NEW COMBINATION CLUTCH.

It is, as its name indicates, a positive coupling for all kinds of shafts requiring connection while in motion, and no matter at what rate of speed the shaft may be running, the connection can be made without the slightest shock or jar, and we believe it is the only coupling combining the friction and positive clutch in one, enabling the operator to make a positive connection or not at pleasure, which is the great desideratum in "friction clutches," as the motion lost in the driven shaft of a manufactory, by depending on friction alone, would in a very short time pay for one of these couplings.

They are free from all rotating pins, bolts, levers, and unsightly projections that endanger the lives of the operators; they can clean and work around them while running with perfect impunity. The head of the key is covered with a leaden collar, and there is not a projection in the whole rotating parts of the device on which a thread would hang.

If it is desirable (as it is occasionally in some manufactories where there is danger of a block in the machinery) to use the friction alone, all that is necessary is to withdraw the clutch and adjust the friction cone to the work required, which can be done so nicely that a slight strain over its normal load will cause it to slip, thus often saving very valuable machinery from destruction.

It is well known among machinists that the old fashioned friction cone is the principal device used for driving by friction, butit is extremely liable to cutting or abrading of the two iron surfaces, which makes it very difficult to withdraw the cone sometimes.

In the clutch shown in the engraving, a foreign substance, such as wood, leather, paper, etc., is interposed between the surfaces, and this difficulty is overcome. The mode of applying it is very simple; any intelligent boy can readily take out the old filling and replace it with new in half an hour.

The method of applying the intermediate substance is by perforating the periphery of the cone, as shown in Fig. 1 and 2, corresponding in depth to the thickness of the filling material, which should stand a little above the surface, so as to keep the cone and drum slightly separated. Wads or pellets of tar millboard, a little thicker than the depth of the perforations, are punched out and driven home with one blow of a small hammer.

Millboard is preferable to any other material, being denser and more adhesive than either wood or leather, punches very smoothly, and lasts a long time.

Two forms of this coupling are made, one for heavy mill work that does not require to be coupled more than once or twice a day, as Figs. 1 and 3, and one for instantaneous coupling, as 2, 4, 5, 6, and 7, for steam winches, elevators, punching presses, shears, etc.

Fig. 1 is a front view of the device, with the parts open showing the filled perforations.

Fig. 2 is a sectional view showing the quick coupling apparatus and serrated clutch.

Fig. 3 is an end view showing the split collar, shifting arms, hand wheels, etc.

Figs. 4, 5, 6, and 7 are detail views of various parts of the clutch mechanism; Fig. 5 showing teeth on the face of the friction cone; and Figs. 6 and 7 being respectively face and side views of the toothed clutch.

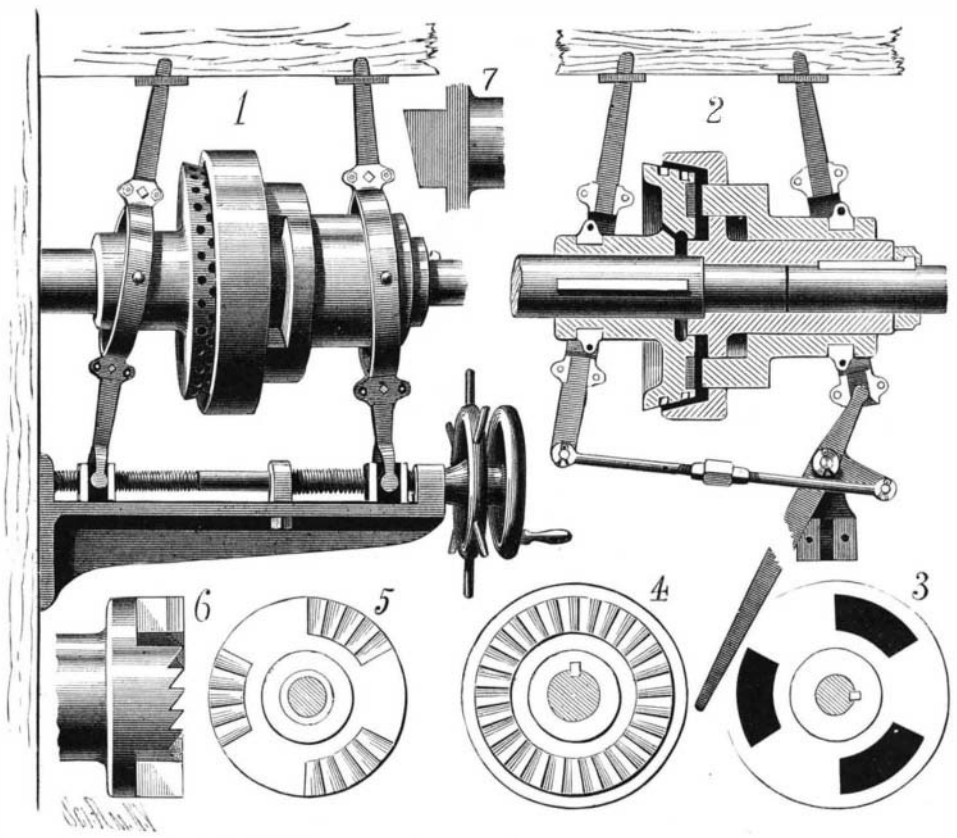
The clutch, as will be seen by the engraving, really comprises two systems, one the friction clutch as already described, the other a positive clutch, and these two forms of clutch, both having novel features, are arranged with mechanism for applying them, constructed so that the friction clutch may be applied first, and the positive clutch afterward.

