

Irrigation on a Large Scale.

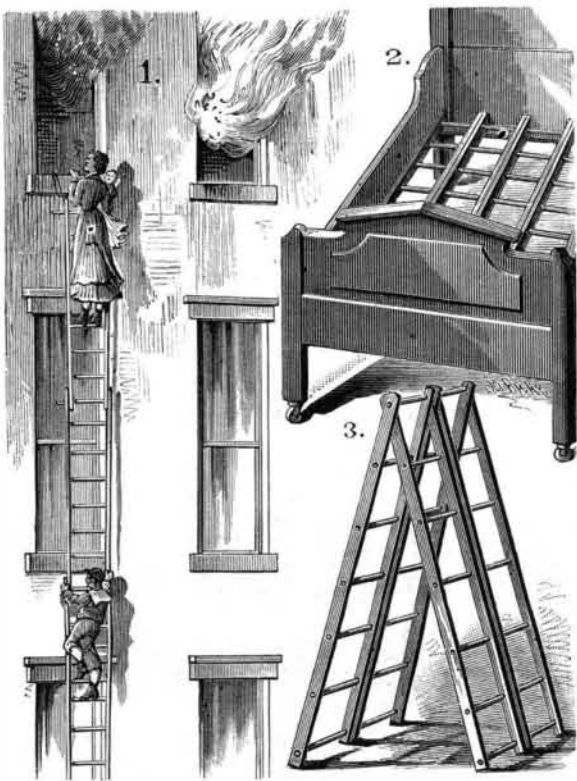
The most gigantic irrigation enterprise ever inaugurated in the State of California has been commenced in Fresno County, the canal for which will be the largest in the State, and fed by King's River. The water is intended to irrigate 30,000,000 acres of rich land, at present barren through lack of water. The source of supply of this canal will be higher than any other debouching from the same stream. Its dimensions are: One hundred feet in width at the bottom; levees an average of fifteen feet in height and eight feet wide at the top, broad enough for a wagon road. The depth of the water is expected to be five feet, with a fall of eighteen inches to the mile. The dam in the mountain cañon, whence the water is taken, will be a wonderful and permanent one. It is twenty-five feet high, eight hundred feet long, one hundred and forty feet wide at the base and twenty-five feet wide on top. It is rip-rapped on the inside with heavy rock, and every precaution taken to make it sufficiently strong to securely hold the great weight of water that must be supported. The water is led into the canal from a large head-gate, constructed of heavy timber, one hundred feet in width and eighteen feet high. It is planked over so as to make a bridge for heavy wagons, and has wings to protect it from the floods. The canal is expected to carry thirteen hundred cubic feet of water per second.—*Los Angeles Herald.*

Railroads in Venezuela.

The first railroad built and operated in Venezuela began at Puerto Cabello and led to the westward. About ten miles were built and operated, but embarrassment followed, and nothing is now to be seen except a dim outline of the road bed. About the year 1870 an English company built a 2-foot gauge road from Tucacas to the mines of Aroa, a distance of 55½ miles. Poisonous reptiles, wild animals, malaria, and dense jungles combined to obstruct the building of the road. The largest bridge has a span of 90 feet. The ties, bridges, and even the telegraph poles are of iron. The road for its last five miles has a grade of 600 feet, requiring specially constructed engines. The freight cars carry from five to six tons and the passenger cars about 30 passengers. A road from La Guira to Caracas, a distance of 22 miles, has been in process of construction for several years. The track of the road is 3½ foot gauge. It is built on a series of reverse curves having a radius of 140 feet. Surveys have been made for other lines, and a small amount of grading has been done on a road 40 miles long from Puerto Cabello to Valencia.

BED BOTTOM FIRE ESCAPE.

The fire escape herewith illustrated consists of ladders which may be disposed so as to take the place of the slats in an ordinary bedstead, as shown in Fig. 2, or joined end to end and suspended from the window of a building, as in Fig. 1, or arranged as a step-ladder, as in Fig. 3. The ladders are made of white ash or other suitable wood from one inch boards; the side bars are 1 by 2 inches, and the rods are three-fourths inch thick, well secured. For general use the sections would be 6 feet long, and would be made tapering from 10 inches wide on one end to 12 inches on the other

**BLOEDON'S BED BOTTOM FIRE ESCAPE.**

By this means the ends of the sections may be lapped and secured by rods and pins so as to form one long ladder. Holes are made in the ends for the connecting rod to pass through. Through holes in one end of one section is passed a rope fastened to a board of a length just sufficient to rest across an ordinary bed. This board is placed across the window, and makes a secure hold for the ladder when used as a fire escape. The parts are, practically, laid away when not needed, and yet may be easily and rapidly connected and hung from the window if circumstances so require.

