No. 860,400. PATENTED JULY 16, 1907.

E. L. MAAG.

SEWER PIPE.

APPLICATION FILED APR. 28, 1906.

Fig. 1.

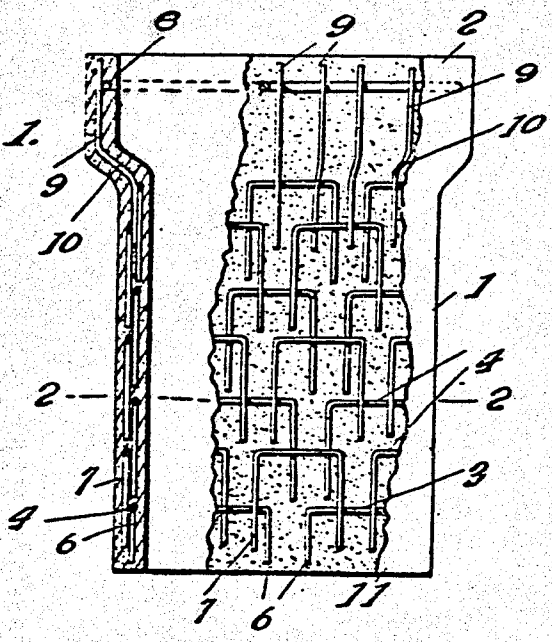

Fig. 4.

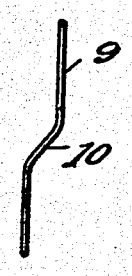

Fig. 3.

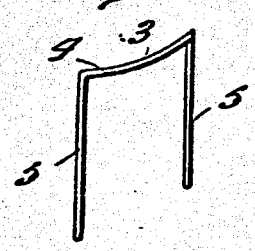

Fig. 2.

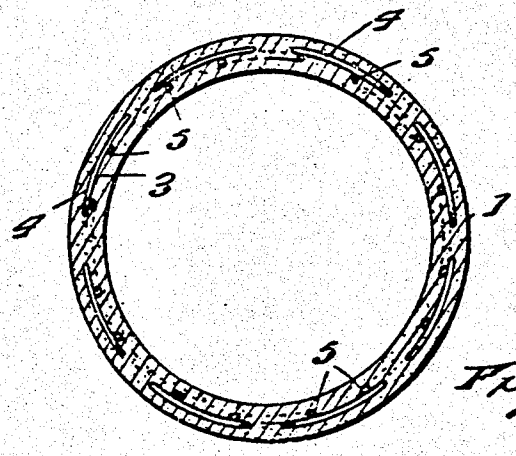

Fig. 5.

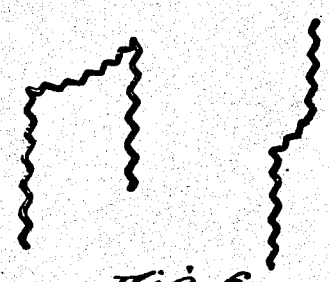

Fig. 6.

Inventor.

E. L. Maag.

Witnesses

[signature]

W. N. Woodson

By [signature]

Attorneys

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UNITED STATES PATENT OFFICE.

EDWARD L. MAAG, OF CLARKSBURG, OHIO.

SEWER-PIPE.

No. 860,400. Specification of Letters Patent. Patented July 16, 1907.

Application filed April 28, 1906. Serial No. 314,315.

To all whom it may concern:

Be it known that I, EDWARD L. MAAG, a citizen of the United States, residing at Clarksburg, in the county of Ross and State of Ohio, have invented certain new and useful Improvements in Sewer-Pipes, of which the following is a specification.

This invention relates to improvements in pipes of that type which are commonly employed for the construction of sewers and which are formed in sections connected by spigot joints. The pipe embodied in the present invention is designed to be formed of some plastic material such as concrete having a number of peculiarly designed reinforcing members embedded therein. These reinforcing members are peculiarly formed so as to prevent any serious injury to the pipe by a slight cracking of the concrete and also so as to enable the concrete to be thoroughly tamped in the formation of the pipe.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of a sewer pipe constructed in accordance with the invention, parts being broken away; Fig. 2 is a transverse sectional view through the pipe on the line 2—2 of Fig. 1; Fig. 3 is a detail view of one of the U-shaped ties; Fig. 4 is a detail view of one of the longitudinal ties employed to bind the bell to the body of the pipe; Fig. 5 shows a modification of the U-shaped tie shown in Fig. 3; and, Fig. 6 shows a modification of the tie illustrated in Fig. 4.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The numeral 1 designates the pipe which is enlarged at one end to form the bell 2 and which is shown as having a circular cross section, although other cross sections could be employed without departing from the spirit of the invention. This pipe which is formed of some plastic material, preferably concrete, is reinforced by means of the ties 3 embedded in the concrete. These ties are angular and are approximately U-shaped and comprise a cross bar 4 which is laterally disposed in the concrete so as to resist any tendency of the pipe to burst or split longitudinally. At each end of the cross bars 4 there is an arm 5 and these arms 5 extend longitudinally along the pipe so as to resist any tendency of the concrete to break transversely.