The boss of each part of the clutch is grooved circumferentially to receive a split ring connected with the lever by which the two parts of the clutch are operated.

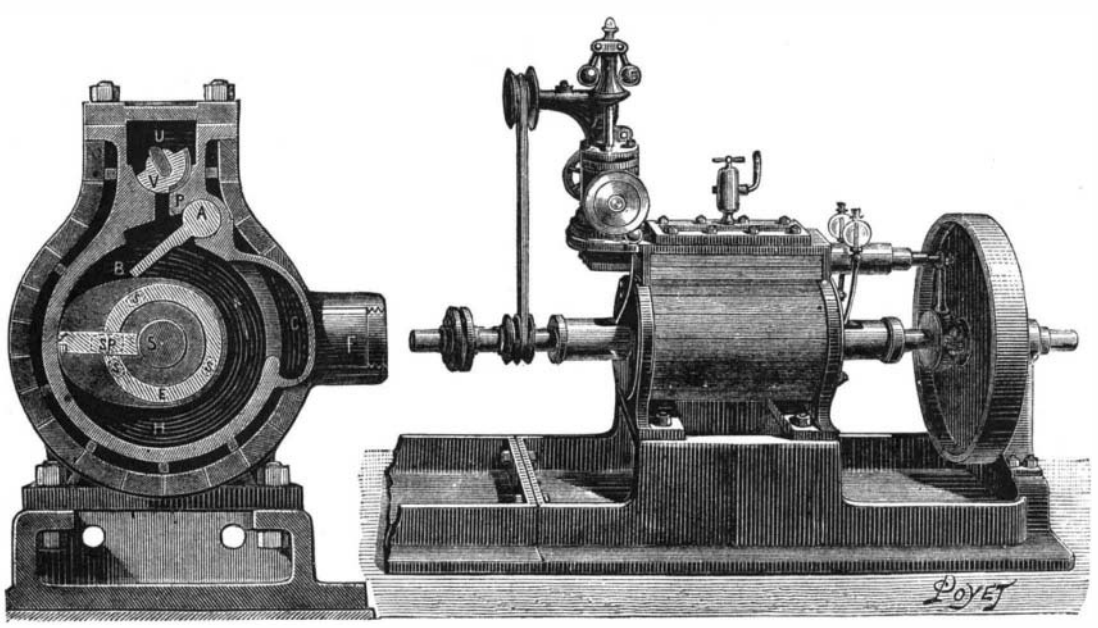
In the clutch shown in Fig. 1, the two parts are operated by screws, one screw passing through the other, which is tubular; both screws being provided with hand wheels by which to operate them. In the clutch shown in Fig. 2, the two parts are operated by means of a hand lever which works both parts by a single forward movement, the friction cone being first thrown into place and then the toothed clutch.

The operation of the clutch, shown in Fig. 1, is very simple. The hand-wheel is turned to the right, drawing the friction cone into the drum, giving the motion of the driving shaft to the driven shaft. The other hand-wheel is now turned to the left, forcing the lugs of clutch through the apertures of the drum against the face of the friction cone.

