghold. Here it was decided to study the questions upon a small scale at first. Owing to the generous munificence of a well-known Englishman, Mr. Henry S. Wellcome, however, it was found possible to establish an extensive institution for tropical research. The donor, in connection with his gift to the Sudanese government, offered to equip the laboratories with all the latest appliances that might be desired, so that the investigations could be carried out upon the most comprehensive lines. These laboratories are unique, inasmuch as they are the only ones of their character upon the African continent, which is unanimously held to be the greatest seat of all those peculiar natural conditions inimical to the white man which have appreciably retarded the development of the country in the past. But through the efforts of this institution invaluable work has been accomplished in reclaiming the northern part of the country, which, in conjunction with that of the Liverpool and London Tropical Schools of Medicine, has assisted in the hygienic betterment of the continent at large.

The work of the Wellcome Tropical Research Laboratories is broadly divided into six ramifications, as follows: (1) The promotion of technical education; (2) the bacteriological and physiological study of tropical disorders, more especially the infectious diseases of both man and beast peculiar to the Sudan, and to extend assistance to the officers of health and to the clinics of the civil and military hospitals; (3) to assist experimental investigations in poisoning cases, by the detection and experimental determination of toxic agents, particularly the obscure potent substances employed by the natives; (4) chemical and bacteriological tests in connection with water, food-stuffs, and such sanitary matters as may be found desirable; (5) the promotion of the study of disorders and pests which attack food and textile producing and other economic plant life in the Sudan; (6) to undertake the testing and assaying of agricultural, mineral, and other substances of practical interest in the industrial development of the Sudan.

The work upon these diverse subjects is under the direction of Dr. Andrew Balfour, B.Sc., D.P.H., F.R.C.P., and he is gladly assisted by the various other departments of the government which are interested in one or more of the avowed objects of the Institution, such as the Egyptian Army Medical and Veterinary services; indeed, the co-operation of outside workers in the same field is much appreciated and fostered, so that there may be an indisputable conclusiveness concerning the results achieved. Within the first year of its foundation the laboratories became fully occupied in all their departments, and then Dr. Andrew Balfour gradually and carefully selected the best fields of work, and concentrated the attention of his staff thereon. Chemistry and entomology have received almost as much attention as tropical medicine, and recently the work of the Institution has been extended to the sciences of ethnology, ethnography, and anthropology.

Tropical medicine comprises researches in the trypanosomiasis of animals, chiefly cattle and camels—fortunately the dreaded scourge of sleeping sickness among humans has not extended to the Sudan. Piroplasmosis, spirochætosis of Sudan fowls, and studies of the many fell diseases such as kala-azar, mycetoma, and dengue fever, which cripple human life in the tropics, constitute the most prominent of the purely pathological and bacteriological work. Then again the sanitary organization of Khartum and Omdurman has been taken in hand, involving the destruction of mosquitoes and the introduction of sanitary laws and a conservancy service. Dr. Balfour, the director, is the medical officer of health of the towns, and, with the adequate laboratory resources at his disposal, has been able to revolutionize completely the conditions of life in a few years, and has practically exterminated malaria at Khartum.

The headquarters of the laboratories are at the Gordon College; and here within a period of seven years innumerable experiments and investigations were carried to a successful issue, and a mass of unique information collected which is of inestimable value in connection with the subjects treated. It was found, however, that the conditions under which the researches were made were not quite perfect, on account of the possibility of change in or damage to bacteriological and other specimens in their transmission from remote districts to Khartum. It was therefore decided to carry the war into the enemy's camp, and to carry out the investigations on the spot under conditions very similar to those at the Gordon College. For this purpose a floating laboratory was established, and the work accomplished therewith has been of far-reaching value. The southern Sudan is a country criss-crossed by waterways, on the banks of which are clustered native villages, wherein all manner of rare and interesting pathological conditions are to be found. Flies and mosquitoes abound; the birds, reptiles, and fish harbor strange parasites; men die from curious diseases, and there is a vast field for the study of tropical medicine. Before the days of the floating laboratory, material occasionally reached Khartum from these distant territories, but too often it was in a badly damaged condition. Blood slides were dirty and spoiled, insects broken, and notes incomplete. On the whole, it was recognized that the proper study of conditions must be conducted on the spot, and then many valuable data could be gathered.

