Feb. 13, 1934. W. N. STEVENSON 1,946,819

MACHINE FOR CURING CONCRETE

Filed July 8, 1931 3 Sheets-Sheet 1

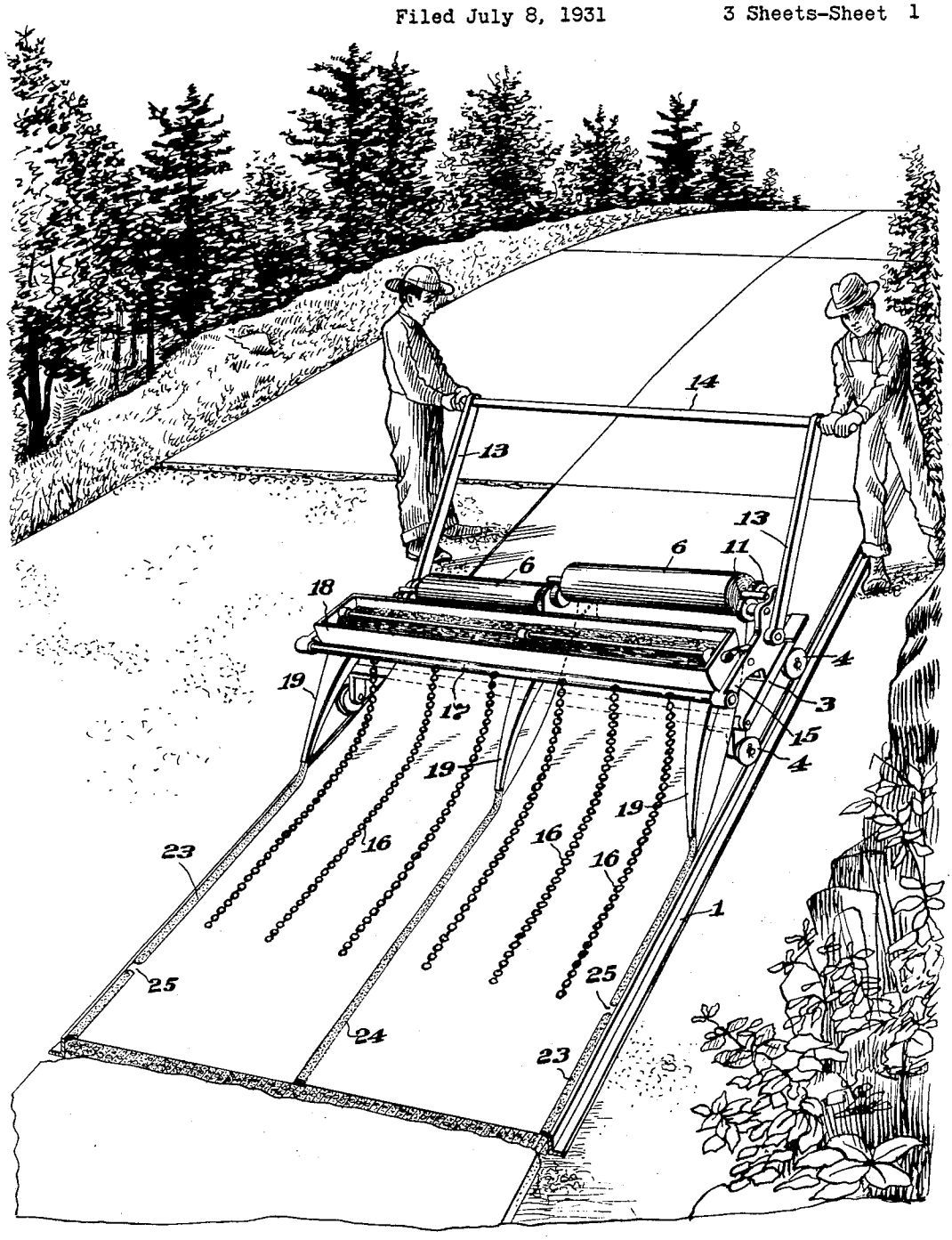


Fig. 1

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Fig. 2