The friction is now released a little, allowing the friction cone to gain on the drum, until the long end of the lug enters the recess in the cone, and by the time the cone has gained on the drum the width of the lug, it has entered the recess the depth of the tooth, and abuts against the driving end of the recess in the face of the cone. It now only remains to force the clutch to its destination, and slacken the hand wheels enough to relieve the split collars and their grooves from friction. To uncouple the same, the operation is reversed. The clutch shown in Fig. 2 is operated by the motion of the lever, which has two short ends set at right angles; the short horizontal end is connected to the cone lever, by the connecting rod, which is adjusted by the right and left threaded sleeve, so that when the short end and connecting rod are on the center, the cone is tight enough to drive the drum, and in this position the perpendicular end of the lever has advanced so far that the teeth in the ends of the lugs, Fig. 7, are about to enter the teeth in the face of the cone. When the lever and connecting rod have passed the center, the cone is released enough to ease the split collars, and the same motion has advanced the vertical short end of lever so as to engage the toothed lugs with the serrations in the face of the friction cone. Further information may be obtained by addressing Mr. E. Wilkinson, 276 Ellison Street, Paterson, N. J.



WILKINSON'S POSITIVE COMBINATION CLUTCH.



HODSON'S HIGH SPEED ROTARY ENGINE.

HODSON'S HIGH SPEED ROTARY ENGINE.

Rotary motors, which up to the present time had not given sufficient results to cause them to be adopted in the industries, seem to have come into some favor for a few years past. The causes of this are manifold; but, at all events, the great progress made for the last twenty years in mechanical construction, and the astounding development in the industrial applications of electricity, have, for the most part, contributed to the success that these machines now enjoy. Dynamo-electric machines require, in fact, of the motor which actuates them, qualities of a peculiar nature. They must be able to revolve with great speed and regularity, while at the same time possessing strength, simplicity, power, and lightness, and being of low price and costing little to run. Rotary motors exhibit in principle most of these qualities in a certain measure; for the direct action of steam upon the rotary piston gives at once lightness, high speed, simplicity, power, regularity, and economy as regards cost price. Economy in the expenditure of steam can be only obtained by the introduction of expansion, and this is what is accomplished in the already described Dolgorouki motor, and in the Hodson motor which we are now to make known.

This engine, of which the annexed cut gives a general view and transverse section, consists of a piston in the form of a cam, which revolves in a cavity of cylindrical form revolving around the axis, S. More accurately speaking, the motor consists of two distinct pistons fixed against one diaphragm in common, and keyed at 180 degrees from each other so as to insure of greater regularity; but it will be sufficient to consider only one of them. The axis of the rotary piston carries an eccentric which controls a slide valve, V, arranged in a cavity, U, through which arrives the steam under pressure, and which, through a backward and forward motion, regulates the admission of the latter and closes it at the instant at which expansion is to be effected. A B is a sort of valve which separates the cylinder into two parts, and which, at a given moment, enters a cavity made to receive it and allows the cam-shaped piston to pass. In revolving around A, the valve, A B, rests constantly against the piston; and the pressure of the steam insures of a hermetical joint in all positions. The eccentric is keyed upon the shaft in such a way that the valve, V, shall be open and allow the steam to enter at the moment at which the point, *f*, of the piston is at the upper part, and shall close the admission when the part, *f*, is at H. The steam inclosed within the space, B H (left half of the cylinder), expands, and then escapes at C, through the escape pipe, F. Expansion then occurs at half the travel. The function of the valve on the second piston is identical, but alternate with that of the first, so that one piston is always working at full pressure, while the second is operating by expansion. A fly wheel and a centrifugal ball governor, acting on the steam inlet, go to complete the motor. The machine actuated (be it dynamo-electric machine, circular saw, hydro-extractor, or otherwise) is fixed to the right or to the left on the prolongation of the shaft. The left end of the frame is squared off so that it and the frame of the driven machine may be solidly united by bolts and nuts in order to insure of an invariable position of the axes and to give more rigidity to the whole.

All parts of the machine submitted to friction are of phosphor bronze, and all the joints are kept tight by means of crowns and bands of the same material held against the stationary pieces by springs. These Hodson motors exhibit very great elasticity of power in causing a variation in the pressure of steam and in the speed, which latter may rise from 25 revolutions per minute up to 1,500 and even 2,000. So they are perfectly adapted for actuating dynamo-electric machines, as they communicate a proper speed to these without intermediate shafting and under the best conditions of simplicity and economy; and it will be especially in places where space is wanting that their advantages will be most appreciated.