The floating laboratory is a commodious vessel well adapted to service upon the waters of the South. The main working room is completely mosquito proof, and is adequately fitted out for proto-zoological and entomological work. Its maiden voyage was carried out

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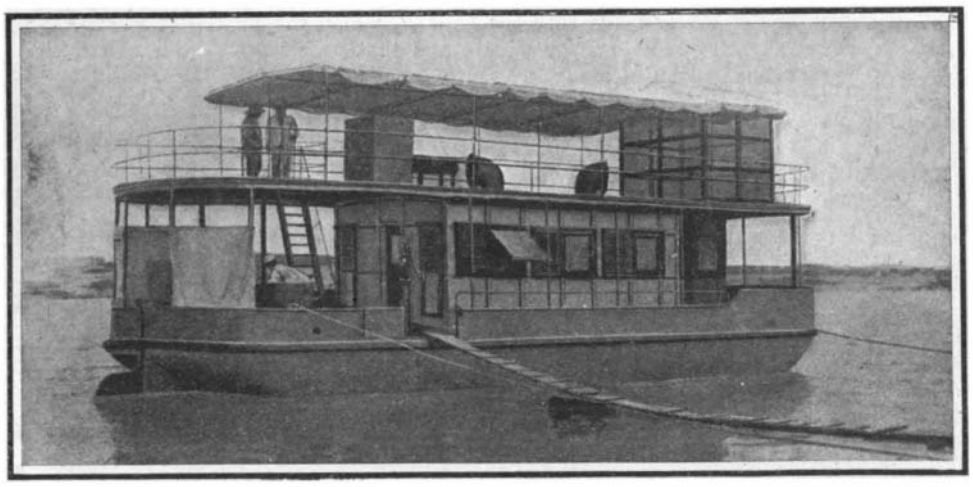
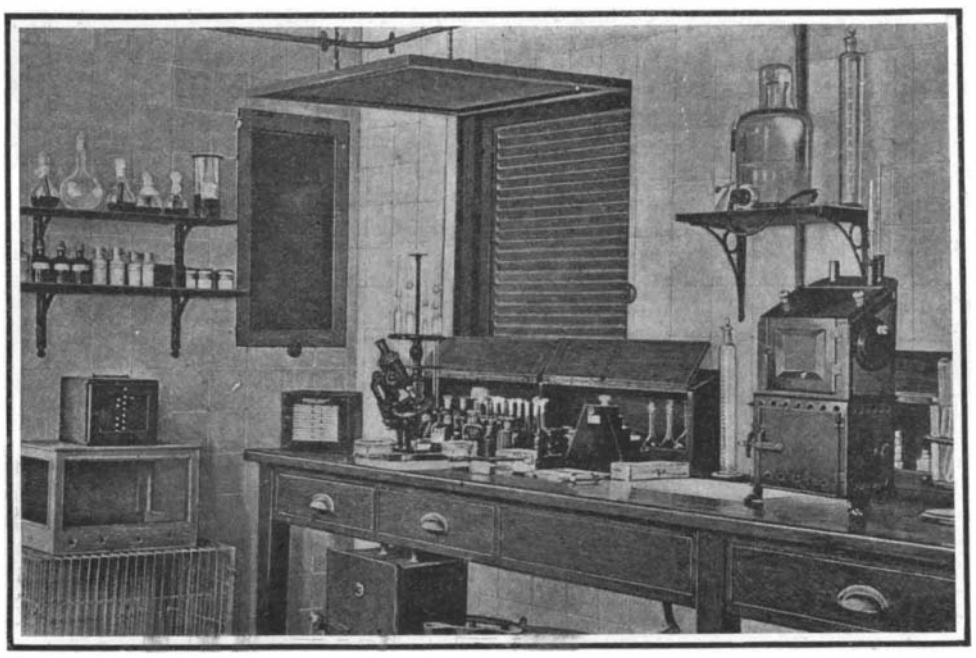
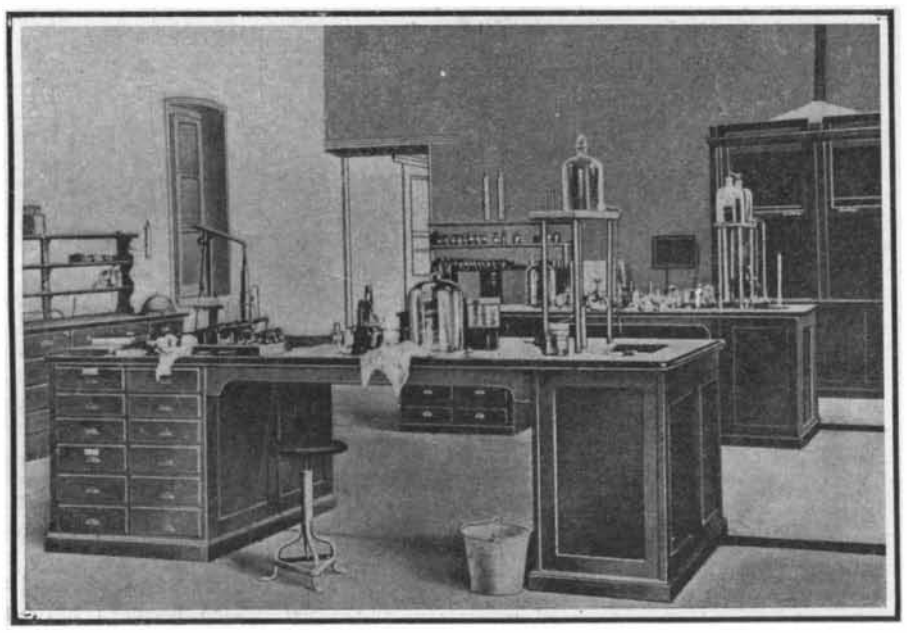


