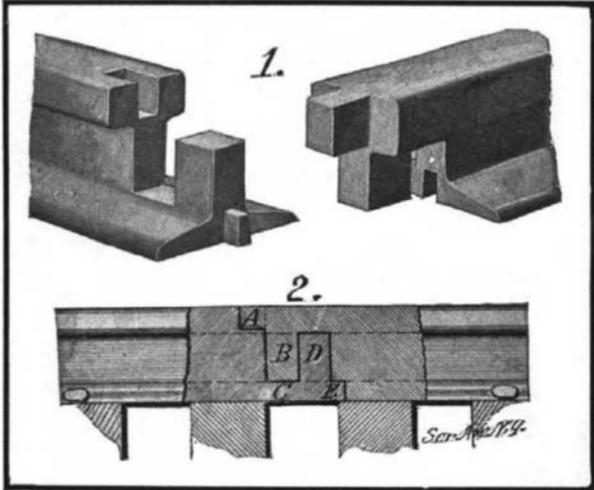




**INTERLOCKING RAIL JOINT.**

A recent invention provides a rail joint in which the meeting ends are firmly yet detachably connected with-

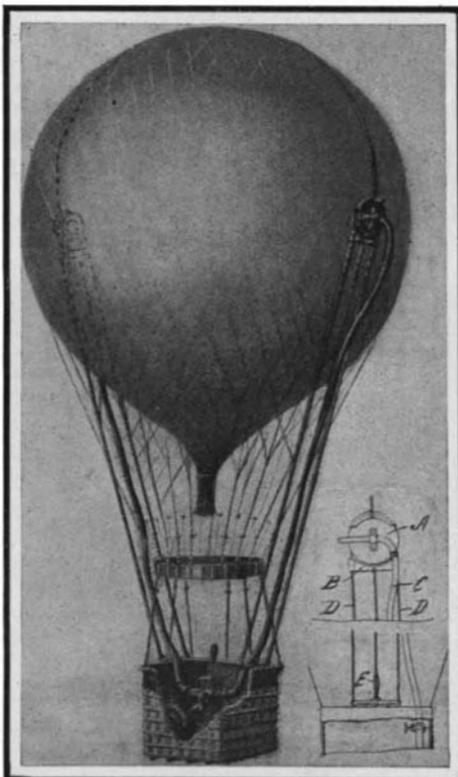


**INTERLOCKING RAIL JOINT.**

out the use of fish plates and bolts, or other form of fastening independent of the rails themselves. The method of accomplishing this novel result is clearly illustrated in the accompanying engraving. Fig. 1 shows two meeting ends of a rail, while Fig. 2 is a section through the rails at the joint. It will be noticed that the base of the rail at the right-hand side is cut away, leaving an overhanging head. The head is formed with a projecting portion A. Part of the web is retained to form a vertical post B. A slot is cut in the base of the rail. The left-hand rail is formed to interlock with the right-hand rail. The head is cut away, and a slot is formed therein to receive the projection A. Part of the web is cut away to receive the post B, while the post D, left standing, fits into the recess formed behind the post B. A lug or projection E fits into the slot in the base of the right-hand rail. It will now be seen that if the right-hand rail be raised, and its projecting portion brought over the projecting base portion of the other rail, and then lowered vertically, the rails will be engaged or interlocked. The tenons A and E will prevent lateral movement of the rails, while the posts or abutments B and D will prevent endwise movement of the rails. In use the weight applied by the wheels of a passing train will be imposed directly upon the overhanging portion of the right-hand rail, and thereby upon the underlying portions of the left-hand rail. The inventor proposes to construct these joints by means of stamping dies. A patent on this novel rail joint has been granted to Mr. John C. Abbott, of Carnegie, R. D. No. 1, Penn.