At the Exhibition of Electricity at the London Crystal Palace, we saw several of these motors driving Brush, Gramme, and Siemens machines. Without in any way

American Beer Glasses in Germany.

In a recent communication from United States Vice-Consul Wm. Hummel, at Munich, the surprising fact is noted that a large proportion of the five millions of beer glasses used annually in Berlin are imported from America. Mr. Hummel thinks that it would be a good plan for American makers to establish agencies in other German cities, and expresses a willingness to forward, so far as he can, any efforts in that direction.

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desiring to prejudge the importance of such applications, it was none the less interesting to remark how new needs may sometimes direct the researches of inventors toward old machines that were about condemned in the early history of the steam engine, but which, thanks to the progress in tools and to the application of science to industry, are to-day becoming practical.

Cold Winters.

The following statistics of the good old winters are curious: In 401, the Black Sea was entirely frozen over. In 768, not only the Black Sea, but the Straits of the Dardanelles, were frozen over; the snow in some places rose fifty feet high. In 822, the great rivers of Europe—the Danube, the Elbe, etc.—were so hard frozen as to bear heavy wagons for a month. In 860, the Adriatic was frozen. In 991, everything was frozen; the crops totally failed, and famine and pestilence closed the year. In 1067, the most of the travelers in Germany were frozen to death on the roads. In 1133, the Po was frozen from Cremona to the sea; the wine casks were burst, and even the trees split by the action of the frost with immense noise. In 1236, the Danube was frozen to the bottom, and remained long in that state. In 1316, the crops wholly failed in Germany; wheat, which some years before sold in England at six shillings the quarter, rose to two pounds. In 1339, the crops failed in Scotland, and such a famine ensued that the poor were reduced to feed on grass, and many perished miserably in the fields. The successive winters of 1432–33–34 were uncommonly severe. It once snowed forty days without interruption. In 1468, the wine distributed to the soldiers in Flanders was cut with hatchets. In 1684, the winter was excessively cold. Most of the hollies were killed. Coaches drove along the Thames, the ice of which was eleven inches thick. In 1709 occurred the cold winter. The frosts penetrated three yards into the ground. In 1716, booths were erected and fairs held on the Thames. In 1744 and 1745 the strongest ale in England, exposed to the air, was covered in less than fifteen minutes with ice an eighth of an inch thick. In 1809, and again in 1812, the winters were remarkably cold. In 1814 there was a fair on the frozen Thames.

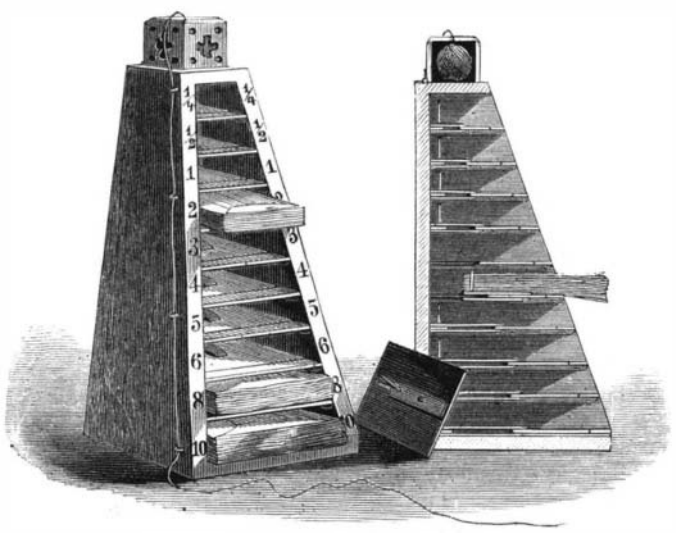
PAPER-BAG HOLDER.

We give herewith perspective and sectional views of a very convenient holder for paper bags, recently patented by Mr. Richard M. Shaffer, of Cranberry, W. Va.

This device is for receiving and holding paper bags in assorted sizes in convenient position for easy access and removal. It is designed for the use of merchants and others who use paper bags for wrapping up merchandise.