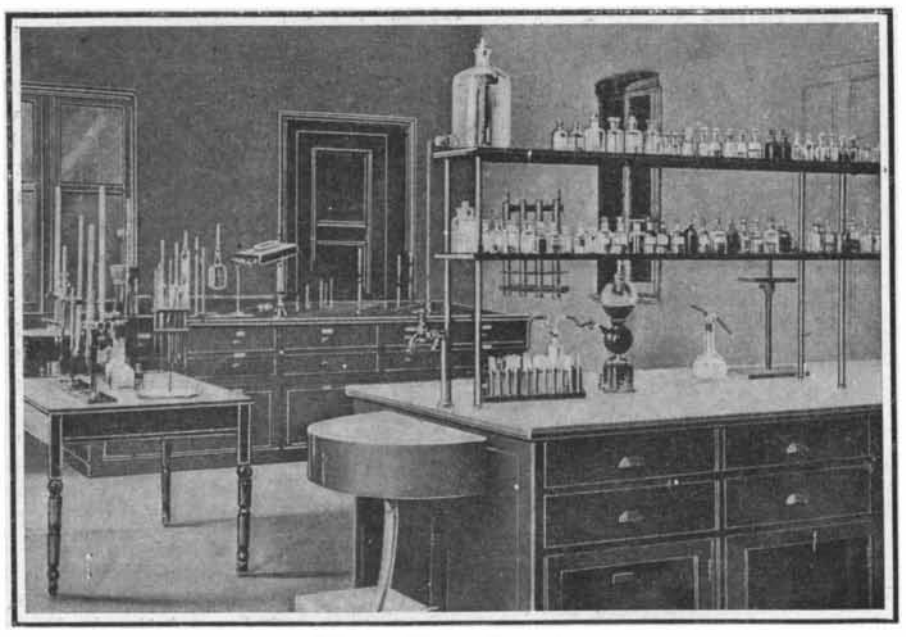
The floating laboratory on the Nile, auxiliary to the Wellcome Research Laboratories.



Part of bacteriological section of floating laboratory.



Bacteriological room.



General chemical laboratory.

THE WELLCOME TROPICAL RESEARCH LABORATORIES AT KHARTUM.

