IMPROVED STEAM JET PUMP.

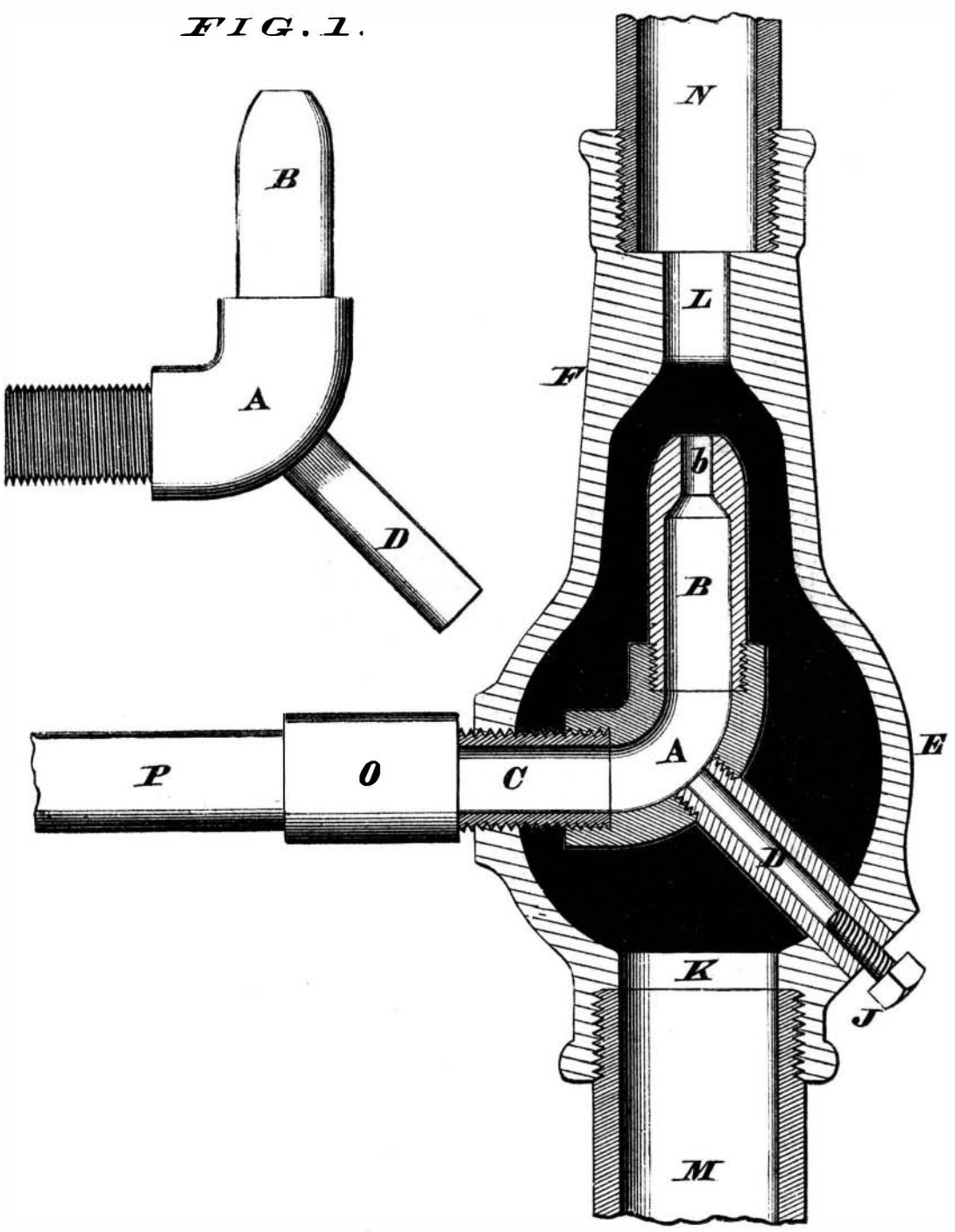
It has been customary to cast the nozzle of the above named pumps in one piece with the shell of the pump: but, owing to the peculiar shape and internal position of the nozzle, it has been found to be a difficult matter to impart a smooth finish there. An undue amount of friction is thus opposed to the passage of steam and water through the pump, which impairs the efficiency of the device.

