June 5, 1951 P. J. M. T. ALLARD 2,555,951

METHOD FOR CONSTRUCTING PILES OR PIERS FOR FOUNDATIONS

Filed Feb. 5, 1948 2 Sheets-Sheet 1

Fig. 1

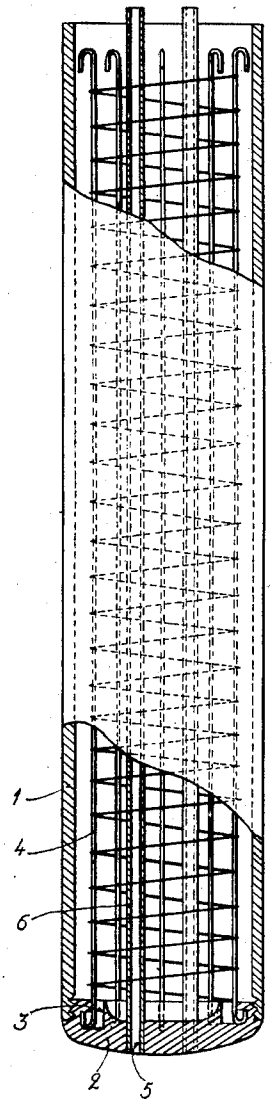


Fig. 2

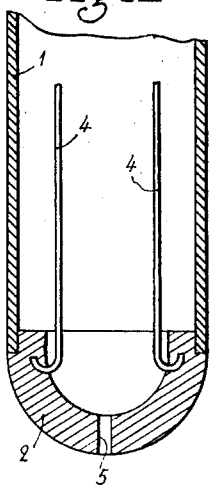


Fig. 3

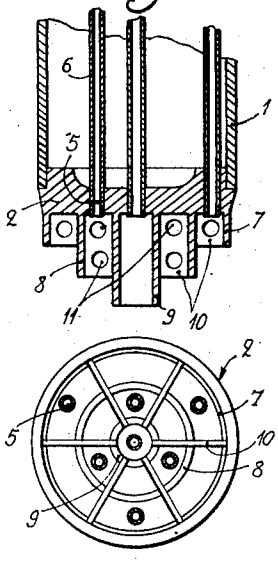


Fig. 4

INVENTOR

Pierre Jean Marie Théodore Allard

By [signature]

His Atty.

June 5, 1951 P. J. M. T. ALLARD 2,555,951

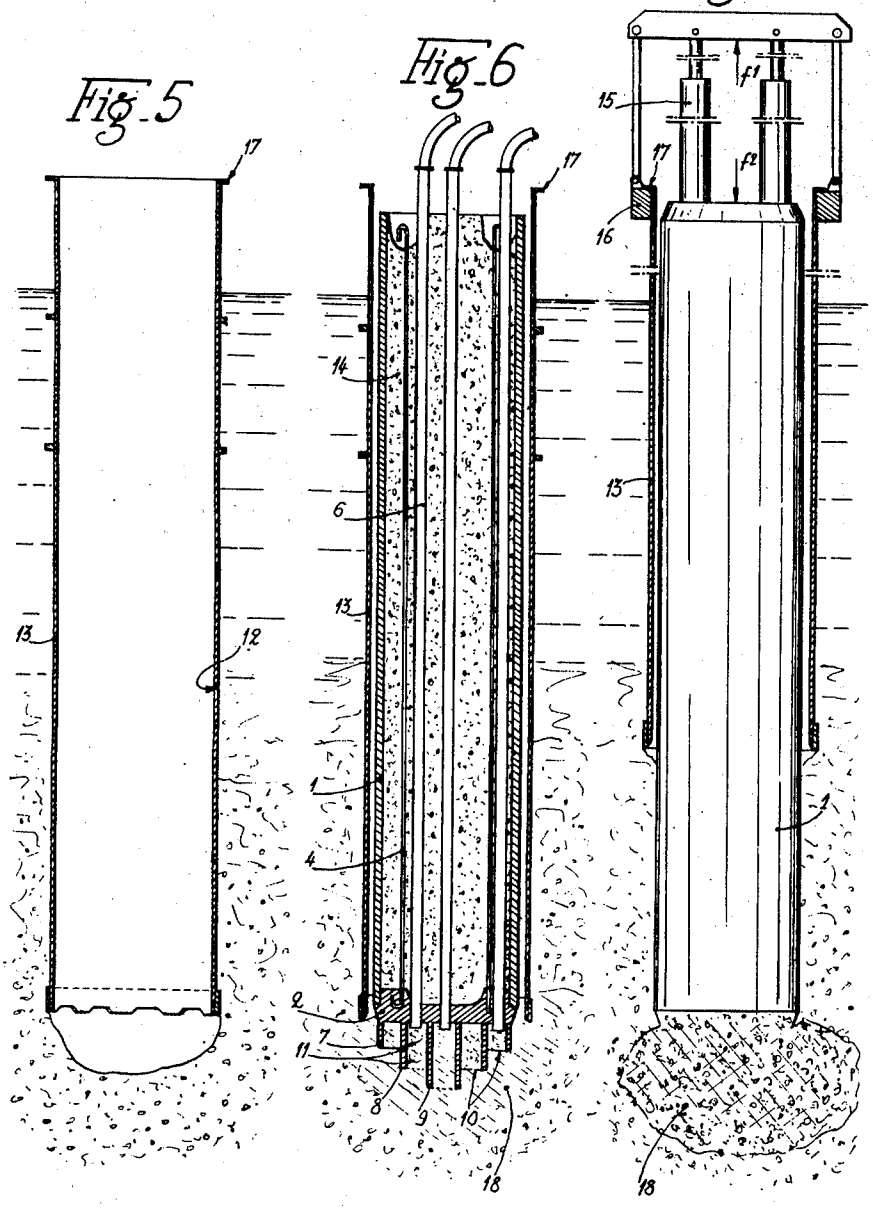
METHOD FOR CONSTRUCTING PILES OR PIERS FOR FOUNDATIONS