Internal combustion engine, W. M. Appleton	939,376
Internal combustion engine, A. J. West	939,459
Iron oxid scale, electrolytically removing, Danforth & Jones	939,223, 939,224
Key fastener, W. A. Loveland	939,607
Kinetoscope, A. C. Roebuck	939,634
Kinetoscopic apparatus, J. E. Lagergren	939,274
Kitchen utensil, F. H. Hamblin	939,251
Kitchen utensil, J. Saul	939,329
Knife blade, detachable, M. H. Sterling	939,346
Knitting machines, lace pattern mechanism for straight, Salzer & Walther	939,328
Lacing tips and the like and composition for the same, fabric for, G. W. Prentice	939,313
Lamp, carriage, H. Blau	939,385
Lamp, gas or vapor electric, P. C. Hewitt	939,912
Lamp, mercury and other vapor electric, Kent & Lacell	939,708
Lamp, miner's electric, H. Remane	939,630
Lantern, J. H. Pence	939,542
Lantern and heater, combination, O. H. Armington	939,377
Last, locking collapsible, C. F. Pym	939,860
Last, shoe, A. J. Buch	939,212
Lathe tool post, C. L. Libby	939,722
Lawn rake, rotary, C. Walte	939,765
Lead joint runner, W. Vanderman	939,356
Lens carrier, lantern, F. D. Spear	939,754
Lens grinding machine, automatic prescription, E. O. Mattern	939,845
Leveler, automatic, E. Woodward	939,372
Lever, J. R. Weatherly	939,574
Lifting jack, F. M. Allerton	939,374
Lighting and extinguishing device, automatic, A. J. Bedford	939,790
Line casting machine, J. McNamara	939,291
Line casting machines, keyboard mechanism for, J. R. Rogers	939,325
Lino slug trimming machine, S. R. Carter	939,800
Linotype machine, F. Johannesen	939,262
Liquid as a motive power, method and means of utilizing, E. Taylor	939,757
Liquid cooling and dispensing apparatus, G. W. & W. H. Fulper	939,954
Liquid dropper, E. K. Scott	939,556
Liquid fuel burner, B. Moore	939,613
Liquid fuel lighting system, A. Burton	939,799
Lock bolt, L. & D. Moeller	939,921
Lock key, I. C. Freud	939,679
Locks, seal attachment for, C. H. Johnson	939,699
Loom filling detector mechanism, G. F. Hutchins	939,696
Loom filling detector mechanism, weft replenishing, E. H. Ryon	939,954
Loom pattern mechanism, Owen & Pratt	939,299
Loom picker stick mechanism, L. P. Sherman	939,560
Loom shuttle, Cunniff & Rafferty	939,892
Loom, weft replenishing, E. H. Ryon	939,326
Looms, filling thread cutting device for weft replenishing, B. F. McGuiness	939,433
Looms for weaving, beating up mechanism of, W. Hollas	939,503
Loss preventing device, M. T. Fish	939,487
Lubricant, J. W. Watkins	939,646
Lubricating device, F. R. Paine	939,301
Magneto generator, R. H. Hassler	939,910
Mail bag deliverer, S. B. Colbert	939,806
Mail catcher and deliverer, railway, W. T. Sebree	939,557
Mail delivering and receiving device, J. A. Bossie	939,793
Mail delivering apparatus, J. T. Howard	939,259
Mail delivering appliance for railway trains, H. J. Hill	939,688
Mail pouch catching and delivering apparatus, J. A. Olbon	939,738
Manhole closure, C. C. Puffer	939,628
Massage and air compressing machine, J. B. Fey	939,822
Match box, automatic, J. G. Hanna	939,252
Match holder or safe, H. M. King	939,710
Match machine, W. R. Swett	939,348
Match safe, pocket, J. F. Beatty	939,657
Matrices, dovetail notch chamfering machine for, H. A. Reynolds	939,632
Matrix channeling machine, H. A. Reynolds	939,631