This invention has been patented by Mr. Louis Bloedon, of Bay City, Mich.

MAIL BAG CATCHER.

This invention provides a simple, efficient, and cheap device which can be attached to a mail car for catching the mail bags hung from a crane at the side of the track, while the car is in motion. Across the door of the car horizontally extends a bar, each end of which is journaled in bearings fixed to the side of the car. The arm which catches the bags is heaviest at its center, and the two branches taper toward the ends and are slightly bent at the middle. This arm is attached to the cross bar by a tenon, and between the arm and bar is a shoulder, which may be a separate piece or which may be made as a part of either. The crossbar is

**KELLOGG'S MAIL BAG CATCHER.**

recessed at each side of the center in order to more securely grasp the mail bag after it has been caught from the crane. This method of construction, together with the shoulder, will facilitate the removal of the bag from the catcher by the mail agents. Projecting from the opposite side of the cross bar is a handle by which the bar can be swung axially. The arm being double, either end may be brought into position for catching the bag, irrespective of the direction in which the car is moving, or the speed. When not in use the catcher gravitates, by the weight of the arm, to an upright position, in which it is out of the way.

This invention has been patented by Mr. Joseph A. Kellogg, of Nashville, Tenn.

Brazilian Woods.

M. Thanneur, a correspondent of *Les Annales*, describes some of the timber to be found in abundance in the valley of the La Plata and vicinity, and claims high value for them for mechanical and engineering purposes. He says the "quebracho" is perhaps the most interesting of all and the most used. It is very abundant in Brazil and La Plata. Its diameter varies within the same limits as that of the oak, but the trunk is shorter. It is used for railway sleepers, telegraphic poles, piles, etc. It is very durable, especially when well seasoned. It is much heavier than water, its specific gravity varying between 1.203 and 1.333. Its color is reddish, like mahogany, but it becomes darker in time. On account of its hardness it is difficult to work, and it cannot be readily cut with an ax. It has been introduced into France on account of its richness in tannin. A large proportion of Brazilian leather is tanned by the sawdust of quebracho, but the leather is rather brittle. A mixture composed of one-third of powdered quebracho and two-thirds of ordinary tan gives very good results.

Another Balloon Experiment.

The *St. Louis Globe-Democrat* has the following item respecting M. Gentil, the inventor of the balloon, of which our Western contemporaries have lately had considerable to say: M. Gentil was a medical practitioner in France, but owing to political reasons he came to America in 1862, and settled in St. Louis as a locksmith. It has been his life dream to make an air ship, and he has constructed four different machines, each susceptible of improvement. The final effort is a cigar shaped balloon, with gas compartments, a rudder at the thick end, and screw shaped sails at each side to raise or lower the altitude. He claims that he can steer his air ship at will, work his pinions, and raise her when the lifting power of the gas is exhausted. The whole is inclosed in a network, from which depends the car supported by a series of guys, ropes, stays, and gaskets, having the look and gearing of the main deck and bulwarks of a full rigged ship. The model is suspended from the ceiling of his little shop in St. Louis, and is his idol. "It is for the scientific public," M. Gentil said, "the work of my life; and shall I, then, prostitute my grand work by putting it upon exhibition at ten cents a head, like a stuffed whale or petrified hog? I want no money. I give it to the people, and I am happy."

A Remarkable Ice Well.

Mr. Levi Allen, of Horse Plains, Montana, writes as follows: I have a well forty-five feet deep, situated under saw-mill. In sinking the well, at a depth of thirty-five feet we encountered a strong current of air, strong enough to blow out a candle. Last September the well commenced to freeze up; we banked it with sawdust, but it did no good. The last of November it was frozen solid. I have a steam pump within fifteen feet of bottom of the well; went down last week to the pump to repair same, and found two feet of solid ice within four feet of the pump. The mill has been idle for three months. This well is dug through solid gravel, is situated on low ground, seems to have been the bed of the Pend d'Oreille River. The river is distant three-quarters of a mile.

