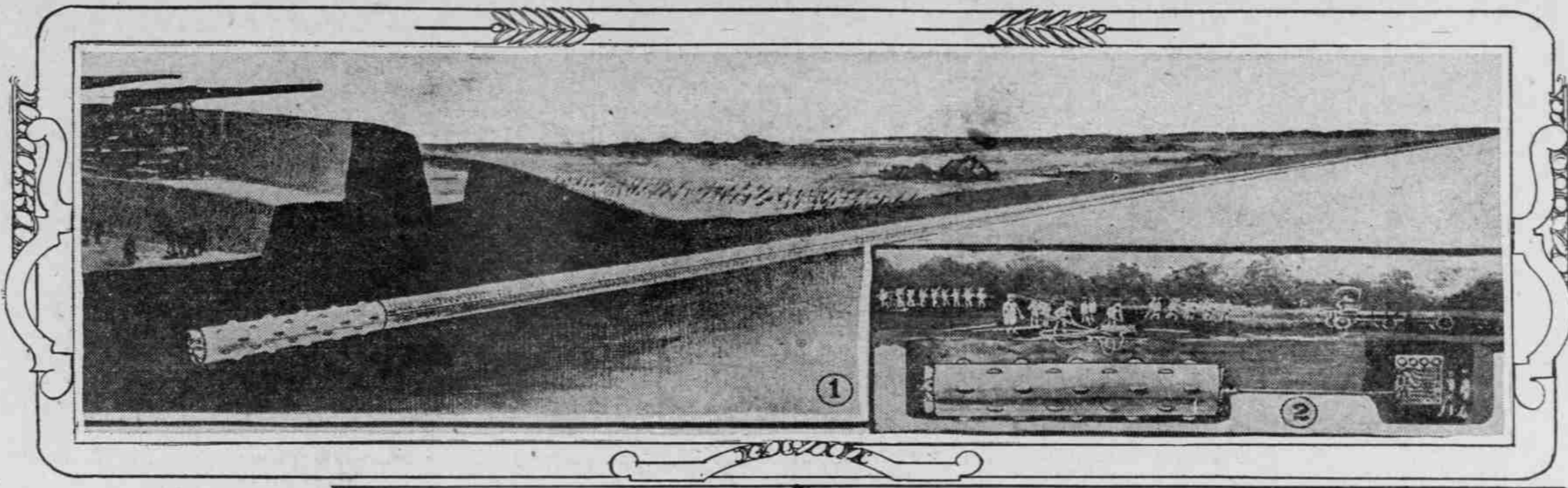


American Engineer Invents New Agency of Destruction Which May Cause Cities to Collapse and Strongest Fortifications to Crumple

A TORPEDO designed to burrow its way through earth and rock and on detonation to cause cities to collapse and the strongest fortifications man has devised to crumble is the instrument of destruction which an American engineer and inventor, Clifford P. Marye, proposes to add to the scientific agencies which make modern warfare terrible but effective.

The Marye subterranean, as the device has been named, was conceived 29 years ago, when the inventor was interested in mining operations. Its cost was prohibitive for such peaceful purposes as digging tunnels into hillsides. Today the French government is investigating its practicability, with a view to acquiring the European patent rights from the inventor.

The subterranean resembles in its operation nothing so much as a gigantic, rigid mechanical earthworm. Its "shredding head" is a maw which will feed on the gravel, sand, earth or clay which may obstruct its course as voraciously as that of its prototype, but on a vastly greater scale. Its "spiral flight conveyor" constitutes a digestive tract in which this "mass" or "food" is assimilated and converted into what the mining engineer calls "muck."