Matrix combination punching machine, H. A. Reynolds	939,633
Measurer, liquid, C. C. Allen	939,198
Metal box, Klenk & Fink, reissue	13,038
Metal shears, G. Potstada	939,627
Metallic tie, T. B. Bradford	939,794
Micrometer, H. Spahn	939,562
Milk, desiccating, F. X. Govers	939,495
Milk heater, H. C. Root	939,936
Miter gage, Erikson & Wikander	939,405
Mold, J. N. Erixon	939,819
Molding flask, J. D. Millar	939,849
Molding mechanism, W. Zimmerman	939,581
Mop, Wichmann & Rich	939,883
Mower trimming attachment, lawn, H. Smith	939,926
Music turner, W. & R. Mark	939,525
Musical instrument strings, holder and protector for, O. J. Muller	939,734
Musical instrument tracker mechanism, T. P. Brown	939,387
Net frame, landing, G. M. Barnes	939,381
Nut lock, W. Atkins	939,654
Oil and grease gun, combined, F. J. Ball	939,465
Oil burner, C. Eckland	939,816
Oil cake forming machine, A. W. French	939,492
Oiling device for gas meter diaphragms, automatic, J. R. Daly	939,675
Ore separator, magnetic, W. D. Ludwick	939,523
Oven, bake, B. A. Geurink	939,410
Packaging machine, B. W. Tucker	939,353
Packing and display receptacle, W. E. Collins	939,807
Painting machine, wheel, J. Heinz	939,416
Paper box blank machine, J. R. Van Wormer	939,571
Paper cutter and printer, automatic roll, G. V. A. Pine	939,545
Paper dish-making machine, I. Bertin	939,888
Paper feeder, automatic, J. Hren	939,260
Paper shells, machine for making, J. Chesney	939,948
Pedal and panel mechanism, T. P. Brown	939,386
Pen, fountain, H. J. Upton	939,456
Pen holder, R. J. Cox	939,810
Pendant, A. Jacques	939,510
Percolator, J. B. Livingston	939,281
Perforator, casing, Lapp & Harrison	939,917
Permutation lock, O. Anderson	939,887
Phonograph, F. E. Holman	939,692
Piano violin, J. Bajde	939,786
Pianos, repeating action for grand, F. A. Wessell et al.	939,362
Pianos, sostenuto attachment for, E. Peterson	939,309
Picture hanger, adjustable, J. Degan	939,226
Picture machines and phonographs, synchronizing device for, P. Seiler	939,337
Pipe and cleaner therefor, M. A. Hadcock	939,247
Pipe cleaning apparatus, G. A. Lutz	939,608
Pipe coupling, F. C. Pahlow	939,339
Pipe joint, flexible, W. A. Greenlaw	939,908
Planter and harrow, combined, J. M. Tucker	939,761
Planter, corn, C. W. Lanham	939,717
Planter, corn, L. E. McQuitty	939,853
Plow, H. H. Julich	939,704
Plow, reversible, W. Koehler	939,271
Plow, reversible, J. J. Nall	939,617
Plowing machine, Kuster & Niemann	939,716
Pneumatic despatch system, P. R. Shill	939,872
Pot and kettle cover, I. Chapman	939,802
Powder cutting machine, C. Dobbs	939,895
Powder distributer, enameling, W. Lindsay	939,918
Press, L. H. Conner	939,475
Press, H. G. Miller	939,732
Press button, R. Scheewe	939,446
Pressure control, automatic, J. H. Smith	939,752
Pressure generating and applying device, hydraulic, J. W. Nelson	939,535
Pressure generating, controlling, and applying apparatus, hydraulic, J. W. Nelson	939,737
Printer's galley, A. S. Orchard	939,620
Printing and issuing machine, ticket, R. North	939,297
Printing and issuing tickets and registering fares, machine for, R. North	939,295
Printing machines, sheet inverting apparatus for use in connection with, T. R. G. Parker	939,541

