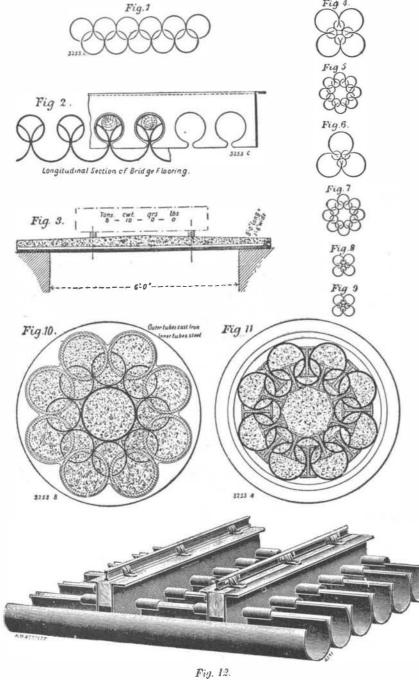
## PEASE'S TUBULAR CONSTRUCTION.

Pease's tubular construction is founded on one of those exceedingly simple ideas which appear self-evident as soon as they are seen, and yet are quite novel. The conception on which it is based is that three incomplete tubes, that is, tubes formed by bending strips into a circle, but not welding or otherwise connecting the opposing edges, can be interlocked with one another, so as to make a fairly firm structure. The it has the advantage of perfect portability. As there



PEASE'S TUBULAR CONSTRUCTION.

number of tubes that can be connected in this way is | ral kinds of columns built up from tubes according not, however, limited to three. That is the minimum number, and there is no maximum. If, in addition to the stiffness obtained by the interlocking of the tubes. Filled with concrete, it weighs 16 pounds per tubes, their interiors be filled with concrete, there is foot, and a length of 95½ inches failed under a load of ing bearings for the trunnions of a deflector plate produced a structure of very great rigidity, in which the metal tubes supply the tensile strength which the concrete lacks. It is well known that concrete will take such a firm hold of iron as to fully utilize the strength of the latter.

From time to time we have given reports of the strengthening of concrete slabs by iron bars and wires with most satisfactory results, but in no case have the conditions been so favorable for perfect adhesion as in the construction before us. There are, however, a great many cases in which simple interlocked tubes give ample strength without any kind of filling. For instance, in Fig. 1 is shown a form of construction well adapted to form walls and roofs of temporary buildings, and failed, as did all the others, by in substitution of corrugated iron. The tubes are of buckling. Fig. 8 is built of 1 inch . 24 Birmingham wire gage, and 2 inches, 4 inches, 6 and of 1/2 inch tubes, and weighs, inches, or any other diameter. Of course, a wall or filled, 46 pounds per foot. Its load, roof built in this way is heavier than one of corrugated iron, but it offers considerable advantages, both in hot and cold climates, from its non-conducting qualities. Each tube forms an air cell, while the points of contact between the inner and outer rows of tubes are so small that they do not offer much opportunity for the direct transmission of heat from one to the other. Further; the tubes may readily be filled with moss litter, chaff, sawdust, or other non-conducting material, and thus there will be produced, at small cost, a building that it will be possible to live in with a fair amount of comfort in tropical climates. The same type of construction is adapted both for roof and walls; the former is perfectly watertight, even if laid flat, and all the rain must find its way into the lower row of tubes and run out at their ends.

material by adopting two different diameters, as shown in Fig. 2. This is marked as a section of bridge flooring, but it also does excellently well for walls or partitions which have to be plastered inside. If the larger tube be almost filled with straw, the quantity of plaster required is reduced, while at the same time a good key is provided. Whatever design of wall be adopted, are neither bolts nor rivets

up and down a score of times without damage to the materials.

Figs. 2 and 12 show a flooring without rivets. It will be seen that it is made of two different sizes of tubes, and there being in the tube a that it is further stiffened by friction slide on which is a wooden keys. The bar with pin projecting through the the holes in it is threaded on at an angle to secure further spring metal, as shown also rigidity. A floor of this de- in the small figure, serves to scription is shown under test draw the tube or casing into in Fig. 3. Over the metal sufficiently firm contact with there was applied concrete, the chalk. making the depth 5 inches over all. The span was 6 feet and the width 1 foot 6 inches A load of 8 tons 10 cwt. was while the weight of metal was 22 pounds per square yard, or equal to a plate  $\frac{1}{16}$  inch thick. The floor broke down under clean in two. The deflections breaking. In another test made by Messrs. David Kirkaldy & Son, four tubes 3 inches in diameter were joined by three tubes 2 inches in diameter, and were covered with cement to a total thickness of 5% inches. A load was applied at the center over a span of 6 feet, and the ultimate stress was 5,387 pounds. A beam, made of three 4 inch of the same size, and all filled with concrete, carried, on a 6 foot span, 6,042 pounds applied at the center before the iron parted from the cement; it failed entirely at 7,822 pounds. In every case the

to the methods of Pease's construction. Fig. 4 shows the gas and mix therewith the amount of air necesa column composed of four 2 inch tubes and four 1 inch sary for its most efficient combustion. Extended up-22,048 pounds.