The principal feature of the invention is the means for preventing the withdrawal of the bag adjacent to the one being pulled out whenever the bags tend to stick together. The bag holder is provided with a twine holder, making a convenient and compact device that can be placed almost anywhere on the counter without being in the way.

The back wall of the outer case is perpendicular, and the side walls and front incline inwardly at the top. The case contains a series of horizontal shelves, which constantly diminish in size from the bottom to the top, forming compartments for the bags. The compartments are marked with



SHAFFER'S PAPER-BAG HOLDER.

the size of bags which they are designed to contain. The shelves are made detachable, and rest upon cleats or guides on the side walls, and each shelf is provided, near its back end, with an upwardly-pointing pin, while the front end rests against a strip which forms a stop to hold the shelf in and prevent it from being pulled out when the bags are withdrawn. The pins pierce the edges of the bags near their mouths and hold the bags in place, so that only the bag which is taken in the fingers is removed, the others being held by the pin. As each bag is pulled out it is torn loose from the pin. To accommodate bags of different lengths the pins are mounted upon a sliding base, which moves in a slot in the back portion of each shelf.

Further information in regard to this useful invention may be obtained by addressing the inventor as above.

IMPROVEMENT IN RAZORS.

The engraving shows a razor of new design, recently patented by Mr. W. H. De Pew, of New York city. The invention consists specially in the shape or configuration of the shank or handle of the blade, which is made in the form of a reverse curve or in the form of an elongated S. The curve or bend next to the heel of the blade extends above the back of the blade, so as to increase the depth of the thumb rest. The reverse curve extends to the end of the shank of the handle. This is a marked improvement on the old-fashioned razor, making it a really scientific instrument, much better adapted to its use than any of its predecessors.

The tang is of unusual length, and is attached to a perfectly

DE PEW'S IMPROVED RAZOR.

formed blade of new design. It is pivoted with the handle in such manner as to give the whole a perfect balance in the hand, and gives a complete control of the razor and a firm and steady grasp. This renders shaving easy without slip or fatigue. Further information in regard to this useful invention may be obtained by addressing Mr. W. H. De Pew, P. O. Box 3018, New York city.

Professor Esmarch on the Case of President Garfield.

Professor Esmarch delivered a lecture on the treatment of President Garfield's wound before the Physiological Society of Kiel, in February last. This lecture he has now printed and circulated, and it is impossible that the views of a surgeon so accomplished and so worthy of expressing an opinion on such a case should not be canvassed. The facts of the case are first of all clearly and fairly stated from Dr. Bliss's own published accounts of the progress of the case and of the *post mortem* examination. Professor Esmarch's conclusions are: (1) that the wound was not in itself absolutely fatal; (2) that the bullet was not the cause of the septic suppuration in the wound which led to the fatal result; (3) that the cause of the septic suppuration was introduced from without, and that as contributing directly or indirectly to this were the following errors in the treatment: the repeated probing and examination of the wound with instruments and fingers not rendered aseptic, the failure to dress the wound aseptically, the syringing out of the wound with fluids not sufficiently antiseptic, and the failure to give a complete vent to the "bagging" pus; (4) there was no true pyæmia, but only metastatic inflammation of the parotid gland; (5) the cause of death was hemorrhage, moderate in amount, but occurring in one whose strength was undermined by septic fever, decubitus, bronchial catarrh, and hypostatic pneumonia; (6) although the splenic artery may have been injured primarily by the bullet, or by a splinter of bone, this would not have led to the formation of a false aneurism, except for the establishment of putrid suppuration.

In conclusion, Professor Esmarch refers to the popular superstition that the bullet is the cause of all danger in a gunshot wound, and that to extract the bullet should be the chief aim of the surgeon. He asserts that most of the secondary dangers arise rather from the fingers of those who explore the wound, and that the American surgeons committed the error of doing too much rather than of doing too little, as they have been freely accused of at home. Finally, he surmises that if no search had been made for the ball, and the wound had been dressed aseptically, the unfortunate patient would have been alive now.

Valuable as is Professor Esmarch's opinion on such a point, we regret that this lecture has been published, at any rate so soon. It would not have lost in value by being kept back until the acrimonious discussions of the conduct of the attending surgeons had died out on the other side of the Atlantic. It is proverbially easy to be wise after the event, and it is an ungracious task to criticise adversely the conduct of men who, under very trying circumstances, were suddenly called upon to act in a grave emergency. We are willing to admit that mistakes may have been committed, but it is a case in which the golden rule is eminently applicable: "Let him that is without sin first cast a stone."—*Lancet.*

Dangers of Steam Street Pipes.