THE WELLCOME TROPICAL RESEARCH LABORATORIES AT KHARTUM.

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under the direction of Dr. C. N. Wenyon, proto-zoologist to the London Tropical School of Medicine, and proved such a complete success that the work in this direction is being considerably developed.

Entomology is another very promising science that has claimed considerable attention in these laboratories. There is an immense field in the Sudan for an economic entomologist, and the scope and variety of the work done is almost bewildering. There are pests of every kind infesting every living being and plant, and the task of reducing these would at times seem almost hopeless. Every year taxes, aggregating large sums, have to be remitted owing to the ravages of *Aphis sorghi* and other pests. Fatalism, natural indolence, and improvidence often prevent the natives, unless supervised, from taking those active measures so necessary in cases of insect infestation of crops. These labors have also a direct bearing on tropical medicine, as results have abundantly testified.

In the field of anthropology very valuable work has been accomplished. The laboratories are recognized as a working place for fellows of the Carnegie Research Fund; and on the recommendation of the director, Dr. A. MacTier Pirrie was appointed anthropologist to the Institution. In addition to his medical qualifications, Dr. Pirrie held a special degree in anthropology, and was particularly well versed in physical work. Although he labored under the great disadvantage of not knowing the country, he undertook and successfully completed remarkable journeys into the totally unknown Burun country, which lies between the White Nile and Abyssinia. He lived and moved among the tribes inhabiting this territory, and his method of handling the natives was highly appreciated by the government. By his free movement among them he was able to acquire extensive data of their life, manners, and customs of the most highly prized character. Unfortunately, these expeditions proved fatal to the young, enthusiastic investigator. During one journey he contracted an indigenous disease propagated by the parasite of kala-azar. He was prostrated and invalided home to Scotland, but died six months later before he had the opportunity of setting out the results of his work. His notes and observations, as well as those of archæological and ethnological aspect, were worked up by competent authorities, and have thrown much light upon a people and their country about which nothing has previously been known.

The chemistry section has received as much attention as tropical medicine, for it has an important bearing upon the commercial development of the country. The principal fields of investigation in this direction have been Sudan gums, food-stuffs, and seeds, as well as water supply from the Blue and the White Nile and wells. The study of gums has been particularly exhaustive. The Sudan has extensive forests of gum trees; in fact, such constitutes one of its staple products. Inquiry showed that comparatively little was known about gums, so that great attention was concentrated upon this subject. After some four years of labor, the laboratories have made some valuable additions to the chemistry of this commodity, and it is hoped that their labors may result in placing the Sudanese gum industry upon a sound basis.

Unfortunately, on May 11th, 1908, the laboratories suffered a heavy calamity in a fire, which breaking out in the photographic dark room, practically gutted the building, except the library, directors' room, and one or two other departments. Not only was a very large quantity of equipment destroyed, but all the trypanosomiasis specimens were lost, together with the records of two years' work on the subject. Nearly all the paraffin blocks prepared during the previous

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eighteen months, and containing the imbedded organs of fowls dead of spirochætosis, were lost, and thus a far-reaching investigation has been temporarily arrested, and it has not yet been possible to replace the material. Upon the receipt of the news of the catastrophe, Mr. Henry S. Wellcome, to whose munificence the Institution was due, immediately offered to replace the lost equipment; and through his generosity the laboratories were completely refitted and re-equipped with the most modern appliances, so that work could be resumed with the minimum delay. Consequently, so far as general usefulness goes, the Institution was only temporarily crippled.

Work is now again in full swing, and it should be pointed out that there is a very large field to be covered yet. If the various countries interested in the exploitation of the continent could establish similar laboratories to this in their respective territories, it would soon become a white man's land, and through concerted action the terrible maladies which at present arrest development would be completely subjugated.

ARTILLERY FOR AIRSHIP ATTACK.

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is clamped tight against the axles. The third type of cannon is of a much heavier build than the two which precede, seeing that in this case it is designed to be mounted on shipboard, and hence the weight does not need to be reduced as in the other cases. It is of a considerably larger caliber, this being 10.5 centimeters (4.2 inches). In most of the details it is designed on the same lines as the second type. It is intended to be mounted generally upon torpedo boats or swift cruisers, and naturally the gun can be brought into service as an ordinary cannon in cases where it is needed. For the gun proper, the weight is 3,080 pounds, while the support weighs 3,520 pounds, giving a total weight of 6,600 pounds for this type. Like the former, the angle of elevation is 75 degrees at a maximum. The projectile, weighing 40 pounds, has an initial speed of 2,300 feet per second. A horizontal range of 44,500 feet is reached in this case, and we have the unusual height of 37,620 feet.