tubes, and weighs 11 pounds to the foot. Its load was ing intended, by the swinging of this plate, to direct

18,080 pounds. Fig. 6 has three 2 inch tubes and the same number of 34 inch tubes. Its weight is 11.9 pounds per foot, and its crushing load, on a length of 95.5 inches, 17,882 pounds. Fig. 7 has eight outer tubes 1 inch in diameter and eight inner of ¾ inch diameter. It carried a crushing load of 15,864 pounds on a length of 95.8 inches, on a length of 723 inches, was 11,268 pounds. Fig. 9 is practically the same as Fig. S. On a length of 46 inches it carried 7.517 bounds. Figs. 10 and 11 are more ambitious structures. The former is a suggestion for a bridge pier, combining the advantages of cast iron on the outer surface with a steel and concrete core. The latter shows a col-

same size, and in some cases there may be a saving of small, while the forms in which it is used give it the maximum of strength. Already a boiler chimney has been erected in the form of a reeded column (Fig. 6), with a non-conducting lining, and other uses are being tried almost daily.

We are indebted to London Engineering for the particulars and the engraving.

## STOCKER'S CHALK HOLDER.

The simple device shown herewith, for conveniently used, a building may be put holding a piece of chalk for writing or drawing, has been patented by Albert A.

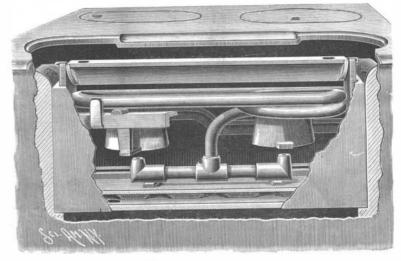
Stocker, of Dixon, Ill. It consists of an open-ended tube, slotted from end to end, a tubular cap fitting over either end of the tube, and slot. A clamping band of

Locomotive Performances, The Railroad Gazette recently gave details of a reapplied as shown, giving 19 cent trial of compound and cwt. per square foot of floor, simple engines on the Chicago, Milwaukee and St. Paul Railroad. A Baldwin com-

2.45 pounds per square foot, pound stood first. Two compounds beat the simple engines singly and collectively, and the choice of them is only a question of mechanical preference, considerthe load, the iron tearing ing the point of simplicity and durability. The simple engines figure out an average mileage of 28,170 were as follows:  $\frac{1}{16}$  inch with miles per year, and the demonstrated saving of 16.6  $3\frac{1}{2}$  tons;  $\frac{9}{16}$  inch with  $6\frac{1}{2}$  per cent would mean about 245 tons of coal saved in tons; and  $1\frac{1}{2}$  inch before a year. At the price of \$2 per ton for coal, the saving a year. At the price of \$2 per ton for coal, the saving would amount to \$490 for each engine per year.

## A GAS GENERATOR AND BURNER.

A device adapted to be placed in the firebox of a stove ordinarily burning wood or coal, and be connected with an oil supply, for generating and burning gas as fuel instead of wood or coal, is shown in the accompanying illustration, and has been patented by Charles R. Clark, of No. 435 State Street, Chicago, Ill. The box or casing is cut away at the rear, that the flame and heat may more readily reach and heat the stove, and the necessary air is admitted through bottubes, united by two others tom openings. Integral with the ends of the base plate are standards, on which are secured the lugs of a frame, adapted to carry the generating coils and mixing cones. The generating tube, entering at one side near the top, passes entirely around the interior of the box, and then forms a lower coil around one cone, passing thence to a central T at the bottom, provided with gas-emitting nozzles, the burning gas from which iron was 24 Birmingham wire is thus directed upwardly into the region of the genegage. Figs. 4 to 9 show seve- rating pipe. The frame also supports, immediately above each burner, a mixing cone, adapted to confine ward from the standards at each end are arms formwhose bottom has a central rib, the surfaces at the Fig. 5 comprises eight 1 inch tubes and eight 34 inch sides of which are curved in the arc of a circle, it be-



It is not necessary that the tubes should be all of the found. The weight of metal employed is exceedingly

nels are employed to give greater strength and rigidity.

As regards the simpler forms of this sheet metal tubular construction, it must be conceded that they furnish a new material for which many uses may readily be

## CLARK'S GAS GENERATOR AND BURNER.

umn in which, in addition to steel tubes, double chan- the flame against the oven side, as desired. It is the purpose of the lower coil, around one cone, to superheat the gas before it reaches the burner nozzles, and thus obtain better results from its combustion.

> MR. A. S. WALBRIDGE, of Mystic, Canada, has been a subscriber to the SCIENTIFIC AMERICAN for 49 years.