THE resistance offered to the flow of any liquid by bends in pipes is well known, says the *Stationary Engineer*, but is too seldom considered in the installation of machinery. The capacity of pumps is often decreased greatly by too great a number of short bends in feed and suction pipes. Similar effects are noticed in steam pipes, but in the case of either liquid or steam the resistance offered by the bends is usually overcome by an increase of pressure at a loss of fuel and greater wear and tear on the machinery. An expert pipe fitter can nearly always overcome the greater part of such loss by making long bends in the pipe where there is sufficient room for them, which should always be provided, and although the job may not appear as neat to the eye of those accustomed to the use of square ells, yet the beauty of the longer curves is apparent to those who are not prejudiced in favor of the old style fittings. Cast iron fittings should be avoided wherever possible, and, instead, the pipes should be bent to conform with the requirements. Bending pipe is not a very difficult matter if a person goes at it in a proper manner, for they can make long bends that will serve the purpose exceedingly well and not decrease the area of the pipe appreciably, as would be the case if shorter bends were employed. In the use of ammonia and some other substances the ordinary style of fittings are not suitable on account of the leakage which would be produced; consequently bends are preferable, and as they are easily made they should be employed wherever possible, for even in ordinary feed pump work considerable will be gained by such arrangement. In bending pipes the bends should not all be made at one heat, as it is almost impossible to do so to good advantage unless a special device is employed for the purpose; but by laying off that part of the pipe where the bend is to occur, several heats should be taken and short bends made at different places along the length, giving a fine contour, retaining the area of the pipe and making the angle of the pipe just what is required. More long bends and less ells should be used in pipe fitting for steam and water.

THE London *Engineer* describes a new form of shallow-draught steamer lately built by Yarrow & Co. It is propelled by a single screw 45 feet in length by 7 feet beam, yet not drawing more than 12 inches of water. The bottom of the hull is perfectly flat, and the bow spoon-shaped. Steam is generated in a horizontal boiler, and the engine is of the simple high-pressure inverted type, driving a screw about 2 feet in diameter. To immerse this size of screw in a boat of the usual form would necessitate a draught aft of at least 2 feet, but in the class of vessel we have before us the water is sucked up, as it were, into a raised tunnel built into the bottom of the boat, and the propeller revolves in it, and is consequently not only entirely immersed, but also well protected from injury. As before stated, the extreme draught is only 12 inches, owing to this method of drawing up the water to feed the propeller, which is a system not sufficiently well known, but nevertheless which has been adopted in a few instances for many years past. When building the first steamers on this principle, special arrangements were made for keeping the tunnel full of water by exhausting the air out of the upper, or above-water, part of it. Experience, however, has shown that the action of the propeller itself is quite sufficient to draw up the water and drive the air out at the after end of the tunnel. On trial in the Thames, a speed of seven to eight miles an hour was easily maintained, and the towing power of the boat was excellent. This little vessel is capable of seating comfortably about thirty-five passengers, but it is mainly intended for towing small native barges. There is a wooden awning extending the whole length to serve as a protection against sun and rain. The steering wheel is forward as usual in vessels for tortuous rivers where a good lookout for snags, etc., is of the utmost importance. The hull is constructed of galvanized steel, which is the most durable material for the river steamers of hot climates.

TWISTED IRON FOR FLOORS.

Fire-proof floors are being constructed of twisted iron incorporated in concrete. In a test recently made in which the floor occupied 10,000 square feet, it was estimated that it would safely carry a load of 250 pounds per square foot, and one section measuring 15 ft. by 22 ft. bore a uniform load of 415 pounds per square foot for a month without deflecting at the centre more than one-eighth of an inch. With spans constructed of this material, measuring about 15 or 20 feet, the saving in weight is about 20 per cent. over iron girders and hollow tiles. The twisting of the iron before it is imbedded in the concrete diffuses the strain equally throughout the bar's whole length, and it is firmly held at all points by the mass enveloping it. It may be mentioned also that any imperfect lamination of the iron is detected at once, and this ensures the employment of a good quality. Cold twisting is said to add to the strength of the bar very materially. In some recent tests it was shown that ordinary iron, $\frac{3}{4}$ inch square, gains 17 per cent. in tensile strength upon being given $1\frac{1}{2}$ twists per lineal foot; six twists per foot give a 24 per cent. increase. The results with superior qualities of metal give a still more marked effect, especially when there is a fairly long interval between the twisting and the testing.

HOUSE DRAINS.

E. R. Boulter, surveyor, says the cleansing of house drains is a matter requiring the serious attention of sanitary authorities, and by this is meant not only the removal of solid obstructions, but also the prevention of gaseous accumulations. Surely the drains of a house need at least as much attention as its chimneys. No sensible person objects to have the latter cleaned periodically; yet many people seem to think that when a drain is once laid no further attention is required in connection with it. Cases are known in which drains that have been in use only a few months are found to have the disconnecting traps completely clogged with matter and the parts above the traps quite blocked. This state of affairs generally arises from mere want of attention, and not from any defect in construction. Owners of property are frequently called upon to pay for work done in removing stoppages which might easily have been prevented by a little care earlier in the day. It should be remembered that a drain once removed is seldom made perfect again. Mr. Boulter suggests that the sanitary authorities of each district should undertake the work of flushing, which is at present so often neglected by house occupiers, and that the cost should be a charge upon the rates. The plan could be carried out in the following way: Workmen, furnished with the necessary implements and deodo-