The present types of gun were given a series of tests by firing upon captive balloons, and two of our engravings illustrate this feature. In one case we observe the balloon, which has not been hit by the shot, and this can be clearly seen by the trail of smoke which shows the path of the projectile. In the second view is represented the effect which takes place when the projectile strikes the balloon, and we have the detonation of the grenade and at the same time the explosion of the gas and the destruction of the balloon.

Alcohol vs. Gasoline Engines.

Almost any engine with a well-designed carbureter will run as well with alcohol as with gasoline, except for a difference in ease of starting and in certainty of operation at low speeds. By using alcohol in an alcohol engine with a high degree of compression the fuel-consumption rate in gallons per horse-power hour can be made practically the same as for gasoline in a gasoline engine of the same size and speed. An alcohol engine with the maximum compression for alcohol will have 30 per cent more available horse-power than a gasoline engine of the same size, stroke, and speed, and the weight per horse-power may be less. Tests with mixtures of gasoline and alcohol showed no gain in efficiency over gasoline or alcohol alone. Diluting gasoline with water did not affect fuel economy.

With alcohol the case was different, but with dilutions up to 80 per cent alcohol the effect was so slight that 80 per cent alcohol is a cheaper fuel than 90 per cent if it can be had for 15 per cent less.

Stamp mortar, M. P. Boss	939,208
Starting and separating gate, R. V. Jones	939,703
Steam generator, F. N. Tilton	939,759
Steam trap, Singer & Pratt	939,450
Steam trap, N. English	939,667
Steering gear, R. S. Riley	939,323
Stirrup, safety, J. L. James	939,697
Stoker for furnaces, mechanical, F. W. Seyboth	939,869
Stone cutting machine, W. F. Meyers	939,528
Stone fluting machine, G. N. Williams, Jr.	939,577
Store service credit system apparatus, C. F. Kettering	939,267
Stove, L. Moore	939,529
Stove, Choltus & Jeannesson	939,890
Superheater for use in connection with vulcanizers and other apparatus, J. Berliner	939,956
Surfacing machine, A. H. Whatley	939,363
Surfacing machine, F. R. Allen	939,373
Suspender check, F. B. Hawes	939,687
Suspenders, G. M. Edgarton	939,898
Suspending device, portable, C. F. Redman	939,318
Sweeping compound, Wolfgram & Klausman	939,369
Syringe or the like, C. P. Leyner	939,520
Syringe, vaginal, E. H. Keske	939,266
Table lock, extension, J. A. Barbrake	939,379
Talking machine, W. W. Wooster	939,781
Tape, T. P. Himes	939,839
Telegraph sending machine, J. A. Hulit	939,507
Telegraph system and apparatus, T. B. Dixon	939,401
Telegraph transmitter, B. F. Bellows	939,383
Telegraph transmitter, G. M. Goddard	939,683
Telemeter, H. Wild	939,366
Telemeter rod, C. E. Flanagan	939,489
Telephone attachment, H. R. Palmer	939,439
Telephone system, F. E. Summers	939,756
Temperature regulating apparatus, J. M. Pullen	939,858
Thermostat, H. G. Geissinger	939,957
Thread cop, A. N. Chartier	939,667
Thread cutting mechanism, filling, E. H. Ryon	939,445
Thread cutting tool, W. Murchey	939,735
Tie holder, A. A. Felix	939,678
Time lock, E. M. Benham	939,384
Tire antislipping attachment, M. J. Frambach	939,491
Tire, cushion, W. E. Marengo	939,524
Tire fastener, L. M. Nelson	939,619
Tire for vehicle wheels, elastic, B. M. de Sa	939,327
Tire, pneumatic, J. L. Maitland	939,428
Tire protector, F. R. & C. R. Colvin	939,474
Tire, resilient, W. H. Rowling	939,638
Tire, vehicle wheel, T. Midgley	939,610, 939,611
Tongue, draft, T. Pojar	939,547
