

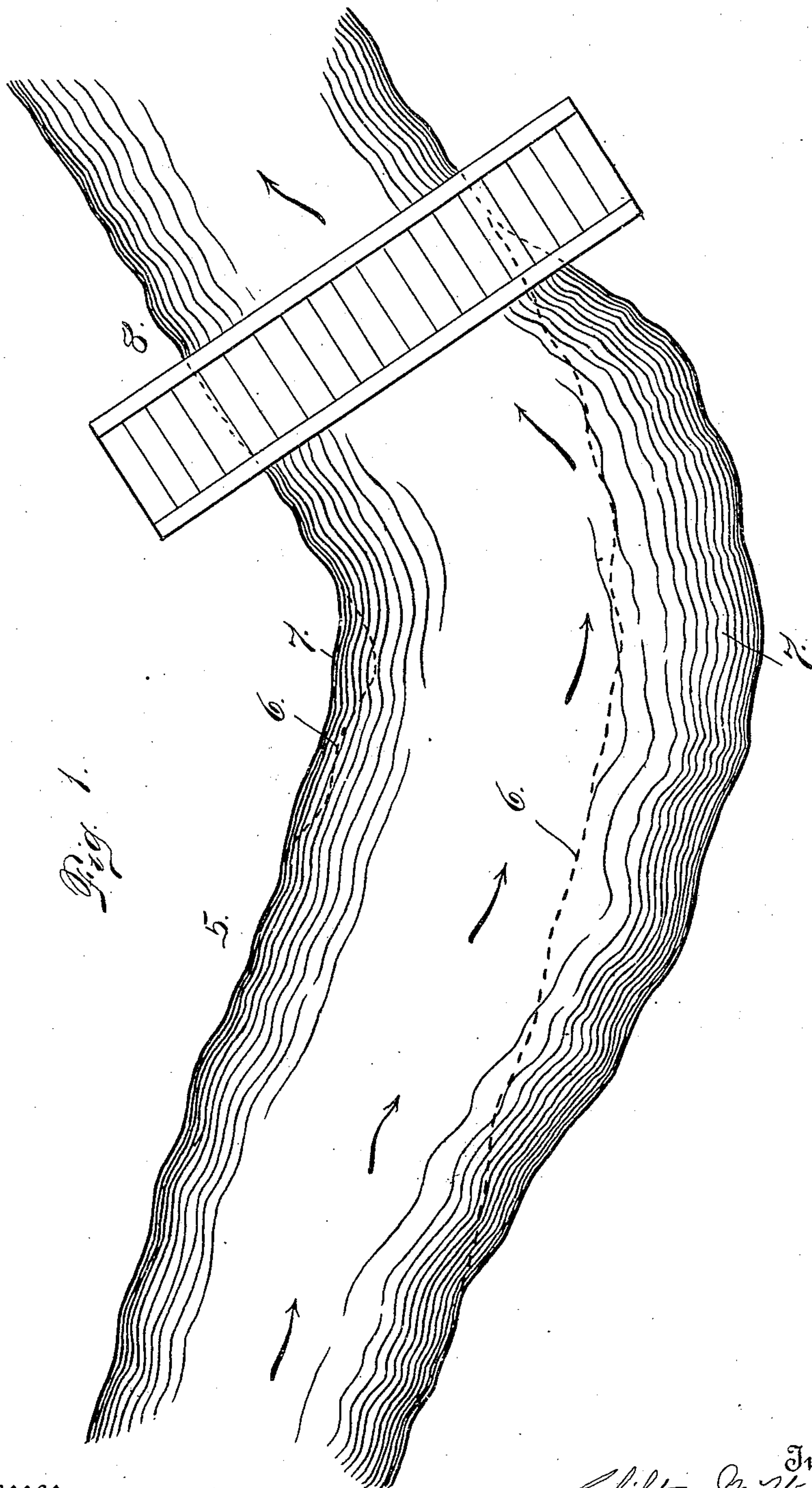
No. 875,480.

PATENTED DEC. 31, 1907.

C. M. WESTENHAVER.
MEANS FOR PROTECTING RIVER BANKS.

APPLICATION FILED MAY 2, 1907.

2 SHEETS—SHEET 1.



Witnesses
Otto E. Haddick.
Dena Nelson.

