A $4,500 COTTAGE.

The above cottage, which is illustrated in this number, is now building in the vicinity of Orange, N. J.

Examination of plans reveals fine parlour, large dinning-room with closet attached, convenient kitchen and roomy hall, with hall closets, together with attractive stairway to the floor above.

Up stairs there are two large chambers, one of which has dressing-room attached, two alcove bedrooms, plenty of closets and wardrobes, together with linen closets. Bath room is large and well-lighted by ornamental skylight. Full ventilation and light throughout the building. Cellar under all except extension. Servants staircase, dressers, pump, sink, etc., complete. The design is intended for a westerly exposure on the front, and a southerly exposure on the left side.—*Ex.*

EARLY COMPOUND ENGINES.

From particulars furnished by a correspondent of the *Journal* of the Franklin Institute it would seem that the compound engine is not so recent an invention as many suppose. "The first composed engines (he writes) are said to have been built by Mr. I. P. Allaire. As early as 1830 and 1832 there were on Hudson River two steamboats with compound engines, the Swiftsure and Commerce. Their engines were of the upright square form, or cross-head pattern (very few of that form now in use, and none built), the high-pressure cylinder being forward and the low-pressure being shaft the paddle-wheel shaft, and both connected to it by cog-wheel gearing. About the same time the Post Boy, with similar machinery, built by Mr. Allaire, was sent to New Orleans. In the machinery of the above steamers the exhaust steam of the high-pressure cylinder passed directly to the low-pressure cylinder without the intervention of valves or receiver between the two cylinders. The Swiftsure and Commerce were in use for several years, and the machinery of the former was subsequently taken out and replaced by the ordinary beam engine. The compound engine, built by the late Erastus Smith, was of ordinary beam pattern, except that it had two steam cylinders, the high-pressure being within the low-pressure one. Their diameters were 37 and 80 inches, and stroke of piston 11 feet. This form has not been duplicated. The present compound engine has practically but little resemblance to those that preceded it, and is very much more economical."—*Ex.*

A SUBTERRANEAN RIVER IN AUSTRIA.

The river Reka, rising in the Schneeberg, in Carnialo, suddenly disappears in the so-called Karst caverns. At San Giovanni di Duino, 20 miles distant from the spot where the Reaka is lost, a river of corresponding magnitude is found issuing from the foot of a hill. This stream is known as the Timavo, which takes a westward course, and discharges its waters into the Bay of Monfalcone. As to the indentity of the Timavo with the Reka there has hardly been any doubt, although until last year no attempt has ever been made practically to demonstrate the fact. The members of the Austro-German Alpine Club last year made three attempts to explore this subterranean river.

Starting from the first great cavern, called Rudolph's Dome, the expedition, consisting of four persons in two boats, proceeded on their eventful voyage. From the cavern just mentioned the river flows for 200 feet through a narrow channel between the two perpendicular walls of rock, estimated to be upward of 100 yards in height. At the end of this channel the explorers, whose course throughout was illuminated by the magnesium light, found themselves in a vast cavern, where they were able to land. The explorers, proceeding, found seven waterfalls, the last one of which, at a distance of about a furlong from the entrance, they were unabie to pass, but will renew the attempt this year with more complete apparatus.

The cavern which was discovered is of far greater dimensions than the Rudolph's Dome or any of the other caves of the district. Its height is upward of 450 feet, so that it could easily contain the cathedral of St. Peter's at Rome.—*Ex.*

FANCY ARTICLES OF CORK.—A German inventor has utilized cork in the manufacture of fancy articles by a novel process. Powdered cork is mixed with starch and water, and the mass kneaded while boiling hot until thoroughly mixed. It is then poured into molds, and afterward dried at a very high temperature.

THE STEAM BOILER.

The question frequently arises: What is the proper way to regulate the draft of a steam boiler furnace by opening and closing the ash-pit and furnace doors, or by means of a damper, in the flue leading from boiler to chimney.

There is some difference of opinion and practice regarding this matter, which probably arises from differences or peculiarities in the constructive details of various boiler plants, which might make it desirable, or even necessary to regulate one way in one case and the other way in another case.

Our own preference is decidedly in favor of regulating the draft by means of a damper placed in the uptake or pipe leading from one end of the boiler, smoke box, or front connection to the main flue. This uptake should be made of wrought iron, and riveted securely to the boiler shell, and the damper should be fitted as close to its lower end, or the tube openings as possible, and be provided with a convenient hand attachment whereby it may be set at any desired point and secured there.

There is much less liability of burning out the grates in a boiler furnace when the draft is regulated by a damper, than there is when it is regulated by the ash-pit door. For, let the ash-pit door be closed tightly, and all circulation of air in the ash-pit is stopped, there is nothing to prevent the heat from the layer of incandescent fuel being transmitted downward and overheating the grates, and overheating means warping, twisting and cracking of the bars, and we have known them to be melted from this cause.

When, on the contrary, the ash-pit doors are fully open there is nothing to prevent the free circulation of air throughout the pit, and the bars are kept cool. We recommend omitting altogether doors to the ash-pit, and make the opening through front nearly the full width of the grate, and making a water cavity or trough, at least six inches deep in the bottom of the ash-pit. This should be kept full of water, and it has a great effect upon the temperature below the grates.

For ease and certainty of regulation, a damper placed in the uptake as described above, possesses great and obvious advantages over any manipulation of ash-pit or furnace doors. Any one who has had charge of boilers fitted up in this manner can readily appreciate the truth of this statement.

There is, also, in our opinion, decidedly less loss of heat by infiltration of air through cracks in the settling walls when the draft is governed by a damper in flue than there is when the doors are used for same purpose; for, when ash-pit doors are tightly closed, the draught of the chimney will draw air in through every crack and crevice in the walls, and this air entering the furnace at all points has a cooling tendency which it is most desirable to avoid. If the ash-pit doors are open, however, any leakage past the damper will readily be supplied by air passing through the fire, which is always the way air should go into a boiler furnace.

The damper should always be so fitted and adapted to the boiler, that, when it is tightly closed as far as it can be by the apparatus provided for operating it, it will allow sufficient draft to just keep the fires going, and carry off any coal gas which may be generated in the furnace.

The forgoing relates more particularly to boilers used for power purposes, and those plants of such size as to require the constant supervision of an engineer or fireman. With many of the small house-heating boilers where the draft is automatically regulated, it is deemed expedient by most steam fitters to regulate the draft by the ash-pit door. For boilers of this type, this is undoubted a good plan in many cases; with the attention this class of boilers receives, there is probably less danger of filling up a house with coal gas.—*Locomotive.*

THE leading pecularity of rice is the very large proportion of starch and the very small proportion of gluten which it contains, there being but one part of gluten to 13 parts of starch. In wheat there are two parts of gluten to every nine parts of starch.

TO TEMPER STEEL ON ONE EDGE.—Red hot Lead is an excellent thing to which to heat a long plate of steel that requires softening or tempering on one edge. The steel need only be heated at the part required, and there is little danger of the metal warping or springing. By giving sufficient time thick portions may be heated equally with thin parts. The ends of wire springs that are to be bent or riveted may be softened for that purpose by this process, after the springs have been hardened or tempered.