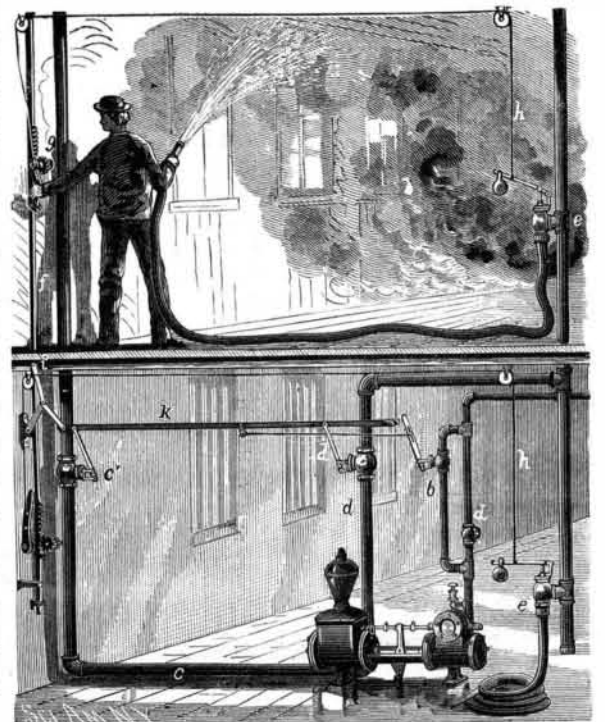
Can you explain the cause of the freezing of the water in this well?

FIRE EXTINGUISHING APPARATUS.

By means of this invention the extinguishing of fires in buildings is greatly facilitated, as on each floor there is a lever controlling the admission of steam to the steam pump, and the same motion opens the valve admitting water. Almost instantly the pump is set in operation, and a bountiful supply of water is received at the point where the fire is discovered. On the lower floor, or in the basement, is an ordinary steam pump receiving steam through a pipe from a boiler, not shown in the engraving. This pipe is provided with a valve placed near the engine, and also with a branch pipe, *b*, the ends of which are connected with the pipe, upon opposite sides of the valve, and by means of the valve in the branch steam can be admitted to the engine independently of the first mentioned valve. The inlet or suction pipe of the pump connects with a well or other suitable water supply.

The discharge pipe of the pump is shown at *c*, leading to a tank in the upper part of the building, and to this is connected a pipe, *d*, leading through the various stories of the building. These pipes are provided with valves, *c'* and *d'*, so that the water may be directed through either, as may be desired. Upon each story the pipe, *d*, is provided with a discharge cock, *e e*, to which is attached a hose. A bar, *f*, extends through the various stories, sliding vertically in guides attached to the wall, and has formed upon it a section of rack teeth, *g*, into which meshes a small gear wheel. One of the journals of the gear wheel projects and is provided with a tongue to fit in a grooved hole in the end of a lever, so that the bar, *f*, can be raised or lowered by operating the lever. To each lever is attached a cord, *h*, which passes over guide pulleys, and the other end of each cord is attached to a lever connected with the valve stem of the cock, *e*. To the valve lever is hung a weight sufficient to close the cock when the cord is slackened.

To the lower part of the bar, *f*, is hinged the upper end of a short bar, *i*, the lower end of which is hinged to the adjacent ends of two short bars, one end of one being hinged to the wall of the building and the end of the other being joined to the bar, *k*. The movement of the bar, *k*, operates the valves, *c'*, *d'*, and *b*, as shown in the engraving. When

**MOLENDO'S FIRE EXTINGUISHING APPARATUS.**

the rack bar, *f*, is raised by the movement of a lever in opening a valve, as *e*, admitting water, it draws the bar, *k*, outward, thus closing the valve, *c'*, in the water pipe leading to the tank, opening the valve, *d'*, in the pipe leading through the building, and opening the valve, *b*, admitting steam to the engine. When the bar is lowered, the reverse takes place. To make the plan operative when steam cannot be furnished to the engine, the tank at the top of the building is provided, so that there may be a pressure of water constantly on hand.

This invention has been patented by Mr. Hermann Molendo, of 210 E. Ninety-third Street, New York city, who should be addressed for further information.

Picture Frames from Carton Pierre.