Filed Feb. 5, 1948 2 Sheets-Sheet 2

Fig. 7

Fig. 6

Fig. 5



INVENTOR
Pierre Jean Marie Théodore Allard
By
his Atty.

Patented June 5, 1951 2,555,951

UNITED STATES PATENT OFFICE

2,555,951

METHOD FOR CONSTRUCTING PILES OR PIERS FOR FOUNDATIONS

Pierre Jean Marie Théodore Allard,
Chantilly, France

Application February 5, 1948, Serial No. 6,433
In France January 9, 1947

1 Claim. (Cl. 61—57)

1

The present invention has for its object to provide a method for constructing piers or piles for foundations, which makes it possible, on the one hand, to increase the stability of the pier or of the pile in the ground, in particular in alluvial ground, and, on the other hand, to seat the structure in the ground in a reliable manner by exerting on said structure, once it has been completed, a considerable pressure before it is finally subjected to the load of the superstructure which it is intended to support.

According to said method the ground is bored and, as boring proceeds, a liner is inserted which forms a temporary shield with an open bottom, the completely or partly prefabricated pier or pile is then lowered into said liner and, after completing said pier if necessary, the shield is removed.

The invention also has for its object the prefabricated piers, posts or piles or the portions of prefabricated piers, posts or piles for carrying out the method.

In the accompanying drawing which is given solely by way of example:

Fig. 1 is an elevational view with parts broken away, of a pile (or pier) element constructed according to the method and intended to rest on firm ground.

Fig. 2 shows a modification of the base of the pile;

Fig. 3 shows another base of the pile;

Fig. 4 is a plan view of the base of the pile of Fig. 3;

Fig. 5 shows a vertical section of the place where the pile is to be inserted, in the state in which it is after the operations effected previous to placing said pile in position;

Fig. 6 is a similar section, after the pile has been placed in position and completed;

Fig. 7 shows the removal of the liner or shield which has been used for placing the pile in position.

For carrying out the method according to the invention, a tubular element of the dimensions of the pile (or of the pier) is prefabricated in the workshop or in the yard. Said element comprises (Fig. 1) a thin casing 1 of circular or other cross-section, of concrete or cement which is preferably reinforced and, for example, centrifugated, of a suitable diameter for the load which is to be supported by the finished structure.

Said tubular element 1 is terminated at its lower end by a base or cap 2 in one or more parts and of a shape that corresponds to the nature of the ground on which the pile is to rest.

In the upper face of the base 2 are provided

2

housings 3 which, by means of a bayonet or like type of connection, enable longitudinal reinforcing bars 4 to be anchored.