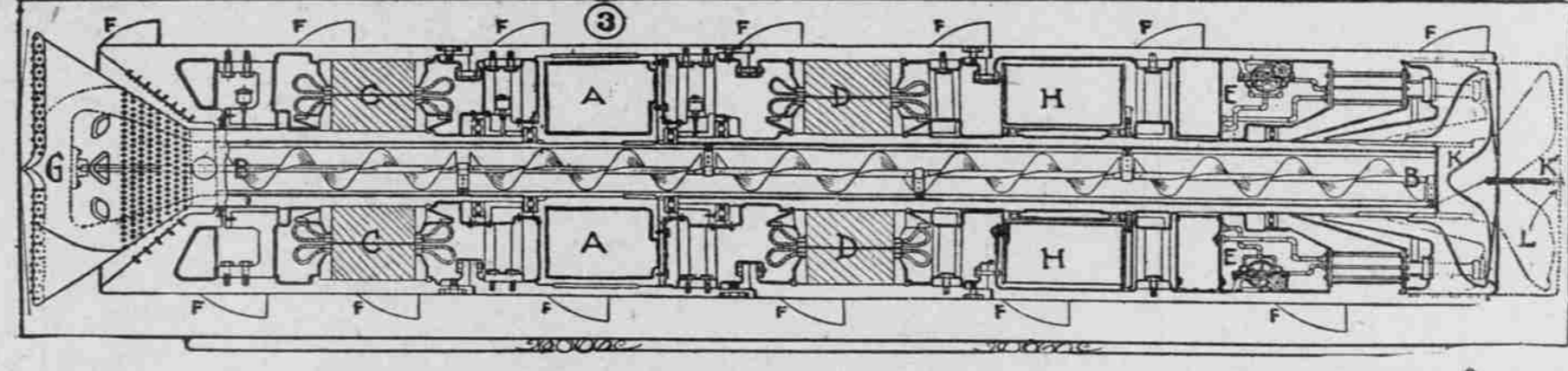


Electricity Drives Forward.

The ejected material, by operation of a "propulsor," is rammed by plungers into a "wake" as solid as the medium through which the head of the subterranean has eaten its way. When further compression of the "wake" is no longer possible, the driving power of these same plungers compels the subterranean forward. Electricity is the propelling power, supplied through a cable which the machine pays out as it moves forward.

The subterranean does not eliminate the earth displaced, any more than a marine torpedo eliminates the water through which it speeds. No bore or orifice remains to mark its passage, except that filled by its cable. The subterranean goes into the earth, and the earth closes in behind it.

No man accompanies the engine of destruction. It is guided and governed by the engineer in command, stationed at the switchboard to which the cable is attached. When the subterranean reaches its destination he pushes a button and detonates the machine. That completes the instrument's mission.



Neither the "cutting" nor "shredding" head nor the plungers are described, for obvious reasons.

As the muck is broken down in shredding apertures in the spiral flight conveyor, extending from B to B on the plan. The revolution of this spiral, just like that of an enormous meat grinder, forces the muck to the rear.

There are two 600-horsepower electric motors within the subterranean. One of these actuates the cutting head and also the spiral flight conveyor. The other serves to compel the plungers to perform their revolving function.

The reciprocating or driving function of the plungers is set in operation by four 20-horsepower electric motors, which operate in concert.

of steel which develops its greatest efficiency when working at cherry red heat, a temperature which probably will be engendered by the friction of operation. The cutting head is so designed that about six feet of it may be worn away before a vital part of the subterranean would be involved, but the destruction of which would stop further progress. Directly connected with the cutting head is apparatus for breaking up the muck and reducing it to a size the spiral flight conveyor can handle.

Enormous Explosive Charge.

The inventor has designed two sizes of subterranean. The larger has a diameter of 8 feet, a length of 42 feet with plungers in normal position, and of 48 feet with the plungers extended, and a weight of approximately 40 tons. The capacity of the explosive chamber in this design is 400 cubic feet.

The smaller model has a 3-foot diameter, a length of 30 feet normal and 24 feet with plungers extended, and a weight of 15 tons. The cost of the first machine of this type will be \$24,000 and of subsequent ones \$6000. The first machine will require 12 weeks to construct. Its explosive chamber measures about 100 cubic feet. The radius of operation of this model is three miles. Its rate of progress from 4 to 60 feet an hour. It will contain two 100-horsepower and one 10-horsepower motors. This form is adapted particularly to undermining and to exploding the enemy's trenches and smaller positions.

The underlying principle of this device has been tested on Staten Island with two small models, each about a foot long. The first test, on December 13, 1914, was through sand. After a successful trial the device was re-covered. The second test was made in July, 1915. The subterranean this time penetrated through sand, earth, clay impregnated with boulders, loose rock, roots of trees and other obstructions. It progressed to the full length of its

face, it would emerge completely from the earth and come to rest.

The subterranean will propel itself at a speed of from 40 to 100 feet an hour, or from one-sixth to one-half mile in a 24-hour day. The maximum distance it may travel is not known, but five or six miles is expected. The skill of the engineer in charge, his knowledge of the terrain traversed and the physical conditions encountered will be important factors in this estimate.

The inventor admits, however, that the subterranean will not be able to make a lengthy journey through solid granite formation. Where the mass encountered consists alternately of strata of earth and stone, or boulders of any size encased in earth, the device's progress will not be impeded, he says; but where the formation met is solid granite the radius of the subterranean will be limited and its progress slow.

The direction of the subterranean will be maintained even if it encounters broken formation. If a ledge of stone, or a boulder, extend partially across its path, it will either be pushed aside by the powerful hydraulic pressure developed or broken down and "digested" in muck.

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Mr. Marye asserts that no obstruction within the earth will be able to deviate the subterranean from its course once it is "aimed." Its great length and its rigidity, in conjunction with the firm grip of its "fins" against any oscillatory movement, he asserts, will make it proceed without variation of a fraction of a degree, regardless of the character of the mass encountered.