Prof. Meidinger gives the following description of a new method employed in the manufacture of gilded and bronzed picture frames. The composition employed consists of glue, chalk, linseed oil, and paper pulp. The glue is first dissolved and boiled, then silk tissue paper (such as comes between gold leaf is very excellent) is stirred in and rapidly disintegrated, then linseed oil is added, and finally chalk. While hot the mass forms a stiff dough, which is hard when cold, but softens between the fingers, and can be kneaded and pressed into moulds. In a few days it gets dry and is then almost as hard as stone. The paper imparts tenacity to it, so that it is less affected by blows than wood is. Separate pieces of this mass unite readily, and it is easily attached to wood. The proportions of the four constituents are not stated, except that the proper proportions are recognizable by the feeling; in summer more glue is added than in winter, as it readily decomposes (spoils). Owing to the glue, of course, it will not stand the wet, and could not be employed for articles exposed to the weather.

When hard the surface can be shaved off with iron, then polished with sand paper, and is finally coated with a size called "Poliment." This, says Meidinger, is a commercial substance consisting essentially of clay, with the addition of soap and fatty substances. For gilding it is used just as it comes, but for bronzing, only blue or gray shades are used, and some dark pigment must be added, either fine black or umber. The dry pigment would make it too dry, and hence it must be softened by mixing it with melted wax and rubbing it up fine on a stone when cold. One-third of this is mixed with the commercial gray or blue poliment. To make it adhere to the ground, liquid glue must be added. Three or four coats are applied until it is sufficiently covered.

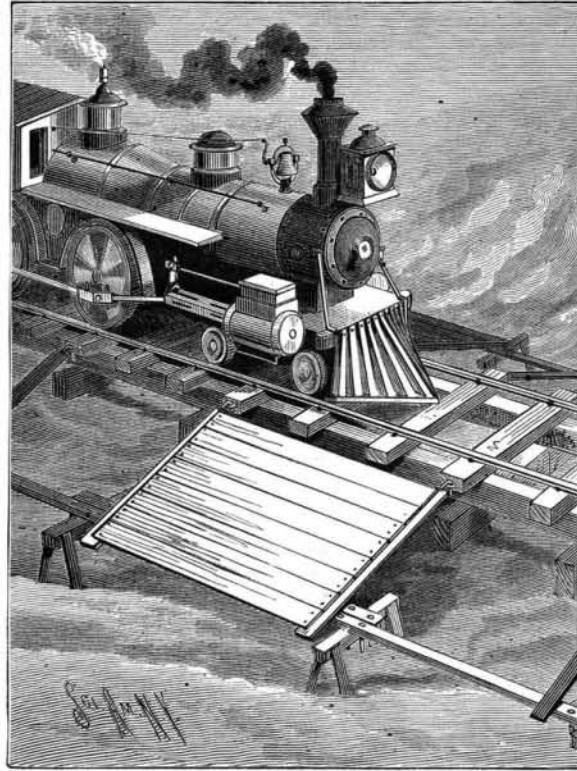
For gilding it is painted over with dilute alcohol and the gold leaf immediately laid on and pressed down. For bronzing a brush is wet with dilute spirits and dipped in the bronze powder, which is applied nearly dry on the poliment. It dries quickly and can be polished at once with agate polishers. The gilding is done as soon as it is polished, but bronzing requires varnishing, so as to impart to it a uniform luster, especially in deep cavities that cannot be polished well, and also to protect the bronze from change of color caused by atmospheric influences. The difference between gilding and bronzing consists, first, in using a darker poliment, as it shows through the bronze, while it is completely hidden by the gold leaf; secondly, in applying the bronze avoiding too damp a brush and too strong alcohol; thirdly, in the final coating with varnish.

NEW TURRET SHIP CONQUEROR.

This ship, now fitting out in Chatham Dockyard, will be, when completed, one of the most formidable vessels in the British Navy. Her armament consists of two of the new 43 ton breech-loading guns, in a turret protected by 12 inches of compound steel-faced armor, four 6-inch breech-loaders, two of which are placed in recessed ports aft, and two on Vavasour carriages, behind shields, amidships on the upper deck. She also carries, says the *Graphic*, to which we are indebted for our engraving, seven Nordenfelds, and two Gardner guns aloft in the top, or "upper fortress." Six

IMPROVED SAND GUARD FOR RAILWAYS.