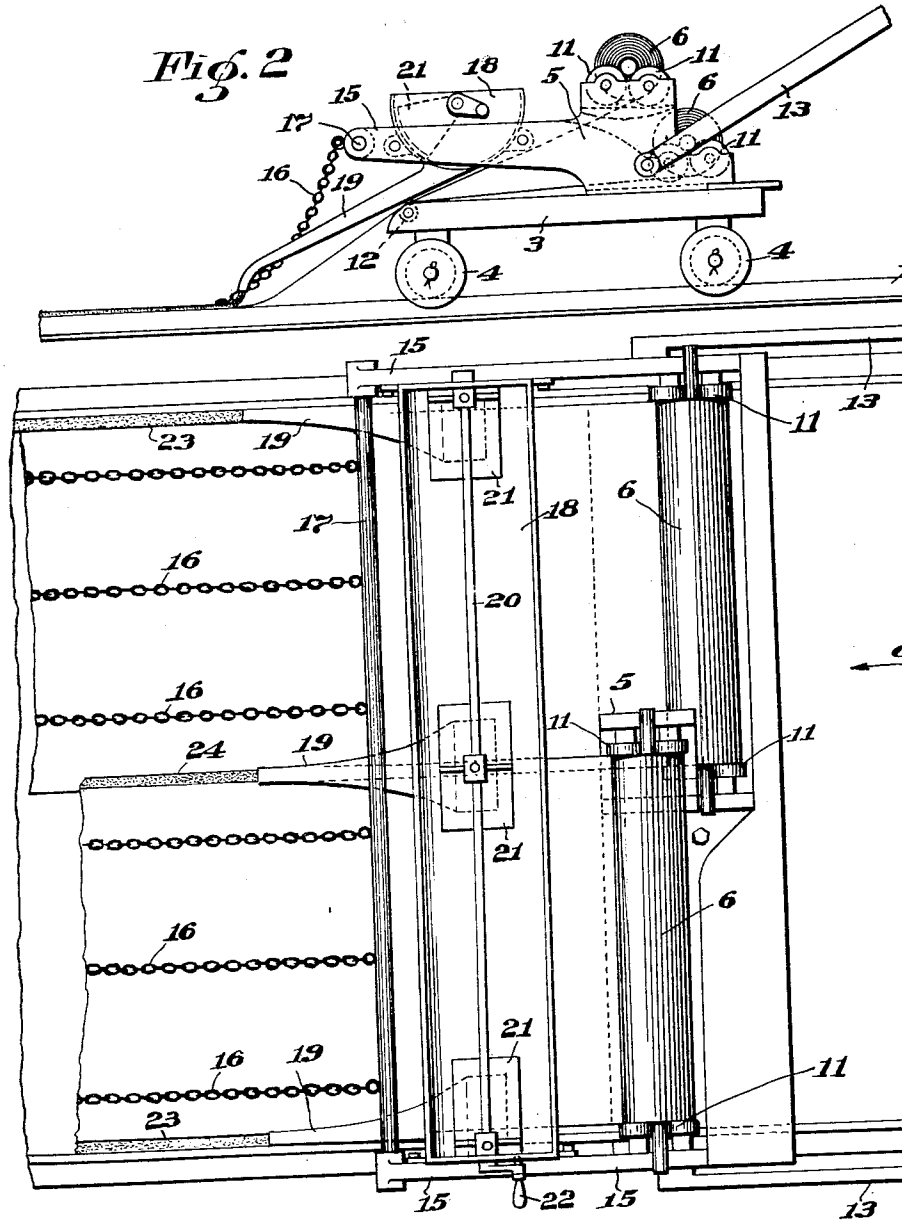


Fig. 3

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Fig. 4

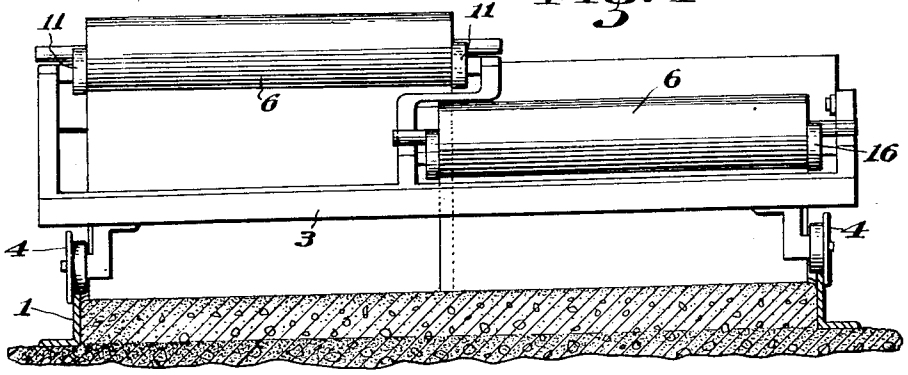
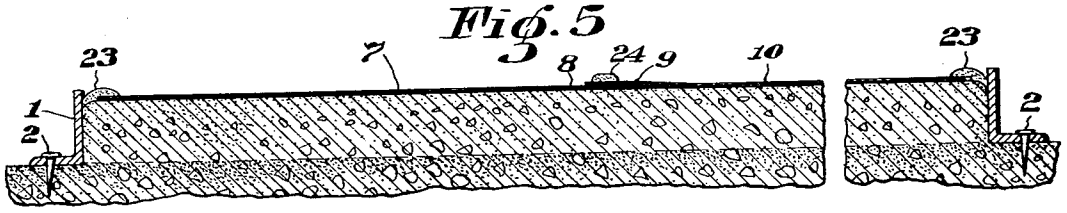