The device herewith illustrated is mainly intended to overcome the difficulty. A, Fig. 1, represents an ordinary elbow, such as is used with gas and steam fittings, and said elbow has the nozzle or jet pipe, B, screwed into it, as shown in Fig. 2. This nozzle is furnished with an ajutage, *b*, of a bore adapted to the capacity of the pump. Projecting horizontally from this elbow is a short pipe, C. Radiating from said elbow is the tube, D, whose office will presently appear. The above described devices A, B, *b*, C, *c*, and D, after being fitted together in the manner shown in Fig. 1, are then placed in a suitable mold, and the shell cast around them, after which the core is removed and the body of the pump is complete.

By referring to Fig. 1, it will be seen that the shell is composed essentially of an enlargement, E, and a neck, F, the enlargement being chambered out so as to afford ample space around the elbow and nozzle for the passage of water. The tube, D, is tapped for the engagement of a screw-threaded plug, J, that can be readily removed whenever it is desired to drain the pump, so as to prevent freezing. K and L represent, respectively, the inlet and discharge orifices of the shell. M and N are, respectively, the suction and discharge pipes, which communicate with the previously described orifices. O is an ordinary coupling that unites the projecting end of the pipe, C, with the steam pipe, P. The body, EF, with its unclosed nozzle, ABC, is ready for use almost as soon as it is taken from the mold. The coupling, O, and steam pipe, P, are now applied, after which steam is turned on, and the apparatus then operates in essentially the same manner as ordinary jet pumps. An economy is claimed by the inventor to result from the unimpeded flow of steam within the nozzle, formed of A and B, and of water around the same, which cannot be obtained when the parts, A and B, are rough castings.

The invention was patented March 7, 1876, by Mr, Hanson P. Tenant, of Newcastle, Ind.

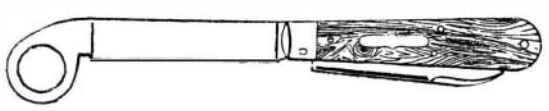
FIG. 1.



TENANT'S STEAM JET PUMP.

COMBINED POCKET AND DRAW KNIFE.

An ingenious device, patented February 29, 1876, by Mr. John W. Pierce, of New Bedford, Mass., is a tool which may be used for a draw knife, and for all purposes required of an ordinary pocket or clasp knife. It consists in a clasp knife, having one or more blades, one of which latter is provided at its outer end with a ring of sufficient size to admit the finger, as shown in the annexed engraving. To use the tool as a draw knife, the handle is grasped by one hand of the user, and one of the fingers of his opposite hand is inserted within the ring. When the blade is closed, the ring



will extend beyond the butt of the handle, and afford a convenient means whereby the knife may be suspended from the person.

Bessemer Steel in France.

In an action brought by Mr. Bessemer against M. Schneider, of Creusot, a decision was given by the Court of Appeal against the plaintiff on April 28 last. "This decision," says the *Bulletin* of the Committee of French Forges, "extinguishes the claims of Mr. Bessemer, and is of extreme importance for the whole of the French trade. Had the claims of Mr. Bessemer been recognized, this recognition would have affected every maker of steel except M. Schneider." Bessemer steel is at present a cheap article in France, and this decision will not increase the price.

The Coca Leaf.

Sir Robert Christison showed recently, before the Edinburgh Botanical Society, that diversity of opinion had existed among chroniclers and travelers in regard to the effects of coca upon those who chew it; for, while most of them considered that it possessed wonderful powers of sustaining strength under prolonged fatigue without food, some thought its use pernicious and dangerous, others, not only innocuous, but beneficial to health. The annual consumption of the leaf, by the eight millions of people along the Cordilleras of the Andes who use it, is thirty millions of pounds. After giving a description of the coca plant, and the method of gathering and drying its leaves, Sir Robert gave an account of some experiments made upon some of his students and himself, in which he had found that it was both a preventive of fatigue and a restorative of strength after severe bodily exertion, and that it had no reactionary effect upon the system. In regard to the use of coca as a medicine, he advised no one to try it until something more was known about it, or, at least, not to make use of it without consulting a physician. He had succeeded in extracting a liquor from the leaf, as a more satisfactory mode of administration than chewing the leaf; but he had not been able to ascertain whether this retained all the properties of the article. A similar *liqueur de coca* was to be had in Paris.—*Medical and Surgical Reporter.*

American Engines vs. English Engines in Holland.

The majority of pumping engines hitherto employed in Holland, for elevating water, have been furnished by English builders, who have practically had a monopoly in this respect of the Dutch market. They now find formidable rivals in American manufacturers. "The Fitchburg (Mass.) Steam Engine Company," says the *Moniteur Industriel Belge*," delivered its first machine in Holland six months ago, and has recently delivered its eighth engine in Amsterdam."