The guard prevents sand which is carried along by the wind from accumulating on the tracks. It consists in a series of boards pivoted at the sides of the track and supporting other boards, under which the wind passes, sweeping over the track and carrying the sand along with it. The rails are spiked to ties, placed the usual distance apart, which rest on longitudinal beams supported on sleepers that

**IMPROVED SAND GUARD FOR RAILWAYS.**

are embedded in the ground, which must consist of gravel or some other earth that cannot be blown away. At the ends of some of the ties are loops for receiving hooks on the ends of boards, whose free ends rest on rails placed at the side of the track and parallel with it. These rails rest on horses placed at right angles to the track, and at the ends are provided with downwardly projecting pins, one of which is on each side of the top piece of a horse. On these rails are boards hinged to the ties or fastened in any suitable manner. The free ends of the boards may rest on the ground instead of on the rails supported by the horses. In sand storms the sand gathers in ridges on each side of the track, encroaches on the track, and finally stops travel. The horses are then placed on top of the ridges, and are pressed down until they have a firm bearing, when the rails and boards are placed on them, the latter having their outer edges a certain distance above the sand. The boards are so arranged that their outer edges will be to ward the direction from which the sand blows. The wind passes under the boards and is conducted to the other side of the track, carrying the sand with it. The boards need only be large

Paper for Uncle Sam's Currency.

The paper on which the United States currency is printed is manufactured at Dalton, Mass., and the *Boston Herald*, in a recent issue, gives the following particulars: Eighteen or twenty Treasury girls, who earn \$3 a day, count the sheets, examining each one closely, and rejecting all imperfect ones. An automatic register at the end of the machine registers every sheet as it is cut off and laid down. The register man takes them away in even hundreds, and they are immediately counted in the drying room. In all the various processes of finishing every sheet is counted, and they are again counted on their receipt at the Treasury Department in Washington. The great protection of the government against counterfeiting lies in the paper here made. The distinctive feature is the introduction of colored silk threads into the body of the paper while it is in the process of manufacture. They are introduced while the paper is in the pulp, and are carried along with it to the end of the machine, where it is delivered as actual paper. This has been more fatal than anything else to the professional counterfeiters.

Hollow Magnets.

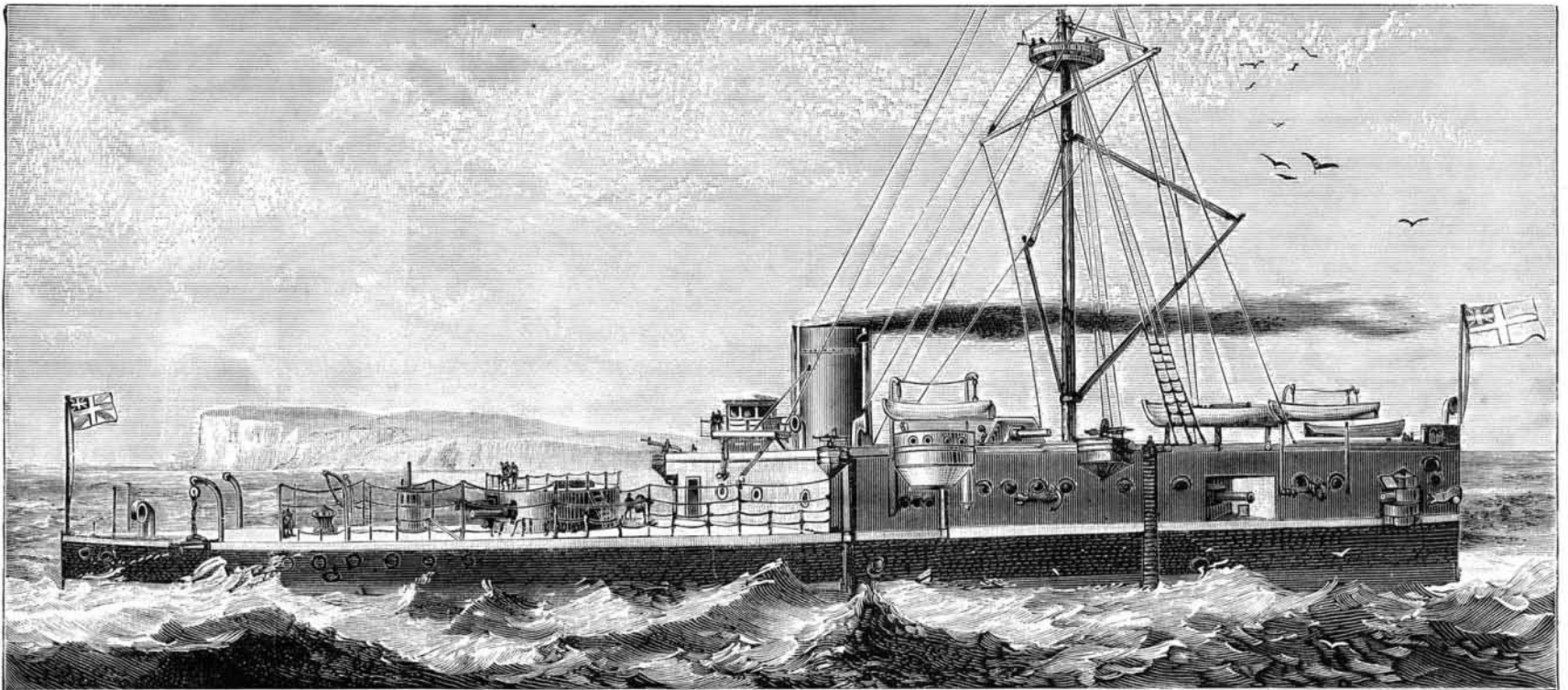
While Preece has found that there is no difference in the conducting power of lightning rods of various forms, Holtz has concluded that solid steel bars do not form so good permanent magnets as tubes, because the core acts as an armature joining the two poles. In experimenting to test his hypothesis, he magnetized rods and tubes to saturation, and found that the magnetism of the tube showed an excess of more than 50 per cent. After waiting six months, he subjected the same magnets to new tests, in order to find which retained the magnetism best. He found that the magnetism of the solid was to that of the hollow magnets, in one case as 1 : 2.5, in another as 1 : 2.9—*Weid. Annalen*.