**APPARATUS FOR SUSTAINING AND DIRECTING BALLOONS**

An apparatus of considerable novelty has recently been devised by Mr. Ignace Gruber, of 407 East 138th



**APPARATUS FOR SUSTAINING AND DIRECTING BALLOONS.**

Street, New York city, which has for its object the control of a balloon or airship. The control is effected by means of a jet of air, which may be directed wherever needed. If, for instance, the balloon is descending, owing to leakage of gas, or to sudden cooling of the gas in passing over a body of water, the air jet is directed downward, when by pressure on the atmosphere outside, and also by reaction of the jet, it will tend to sustain the balloon. Similarly, if the balloon is rising too rapidly, the air jet may be directed upward to resist this motion. Thus sand ballast may be dispensed with. The compressed air is supplied by a centrifugal pump driven by a small motor in the basket or the car. As shown in our illustration, a pair of pulleys A are mounted on blocks B, at opposite sides of the balloon, the blocks being kept in position by a strap which runs over the top of the balloon, and a pair of stays or ropes which run down to the basket. Mounted on these pulleys is a nozzle, which is connected by a flexible pipe C with the air pump in the basket. A cable D is passed over each pulley A, and has its lower ends attached to the opposite ends of a lever. The levers on opposite sides of the basket are keyed to a shaft, which is provided with a handle E at the center. By turning the handle in one or the other direction, the pulleys will be turned, swinging the nozzles of the air pipes C in the desired direction. One of the objections to the present system of using sand ballast is that when the ballast is thrown overboard to lighten the balloon, it cannot again be regained. In the present system of using a pneumatic jet there is no such loss of ballast; for an inexhaustible supply of ballast is found in the medium which surrounds the balloon.

**THE PLUG PUZZLE.**

The following puzzle was brought to our attention by Mr. P. S. Hay, of Montgomery, Ala. We recognize in it a problem which occasionally appears in civil service examinations to test the ingenuity of the applicant. Take a board and cut four holes in it of the



**CUT A PLUG THAT WILL FIT ANY ONE OF THE HOLES.**

relative size and shape indicated in the drawing. Then cut a single plug to such form that it will snugly fit any one of the four holes. The solution of this puzzle will be published in a subsequent issue.

**A Giant Oil Conduit Planned.**

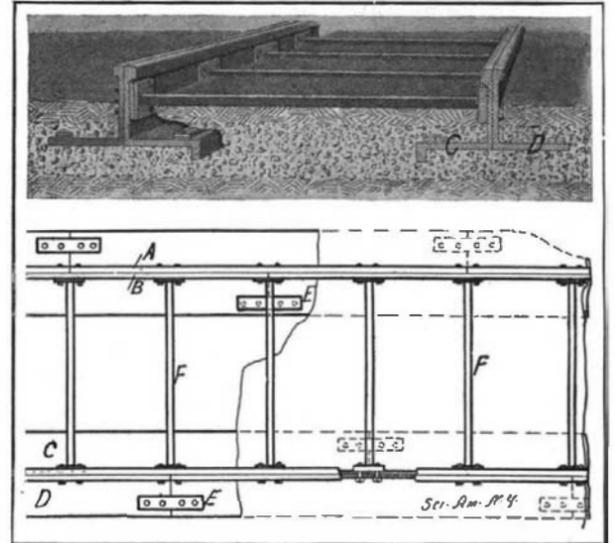
The Southern Pacific is soon to spend \$2,000,000 on an immense oil pipe-line from the Kern County oil fields to a point on San Francisco Bay opposite the city. It will be 265 miles long, and will consist of an 8-inch pipe for the entire distance. This will be the first railroad company in the world to own and operate its own pipe-line. It is intended to supply the Southern Pacific's hundreds of locomotives in California at a minimum cost. The company find it impossible to buy or build enough tank cars to distribute oil at two hundred or three hundred points in the State to daily supply all its engines.

On the 265-mile route there will be 23 pumping plants, each with two single or triple compound duplex oil pumps of special design; also two water pumps for injecting water to facilitate the flow of the oil through the pipe-line from the wells to San Francisco Bay. At each pumping plant there will be a 750-horse-power battery of water-tube boilers in three units; also two large steel tank reservoirs for storage purposes. Work is expected soon to be commenced on this immense project.