"This shows," continues our contemporary, "that with perseverance, profitable results may be attained, and it is certain that, if the American builders can compete advantageously with the English in a country like Holland, they will succeed in time, and by patient efforts, in establishing for themselves outlets of trade in every European market."

Deep Mining.

At a recent meeting of the American Institute of Mining Engineers, Philadelphia, M. Julian Déby, of Belgium, read a paper on the process of sinking deep shafts. The difficulty to be surmounted in sinking mining shafts below the water level is to get a tubing strong enough to sustain the outside pressure. M. Chaudron, a Belgian engineer, finally solved it by constructing a tube of cast iron in sections with flanges, each section being thoroughly tested with hydraulic pressure. The advantages of this system are the complete isolation of the water from all the workings; the durability of the shafting; the great diminution in the cost of the sinking the shaft; the obviation of any necessity for pumping machinery during the boring and nearly so afterwards; the greater degree of comfort to the miner by the absence of water and the possibility of traversing any number of water levels irrespective of the amount of water they contain.

Lecture Experiments with Gun Cotton.

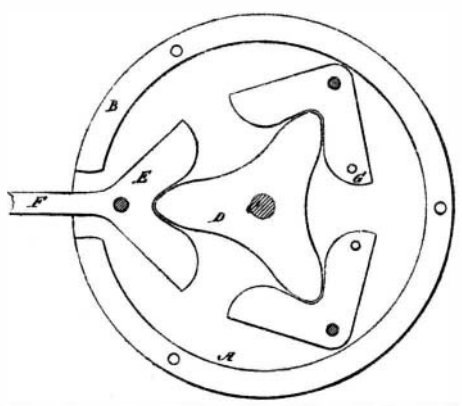
Dr. A. Vogel describes several methods of proving that nitrous and nitric acids are among the gaseous products of the combustion of trinitro-cellulose or gun cotton. A tuft of gun cotton is placed in a large test glass which tapers to a point beneath, ignited, and covered as quickly as possible with a glass plate. The interior of the glass is immediately filled with the characteristic yellowish red fumes of nitrous acid. When gun cotton is ignited on a piece of moistened litmus paper, it colors the paper red. It also reddens tincture of litmus, if burned in a beaker glass on the bottom of which is some of the tincture. When burned on a strip of moistened iodide of potassium and starch paper, gun cotton leaves a dark blue spot. The characteristic test for nitric acid with brucine can be obtained by burning the gun cotton in a conical test glass, at the bottom of which are a few drops of water, and covering with a glass plate. The water at the bottom of the glass has a strongly acid reaction and exhibits this reaction if placed on a watch glass in contact with brucine and sulphuric acid.

A curious reaction takes place when an ounce of collodion is mixed with an equal volume of concentrated nitric acid. The reaction is very violent, red fumes are evolved, heat is generated, and at the conclusion of the reaction nothing remains in the vessel but cotton, the alcohol and ether being totally destroyed or evaporated. The cotton, which now apparently possesses a fiber, is not only not explosive but is almost totally incombustible, its character having been totally changed during the experiment.

NEW MECHANICAL MOVEMENT.

We illustrate herewith a new mechanical movement for converting a rotary into a vibratory motion. It is adapted for use upon reapers, mowers, sewing machines, pumps, hammers, saws, and similar apparatus.

The case consists of two circular plates, A, attached to a hoop or flange, B, by which they are kept at the proper distance apart. To the center of the plates, A, is pivoted a shaft, C, to one end of which the power is applied. To the shaft, C, within the case, is rigidly attached a three-armed cam, D. To the case are pivoted one, two, or three blocks, E, which are made triangular in their general form, and are pivoted at their angle. The third sides of the blocks, E, are turned toward the cam, D, and are notched in such a way that, as the said cam revolves, each of its arms will strike the first arm of the block, E, push it back, enter the notch of said block, strike its other arm, and push it forward, so that each block will receive six distinct impulses at each revolution of the cam, D.



Motion may be communicated from the block, E, to the object to be vibrated by an arm, F, formed upon the said block at its pivoted angle, as indicated at the left hand side of the figure, or by connecting rods pivoted to the ends of the arms of said blocks, as indicated by the pins, G, at the right hand side of the figure. The device was patented through the Scientific American Patent Agency, May 30, 1876, by Messrs. J. Jordan and George Naylor, of Salt Lake City, U. T.