Refrigerating Steamship for Carrying Fresh Meat.

The screw steamer *Loch Ard*, of Dundee, lately docked at Cardiff, is a fine vessel of 838 tons net register, and has been constructed specially for the purpose of carrying dead meat from the River Plate to London. The refrigerating chambers leading forward to the main and fore holds are lined with wood and charcoal, and an engine of novel construction draws the air out of the chambers. The air is then compressed and driven through the holds containing the dead meat, the temperature maintained being often 70° below zero. Messrs. David & W. Henderson, of Glasgow, constructed the engines under the patent of Messrs. Bell, Coleman & Co. The steamer will load for Montevideo, and thence take her cargo of meat for London. The voyage out and home will occupy about three months.

The Bottle-Nose Whale.

The *American Naturalist* asserts, on the record of Dr. Gray and Professor Flower, that the ordinary bottle-nose whale is only a variety of the spermaceti whale. According to information derived from a comparison of the bottle-nose with the spermaceti the former has all the characteristics of the latter in its yield of commercial material. Spermaceti is found in the head as in that of the well known spermaceti whale. The bottle-nose attains a length of thirty feet, and

**THE NEW STEEL TURRET SHIP CONQUEROR.**

torpedo ports, three on either side, from which Whitehead torpedoes can be discharged, and a most powerful ram complete her means of offense. Her engines are by Messrs. Humphreys & Tennant, and a full boiler power propel the ship at a speed of 15.5 knots.

THE returns of the census taken on January 1, 1883, which have just been published, show that the Empire of Japan contained a population of 36,700,100, made up of 18,598,998 males and 18,121,000 females.

enough to direct the current of wind so that it will have the desired effect. They may be applied to either side of the track.

The invention was patented by Mr. T. W. Stapleton, of Portland, Oregon, who assigned it to Mr. John G. McBride, 523 Franklin Street, San Francisco, Cal.

At Reddich, Germany, 14,000 persons are engaged in making needles. The total production of needles in the world is 200,000,000 per week, or 10,000,000,000 per year.

then yields two tons of oil and two hundredweight of spermaceti. It feeds upon small cuttlefish and in pursuit of them stays below longer than any others of its order, a fact which makes it difficult to kill. After running out 700 fathoms of line and remaining below two hours, an old male will come up so fresh as to require a second harpoon, and will attack the boats with head and tail. So strong are the muscles of this whale that he can not only leap clear out of the water, but can guide itself in descending so as to plunge head first instead of falling helplessly sidewise like the larger whales.