Fig. 5



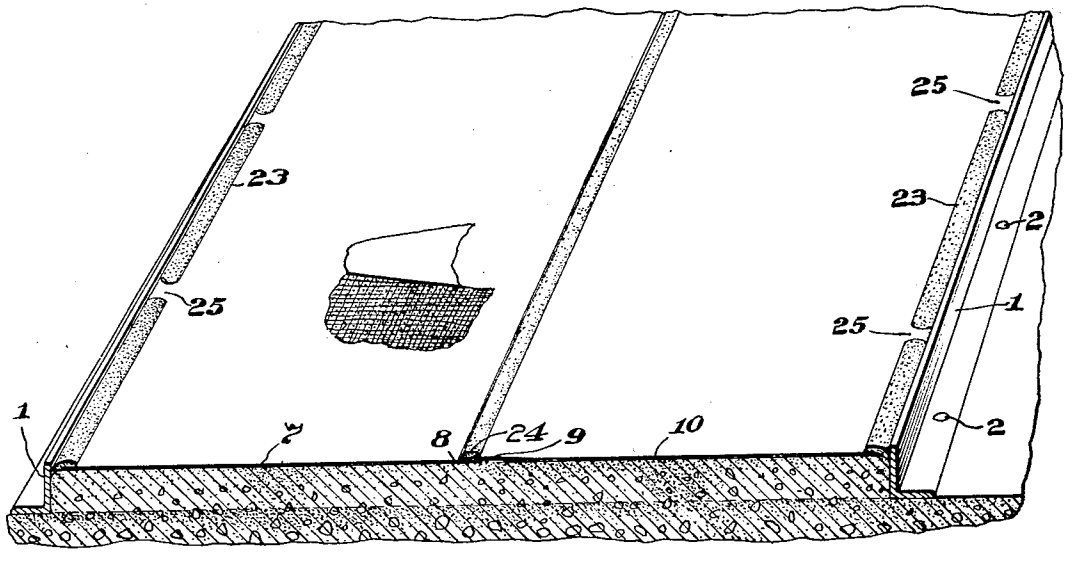


Fig. 6

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UNITED STATES PATENT OFFICE

1,946,819

MACHINE FOR CURING CONCRETE

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Application July 8, 1931. Serial No. 549,390

6 Claims. (Cl. 94—39)

This invention relates to a machine for curing concrete and is more particularly though not necessarily directed to curing concrete roads.

It is well known that the strength of a mass of concrete depends upon the even drying, setting and hydration of the mass. For the best results freshly laid concrete should set gradually during the hydration period, that is the evaporation of moisture from the concrete should be retarded by a surface seal of some kind, and heretofore it has been common to cover the surface of the concrete with water by building a dam about the concrete area, but such method is impractical in many instances, especially where the concrete is laid on a grade. It has been common also to cover the surface of freshly laid concrete with straw, hay or even burlap and to prevent quick hydration of the concrete this surface mass has been kept wet by sprinkling it with water from time to time.

It has also been proposed heretofore to protect the surface of the concrete by one or more strips of sheet material laid upon the concrete surface to retard moisture evaporation, but it has been found in concrete road constructions that the disturbing influences of temperature variations, wind and rain frequently defeat the purposes in view. Should the sheet material be displaced by air currents or wind, the surface of the freshly laid concrete becomes exposed, and where two or more strips of sheet material are laid upon the concrete, expansion and contraction under changing heat conditions will again act to expose portions of the concrete and consequently fail in the purpose of retarding hydration.