Inventor
Clifton M. Westenhaver.
By *[Signature]* Attorney

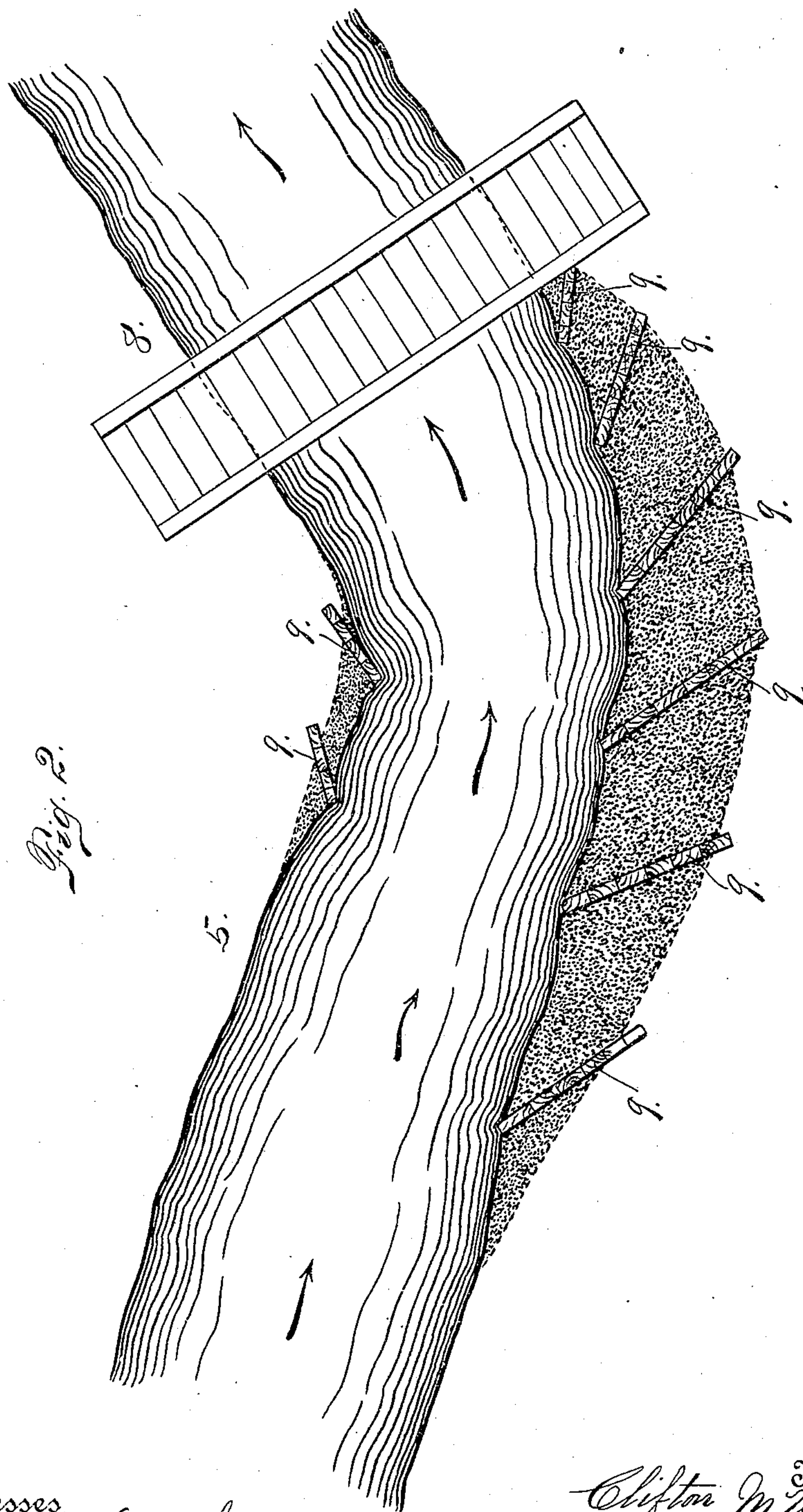
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UNITED STATES PATENT OFFICE.

CLIFTON M. WESTENHAVER, OF DENVER, COLORADO, ASSIGNOR TO THE WESTENHAVER CONTRACTING COMPANY, A CORPORATION OF WYOMING.

MEANS FOR PROTECTING RIVER-BANKS.

No. 875,480.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed May 2, 1907. Serial No. 371,516.