One of the most serious objections that have been brought forward against the use of reinforced concrete hitherto has been that the concrete almost invariably cracks with age and that the cracks have a tendency to follow the reinforcing members. It will thus be seen that in the construction of a reinforced concrete pipe, it would be very objectionable to employ either transverse rings extending continuously around the pipe or continuous longitudinal members, since when the cracks once started, they would follow the continuous members and very quickly produce a rupture. In order to overcome this difficulty, the U-shaped reinforcing ties 3 are arranged in successive transverse series of rings around the pipe, the cross bars 4 in each ring being in staggered relation to the cross bars in the adjacent rings and the arms 5 of each tie in one ring overlapping and engaging the cross bars 4 of two adjacent ties in the adjacent ring. With this construction, it will be apparent that the pipe is effectively reinforced against both lateral and longitudinal breaks and that any minor cracks which might form in the concrete will not produce any serious results.

Another serious objection against the use of reinforced concrete is the difficulty of thoroughly tamping the concrete so as to reduce the voids to a minimum and obtain a secure bond between the concrete and the reinforcing members. In constructing the present pipe, it is preferably formed in a series of successive layers which are each thoroughly tamped. The preferred method of procedure is to place enough concrete in the mold to form one layer which may be designated in the drawings by the numeral 6. The U-shaped ties are then placed in position and the layer of concrete thoroughly tamped. The next layer 7 of concrete may then be placed in the mold upon the first layer and the process again repeated, the ties 3 in the second layer being so placed that the cross bars 4 alternate and overlap the cross bars 4 in the layer 6 and that the arms 5 in the layer 7 extend longitudinally along the pipe so as to overlap and loosely engage the cross bars 4 of the ties in the layer 6. The pipe is thus formed by a series of successive layers each of which is thoroughly tamped so as to eliminate the voids and force the concrete into a close union with the ties.

Where the pipe is formed with a bell 2, the same preferably has a continuous ring or band 8 embedded therein, which is overlapped by a series of longitudinal reinforcing rods 9 extending into the body of the pipe. These longitudinal rods 9 comprise two arms connected by an offset portion 10, one of the arms being embedded in the bell, while the opposite arm is embedded in the body of the pipe and overlaps and loosely engages the U-shaped reinforcing ties 3. It will thus be seen that the bell 2 is securely connected to the body of the pipe and that it is reinforced by the ring 8 against the lateral pressure exerted by the spigot 11 of the adjacent pipe when the

two are brought together. If desirable, the U-shaped ties 3 may be given a zigzag construction, as shown in Fig. 5, and the ties 9 for the bell may also be given a similar construction as shown in Fig. 6.

Having thus described the invention, what is claimed as new is:

1. A concrete construction embodying a series of angular reinforcing ties with cross members and longitudinal members, said ties being arranged in staggered relation and in successive layers of which the cross members of the outer layer overlap the longitudinal members of the inner layer and the longitudinal members of the outer layer overlap the cross members of the inner layer.

2. A concrete construction embodying reinforcing ties of angular formation, each embodying a cross member and a longitudinal member and arranged in staggered relation and in successive layers, the outer layer being arranged in staggered relation to the inner layer and the ties of the outer layer overlapping and in contact with the ties of the inner layer.

3. A concrete construction embodying U-shaped reinforcing ties arranged in a plurality of transversely extending series, the cross bars of one series being in staggered relation ro the cross bars of the adjacent series, and the arms of each tie in one series overlapping and engaging the cross bars of two adjacent ties in the adjacent series.

4. A concrete construction embodying U-shaped reinforcing ties embedded therein in a plurality of transversely extending series and in successive layers, the U-shaped ties of one series of each layer being in staggered relation to the other series of the same layer, the ties of the outer layer overlapping the ties of the inner layer and in such staggered relation thereto that the arms of each tie in the outer series overlap and engage the cross bars of two adjacent ties in the adjacent series.

5. A pipe having a bell at one end thereof and formed of plastic material, U-shaped reinforcing members embedded in the body of the pipe, a reinforcing ring embedded in the bell and longitudinally extending reinforcing rods provided with intermediate offset portions and having one end overlapping the reinforcing ring and the other end overlapping the U-shaped reinforcing members in the body of the pipe.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD L. MAAG. [L. S.]

Witnesses:
P. K. RICE,
HARRY E. HAND.