**RAILWAY TRACK CONSTRUCTION.**

Illustrated in the accompanying engraving is a new form of track construction which does away with the use of ties, and in which that side of the rail that is worn may be taken up and replaced without interfering with the opposite side of the rail. The rails are longitudinally divided on a central vertical plane. The two sections of each rail are bolted together. The abutting ends of alining sections break joints with those forming the opposite side of the rail. Each rail is constructed with an extended base flange, which is imbedded in a roadbed of concrete. To assist in maintaining the rails at proper gage, transversely arranged tie bars are used. In the illustration the two sections forming each rail are respectively indicated at A and B. The base of the section A is formed with a broad

flange D. The base flange C, on the section B, differs from the flange D in having a downwardly-turned outer edge. This when imbedded in the concrete roadbed serves to hold the rails against spreading. The construction is made doubly secure by the use of tie bars F. Not only do the sections A break joints with sections B, but the rails on one side of the track break joints with those on the opposite side, and the tie bars are arranged to connect each joint to the solid por-

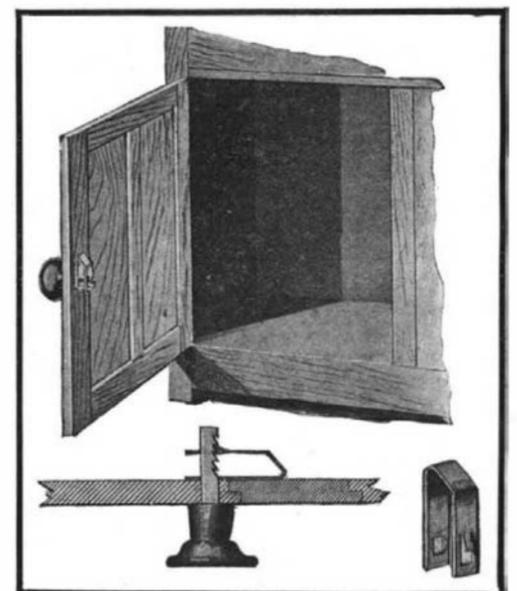


**RAILROAD TRACK CONSTRUCTION.**

tion of the opposite rail. Abutting ends of the rail sections are connected by means of the usual fish plates. The flanges are also connected by means of plates E. Since the inner sections B will wear out sooner than the sections A, the former may be replaced without removing the latter, thus reducing the cost of maintenance. The inventor of this novel railroad track construction is Mr. John H. F. Shulze, 63 Union Hall Street, Jamaica, N. Y.

**AN IMPROVED BUTTON LATCH.**

A very useful improvement in latches of the button type, used in fastening cupboard and closet doors, has just been invented by Mr. F. W. Merriweather, of 1404 Grand Avenue, Kansas City, Mo. The object of the invention is to provide a simple construction, which will hold the door tightly closed and prevent any shake or looseness between the door and latch when the latter is applied. The invention also provides for the convenient adjustment of the tension on the button, whereby the stiffness of the latch may be varied. It is a very common defect of the usual wooden buttons to work loose, and swing clear of the door of their own gravity. This defect is overcome by Mr. Merriweather's invention. The illustration clearly shows how this is accomplished. A knob or handle, of any desired form, is rigidly attached to a shank, which passes through an opening in the door. The projecting inner end of the shank is angular in cross section, and is provided with ratchet teeth cut in one of its edges. The button of the latch is constructed of a strip of spring sheet metal, bent upon itself to provide a pair of spring arms, which are spaced apart and have alining openings adapted to slidably engage with the shank. A tongue cut from the upper arm is bent upwardly, to engage with the ratchet teeth when the button is applied to the shank. It is obvious from this construction that on forcing the spring arms together, the force with which the knob and button are pressed against opposite faces of the door may be varied as desired, thus enabling the stiffness of the latch to be increased or decreased at pleasure.



**AN IMPROVED BUTTON LATCH.**