Tonnage equating machine, J. M. Daly	939,222
Tool, F. H. Gruer	939,496
Tool, pneumatic, C. Christiansen	939,803
Toy, J. B. Bowman	939,586
Track sanding device, E. L. Larson	939,718
Track supporting device, overhead, Neller & Louden	939,618
Traction device, M. E. Schmidt	939,334
Train switch, electrically actuated, J. Y. Porter	939,626
Tramways, point operating mechanism for, T. N. Atkinson	939,939
Transmission mechanism, temperature controlled, H. H. Taylor	939,566
Trap, P. Elfstrom	939,818
Tripod, J. M. Pullen	939,859
Trolley head, T. R. Stam	939,564
Trolley head, J. J. Bennett	939,658
Trough. See Eaves trough.	
Trousers stretcher, E. N. Hallett	939,831
Truck, J. F. Fierke	939,406
Truck bolster, J. J. Byers	939,946
Truck, car, C. S. Shallenberger	939,870
Truck, hand, A. B. Kernel	939,600
Truck, lifting, A. A. Ake	939,783
Trucks, blocking device for, Lattneer & Robinson	939,518
Trunk, wardrobe, G. H. Wheary	939,575
Tube mill lining, G. H. Rotherham	939,637
Tube welding apparatus, Dicke & Klinkmann	939,591
Tubing, apparatus for making spiral, E. T. Greenfield	939,244
Turbine, C. A. Kaiser	939,514
Turbine, J. H. Felthousen	939,821
Turbine, internal combustion, gas, G. E. Doe	939,229
Twine making machine, C. Kieren	939,268
Twine, take-up, J. B. Eastman	939,233
Typewriter attachment, A. C. Kendrick	939,265
Typewriter carriage stop mechanism, M. B. Sargent	939,640
Typewriting machine, C. B. Yaw	939,579
Typewriting machine, E. E. Barney	939,583
Typewriting machine, A. T. Brown	939,587
Umbrella, folding, X. J. Zoller	939,842
Valve, T. J. Hendricks	939,499
Valve, J. L. Fitts	939,893
Valve, air, J. W. Ledoux	939,277
Valve device for corrosive liquids, W. H. Smith	939,927
Valve, regulating, B. Blumel	939,792
Vault closure, Myers & Poister	939,922
Vegetable cutter, Myers & Kahne	939,951
Vehicle body, E. W. Crosby	939,478
Vehicle wheel, L. Garnier	939,681
Vehicle wheel, T. Hubscher	939,695
Vehicle wheel, spring, E. Murray	939,432
Vehicles, fore carriage of, J. Schmitt	939,555
Vending machine, coin controlled, E. F. Spaulding	939,563
Violin, F. O. Fish	939,486
Vise, quick acting woodworking, W. Y. Mentzer	939,284
Voltaic high-current arcs, production of, H. Pauling	939,442
Voting machine, Stacy & Julius	939,755, 939,929
Voting machine counter construction, C. F. Currey	939,674
Vulcanizer, F. E. Smith	939,842
Wagon bed, C. B. Tillery	939,758
Wagon, dumping, J. Heberling	939,414
Wagon, dumping, T. Wright	939,782
Wall and constructing same, composite, J. H. Magdiel	939,726
Warp stop motion, electric, J. Regan	939,924
Washing machine, W. C. & L. R. Simmons	939,340
Washington machine gearing, A. Van Wormer	939,645
Water closet disinfecting devices, valve for, J. Kneen	939,424
Water gage, H. H. Vaage	939,673
Water heater, electric, Levy & Blanchard	939,605
Water motor, J. Hubmann	939,506
Web coating machine, W. A. Daniels	939,396
Weighing machine, W. W. Rosenfield	939,747
Wet machine, W. White	939,480
Wheels, manufacturing metal, G. Kowarsky	939,714
Whip socket, R. Habekost	939,246
Winding mechanism, self, Blodgett & Atkinson	939,791
Windmill tower, W. Hopper	939,504
Window operating mechanism, swinging, J. S. Gourlay	939,412
Window screen, H. B. Wilson	939,780
Wire reel and mounting therefor, F. P. Murphey	939,616
Wire splicer, I. G. Huston	939,509
Wire stretcher, J. F. Ball	939,787
Wood blight composition, J. W. Lafer	939,273
Woven fabric, T. B. Dorman	939,230
Wrench, E. C. & G. W. Rea	939,317
Wrench, D. Mallory	939,728
Wrench, P. Bartok	939,788
Wrench, L. G. Van Ormer	939,879
Yarn cleaner or slub catcher, G. W. Foster	939,490

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