Furthermore, said base is provided with holes 5 which extend right through it and are intended for the subsequent mounting of tubes 6 of such a length that they extend beyond the top of the casing 1. It should be noted that the elements 4 and 6 may be constructed separately; they can be fitted to the casing 1 and the base 2 either before the pile is placed in position, or after the casing 1 and the base 2 have been positioned.

As hereinbefore stated, the base 2 may be of different shapes according to the nature of the ground involved. Whereas in the example of Fig. 1, the base 2 is of a flattened shape of oval or like cross-section, in the example of Fig. 2 it is of hemispherical shape.

In the modification of Fig. 3, which is more particularly intended for ground which is not very firm or is formed by non-contiguous materials such as pebbles, coarse gravel, or the like, the base 2 comprises a flat member which is provided on its lower face with cylindrical or other projections 7, 8, 9, which are preferably of unequal height and are connected to one another by radial fins 10 provided with holes 11. The holes 5, in which the tubes 6 are or will be fitted, open into the various concentric grooves thus formed, between the various cylindrical projections.

The placing in position and the final construction of the pile (or of the pier) are effected in the manner which will now be described.

The pile or the pier has been manufactured in the state shown in Fig. 1 in the factory or in the yard and is ready to be placed in position. It will be assumed that said pile is terminated by a base of the type shown in Figs. 3 and 4 and more particularly intended to be used in ground which is not very firm or which comprises materials that leave spaces between them (for example pebbles).

This being assumed, a bore 12 is effected (Fig. 5) by any known method.

A liner or shield 13, which is open at its base, is inserted as the boring proceeds. The insertion of the shield 13 may be effected by any known means.

Once the liner or shield 13 is in position, the pile provided with the reinforcing bars 4 and the tubes 6 is lowered to the bottom of the bore inside said shield 13. The pile thus rests on the ground.

If the wall 1 of the pile is not sufficiently

strong to withstand the subsequent side thrust of the earth and the weight of the structure, the casing 1 is then filled at 14 with concrete or any other suitable material (sand, waste or the like).

It should be noted that since the casing 1 is absolutely water-tight, it is certain that the quality of the filling material will not be deteriorated by infiltration of water from the ground or that said material will not be diluted when the work is effected under water.

After the concrete or other filling material has set, a device 15, preferably comprising a mechanical or hydraulic jack which, is adapted on the top and, for example, by means, of a collar 16 surrounding the shield 13 and bearing against an upper flange 17 of said shield, a vertical force is exerted on said shield in the direction of the arrow f^1. The jacks which bear against the pile exert thereon a pressure in the direction of the arrow f^2. The shield 13 is thus lifted and the surrounding earth resumes its position against the casing 1.

The pressure on the structure, during the operation, can be checked by means of a pressure gauge or any other suitable instrument.

Owing to the pressure exerted in the direction of the arrow f^2 during the lifting of the shield 13, the earth beneath the base 2 is compacted. A satisfactory seating of the structure is thus obtained. Such seating can be still further considerably improved, in particular in the case of unstable ground, by effecting, either before or after the compression due to the jacks, injections of cement under the base by means of the tubes 6. It may be advantageous to start by the outer annular groove. The injected cement flows into said groove provided between the projections 7 and 8 through the holes 11 provided in the fins 10.

At 18, the cement penetrates into the surrounding ground, thereby considerably increasing the stability of the pile. After the material thus injected is dry or not, an injection of cement is effected into the second circular groove provided between the projections 8 and 9, and then into the cavity formed by the projection 9 itself. This method enables the penetration of the concrete to be increased in the central portion, said concrete being guided by the concrete previously injected into the outer circular portion.

If necessary, the injection may be simultaneously effected into all the circular grooves of the base.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

A method for constructing foundations which comprises boring a well, inserting into said well, as boring proceeds, a tubular shield, lowering into said shield a tubular concrete element provided with longitudinal conduits opening through its lower end, injecting cement through said conduits and then removing said shield while pressure is exerted at the top of said element.

PIERRE JEAN MARIE
THÉODORE ALLARD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,856,604	Upson	May 3, 1932
2,146,645	Newman	Feb. 7, 1939

FOREIGN PATENTS

Number	Country	Date
21,966	Holland	1930
402,799	Great Britain	1933