To all whom it may concern:

Be it known that I, CLIFTON M. WESTENHAVER, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Means for Protecting River-Banks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for protecting the banks of running streams against the action of the current which, particularly during high water periods, is oftentimes inclined to cut away the bank on one side or the other of the river by reason of a change in the direction of the current due to the high water. This action of the stream oftentimes washes away areas of ground of considerable magnitude thus reducing the acreage of farms or gardens located in the immediate vicinity of the stream. The portion of the bank attacked by the current and removed thereby, is sometimes located at the extremity of a bridge, whereby the end support for the latter is undermined thus rendering the bridge unsafe or even resulting in its complete destruction.

My object is to obviate this difficulty by simple means which may be installed at a comparatively small expense. This apparatus consists in forming a number of walls preferably composed of wood formed by inserting planks or thick boards in edgewise engagement, the said walls extending from the solid bank or ground adjacent the river, in a direction up the stream at such an angle that the force of the current will not have a tendency to destroy the wall. The uppermost wall or the one farthest up stream is usually placed at a slight angle to the direction of the current whereby the wall will be subjected to slight strain. The other successive walls down the stream, may form somewhat greater angles and still properly perform their required function which is to cause the alluvial deposits carried by the water to fill in the spaces between the said walls and be-

tween the walls and the solid bank, thus utilizing the action of the stream itself, to protect the bank toward which the current has directed its force. In this way the beds of streams may be restricted and confined within suitable limits, and large areas of valuable ground reclaimed.

Having briefly outlined my improved construction, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a fragmentary view of a stream showing a bridge in top plan view. In this view the dotted lines indicate the normal bed of the stream. Fig. 2 illustrates the same stream showing my improved means applied for restricting the bed or channel of the stream to its original or proper limits.

The same reference characters indicate the same parts in both views.

Let the numeral 5 designate a stream and the dotted lines 6 the boundaries of said stream on opposite sides thereof; while the reference character 7 designates portions of the stream which have encroached upon and washed away the banks which originally confined the stream or bounded its channel. A bridge extending across this stream is designated 8.

In order to reclaim the portions of the river bed outside of the dotted lines in Fig. 1, I form plank walls 9 on opposite sides of the stream, the said walls being anchored in the solid ground and having their planes extending up stream whereby their edges only are opposed to the force of the current. The angles formed by the planes of these walls and the direction of the current may be regulated at will and must be so regulated that the force of the current will not be destructively expended upon the said walls, since the object of my invention is not to confine or restrict the stream by directly opposing the force of its current, but by forming compartments so to speak along its banks in which the deposits carried by the stream will be caused to settle thus confining the stream within the desired limits and reinforcing the bank or extending the bank out into the stream to the extremities of the said walls. These walls may be so arranged as to simply protect the banks of streams, or they may be arranged for

the double purpose of protecting the bank and also for the purpose of preventing the anchorage of bridges which cross the stream, from being washed away or destroyed.
5 These walls may be formed in any suitable manner. Individual planks or thick boards are usually inserted in the ground along the bank of the stream whose channel is to be limited. These planks may be driven into
10 place to form the walls or they may be sunk hydraulically as by the use of jets of water introduced immediately below the said planks whereby the latter are caused to settle down into the bed of the stream, since the
15 water introduced digs out the soil or earth underneath the plank allowing the latter to drop. It is evident, however, that these walls may be formed in any suitable manner.

It must be understood that the angle
20 which the walls form to the direction of the current must be determined by the judgment of the engineer in charge of the work and may be varied or regulated according to circumstances and the necessities of any particular case.
25

The same walls when projected out into the stream as heretofore explained result in the formation of comparatively quiet bodies of water located in the compartments between the said walls, thus allowing or causing
30 the material carried by the water in suspension, to settle whereby the said compartments are filled and the bank extended outwardly into the stream as required.

Having thus described my invention, 35 what I claim is:

1. The herein described means for protecting the banks of running streams, consisting of walls extending from the solid bank of the stream outwardly into the channel thereof and having their planes directed
40 upstream and forming suitable oblique angles with the direction of the current so that the edges of the walls are chiefly opposed to the flow of the current, substantially as described. 45

2. Means for protecting the banks of running streams comprising a series of walls arranged in different planes and having their planes directed up stream and suitably separated to form compartments for the reception of alluvial material automatically deposited by the stream whose channel is to be limited, substantially as described. 50

3. The means herein described for limiting
55 the channels of running streams comprising walls extending outwardly from the bank into the stream so that their edges are chiefly opposed to the flow of the current, the said walls being suitably separated to form
60 compartments for the purpose set forth.

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

CLIFTON M. WESTENHAVER.

Witnesses:

A. J. O'BRIEN,
DENA NELSON.