An illustration of the possible dangers of the system of public steam supply which is now rapidly coming into vogue, is furnished by a recent accident at Lynn, Mass. In that town steam has been supplied for some time to customers by means of pipes laid in the streets, and on a recent Monday morning one of the street mains blew up with a loud explosion, hurling stones and gravel in every direction to a distance of forty or fifty feet. Nearly every window was broken in the neighboring buildings, and some of these received other injuries, while a woman who happened to be passing by was seriously hurt. The accident is explained by the daily papers, in their usual satisfactory manner, as having been due "to accumulation of water in the pipes." It seems that this is the third explosion of the same kind which has taken place in Lynn within two weeks. After the first one an engineer was discharged on the ground that his carelessness in "allowing water to stand in the pipes" had caused the accident, but he appears to deny his guilt, and says that "the system of pipe-laying is not correct."

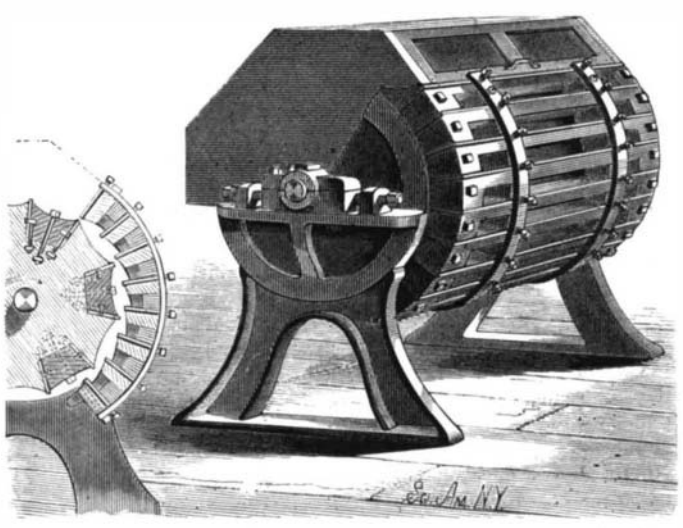
If we were not afraid, says the *American Architect*, of hurting the feelings of the stockholders of the Citizens' Steam Company, we should say that both these explanations were simply ridiculous, and that the obvious cause of the explosion was the inability of the pipes to resist the strain upon them. Whose fault this may have been we do not care to inquire, but we may suggest that it would not be very difficult to ascertain in case of need. Meanwhile, we trust that the engineers of the new steam heating companies in other cities are laying pipes which they are sure will not burst out of resentment at being improperly laid, or because of water being allowed to stand in them. An explosion in Broadway, for instance, would be a serious matter, even if it amounted only to the hurling of a few hundred paving stones over the passers-by, and through the plate glass show windows which line the street.

NEW COTTON SEED HULLER.

We give an engraving of a new cotton seed huller recently patented by Mr. Hugh S. Walsh, of Argenta, Kansas. This machine is provided with adjustable knives in the concave, and with a series of knives placed in the cylinder which revolves in close proximity to the concave, as shown in the sectional view.

The revolving cylinder is fluted longitudinally, and every other concave or flute is a removable segment held in place by screws. To compensate for the wear of the knives on the cylinder, screws are provided in the bottoms of the sockets in which they are placed, so that by removing one of the segments between the knives the latter may set out.

At the top of the machine there is a hopper for receiving the cotton seed. When the machine is revolved in the proper direction, the seeds being carried by the concave flutes of



WALSH'S MACHINE FOR HULLING COTTON SEEDS.

the cylinder into the space between the cylinder and the inclosing case, the knives rapidly remove the hulls.

This machine is easily operated and very readily adjusted. This machine has a great capacity, and does its work thoroughly. The daily increasing use to which cotton seed and cotton seed oil are applied give value to a practical machine of this kind.

A Floating Telephone Station.

Experiments have been made at Havre, France, to test a system of telephony between the Roads and the city. They have been so successful that it has been proposed to form a pontoon structure at a distance from the land, on board of which public telephones should be placed for use by the shipping in communicating with the land.

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