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In order that the operator may have knowledge of the conditions the subterranean is encountering, and the processes going on within it microphones are placed at convenient locations adjacent to its functional parts. These microphones are connected by wire with

telephone receivers. They record and transmit to the engineer the detail of operation. He will soon learn to detect by ear if any vital part of the machine is laboring at a disadvantage. The microphones will enable him to tell when to cease operating the cutting head, the spiral flight conveyor or the rear plungers in their rotary motion and to start the driving motion of the plungers which will cause the subterranean to advance.

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from premature explosion from the heat, air chambers have been designed to completely surround it. They will be lined on either side with asbestos. Mr. Marye asserts that the walls of the air chambers furthest from the explosive may under these conditions reach a red heat without setting off the destructive agency within the device.

The subterranean was first offered to the United States Government. The French Minister of Inventions on July 15 addressed an inquiry to the inventor for further details and terms.

Mr. Clifford P. Marye, the inventor of this device, was born in Selma, Ala., February 21, 1864. He has had an extensive commercial experience throughout the South and Middle West. Until about 1900 he was a practical printer, interesting himself much in machinery details. He has several inventions in use.

UGANDA AFTER 40 YEARS.

Yonder is the vivid green hill on whose summit David's grandfather, King Miesu, received Henry M. Stanley, who sent the challenge to British Christians leading the Church Missionary Society to establish its Uganda Mission, its first two representatives arriving at the capital June 30, 1877. That progressive, fickle, and potentate in turn encouraged Christianity and killed its converts, as did his successor, King Mwanga.

On a level stretch below the buildings is the football field where we first met the youthful King, watching from the royal mat, which we were invited to share, his favorite game. With all the enthusiasm of a Yale or Harvard "rooter" and in as good English as theirs—taught him by the missionaries and an Oxford tutor—David recounted the exploits of Uganda's best eleven, which proved to be the King's all-star team.

The following day we attended the consecration of the just-completed royal chapel near the palace, where we were seated at the King's left and later knelt to receive communion second from His Highness, going from the chapel to the palace, which we were invited to share, his favorite game. With all the enthusiasm of a Yale or Harvard "rooter" and in as good English as theirs—taught him by the missionaries and an Oxford tutor—David recounted the exploits of Uganda's best eleven, which proved to be the King's all-star team.

\$30,000 IS PRICE OF HOMER

THE auction record for an American picture is \$42,800. It was obtained by Mr. Thomas E. Kirby at the sale by the American Art Galleries of the collection of Mr. Emerson McMillan for a landscape by Inness.

This auction record occasionally is approached by private sale. It was during the last season that the Worcester Art Museum purchased from the Snedecor Galleries, of New York City, Winslow Homer's picture "The Gale," for \$30,000. At one time this picture was in the gallery of William Scheraga. He asked \$750 for it but was unable to sell it. Finally his partner objected to keeping it any longer, not because it hadn't been sold but because he disliked it. "It disturbs the whole gallery" was his dictum.

In the museum bulletin "M. E. S." gives some information regarding the picture. "The Gale" is signed and dated "Winslow Homer, 1832." It was bought by Mr. Thomas B. Clarke, of New York, who for years was a constant purchaser of Winslow Homer's paintings, both in oil and water color. In that year, 1832, the picture was one of 13 of Homer's oils exhibited at the World's Columbian Exposition in Chicago, where it received the gold medal, under the title "The Great Gale." At

the time of the sale of Mr. Clarke's collection, in 1899, it was bought by Mr. T. Harsen Rhoades, of New York, and later came into the possession of Mr. Rhoades' daughter, Mrs. B. Orden Chisholm, of New York. Mr. Rhoades paid \$1675 for it. Thus it rose in price from \$750 to \$1675 in 1899 and \$30,000 in 1916, a very satisfactory record for an American painting.

The picture was painted when the artist was 57 years old and thus belongs to that fine decade from 1886 to 1899 in which were produced such works as "Eight Bells" (1886), "The West Wind" (1891), "The Fox Hunt" (1893) and "The Maine Coast" (1896). The picture hardly needs its title for explanation. Everything in it tells of the gale.

A woman, probably a fisherman's wife, is coming along the shore, her small son carried on her back, his eyes staring out partly in fear and partly in the zest of adventure over the edge of the shawl in which he is held. One can feel the slow difficulty with which even one so solidly sturdy as she makes her way against the wind that buffets her heavy skirt, carries her apron streaming and flapping behind her and flings out the short, coppery locks of the little boy.

Sketches From Life. by Temple.



Bugs!



So Mother Won't Know



Same As At Home