One of the important features of the present invention consists in providing a complete waterproof covering for the surface of the concrete, which covering will not be disturbed by wind or air currents nor by changing temperature conditions during the concrete curing period, and the contributing factors to this end consists in bonding or sealing the outer edges of the strip material to the edge portions of the concrete and bonding the adjoining edges of the strips together by an expansion joint, the effect being that air currents are effectively prevented from passing between the strip material and concrete surface, and expansion or contraction of the strip materials is permitted without uncovering or exposing any portion of the concrete. The bonding or sealing factors may be established between the respective parts by a deposit of any suitable granular material preferably in the form of a bead or ridge, such, for instance, as a low grade cement or concrete, or other granular material in either a wet or dry state and sufficiently stable to maintain the bond or seal between the parts during the curing period. Likewise such bond or seal may be applied in a variety of ways either by manual manipulation or by a suitable mechanical device.

In accordance with one aspect of the present invention the surface of the freshly laid concrete is covered by waterproof sheet material, such as a waterproof reenforced paper and the outer side edges of the strips are bonded to the side edge portions of the concrete, thereby effectively eliminating any disturbing or displacing influence of air currents or wind, and where two or more strips of sheet material are laid upon the concrete the adjacent edges of the strips are placed in overlapping relation and an expansion air current tight joint is formed between the overlapping edges whereby a complete covering is provided over the entire surface of the freshly laid concrete for the curing period.

It may be desirable in some instances in carrying out the purposes of the present invention to provide a temporary pressure upon the strips of sheet material as they are laid upon the concrete in order that the strips of sheet material may be held in place as laid and after the bond or seal, as above set forth has been placed, the temporary pressure may be removed.

In accordance with the present invention the bond or seal along the outer edges of the sheet material and concrete may be interrupted at intervals to form a drain passage for water from the top surface of the sheet material.

The present invention may be variously carried into effect either by hand or otherwise, but in order that the invention and its novel features may be clearly understood a novel form of machine will be hereinafter described.

In the drawings:—

Fig. 1 is a perspective view of a novel type of machine for carrying out the purposes of the present invention;

Fig. 2 is a side elevation of the parts represented in Fig. 1;

Fig. 3 is an enlarged plan view;

Fig. 4 is a view of the parts shown in Fig. 3 looking in the direction of the arrow *a* of Fig. 3;

Fig. 5 is a cross sectional view of a concrete roadway showing the strips of sheet material bonded to the side edges of the concrete and having an expansion air current tight joint at the adjoining overlapping edges of the strips; and

Fig. 6 is a perspective view with parts in section showing the strips of sheet material secured in place on the surface of the concrete and illustrating the strips of material as formed of reenforced waterproof paper.

In laying concrete roadways it is now the usual practice to provide edge strips, usually formed of metal and which serve to define the width of the concrete to be laid between the strips. Such metal strips are indicated at 1 and it will be noted that these strips are secured in place by appropriate securing means such as the pins 2 which are driven through the strip at intervals and into the ground. The upstanding flange of each side strip usually constitutes a grade level for the top surface of the freshly laid concrete and this fact is utilized in accordance with the present invention as a track way for a bridge or carriage 3.

As shown, the bridge or carriage 3 consists of a platform having extending downwardly therefrom the flanged rollers 4 which rest upon and travel on the top edge portion of the upstanding flange of the side strips 1.

The bridge or carriage 3 has supporting means, as shown, for two or more packages or rolls of sheet material and as illustrated more clearly in Fig. 2 such supports 5 for the rolls of sheet material are secured to the bridge or carriage 3. The rolls of sheet material 6 are supported by the bridge with the adjacent edges of the sheet material in overlapping relation, as more clearly indicated in Fig. 4, so that as the sheet material or reenforced waterproof paper is drawn from the bridge or carriage as the latter is progressively moved along its track way, the adjoining edges of the strips will be in overlapping relation, as indicated in Fig. 5. In other words, one of the strips of sheet material 7 will have its edge 8 underlying the edge 9 of the adjoining strip of sheet material 10.

While the packages or rolls of sheet material 6 may be supported in a variety of ways it is preferable that such packages or rolls be supported by anti-friction means, such as the small wheel 11 supported by the brackets 5, the result being that as the bridge or carriage is progressively moved along its track way the rolls will be turned by the pull of the sheet material and deliver the same to the surface of the concrete.

The bridge 3 is preferably also provided with a guide roll 12 of Fig. 2, over which the sheet material passes as it is delivered from the bridge or carriage to the surface of the concrete.

It may be desirable in some instances to provide the bridge or carriage with means for traveling it along its track way and in the present instance of the invention this is shown as provided by the arms 13, one at each side of the bridge or carriage and having a cross bar 14, the end portions of which may be grasped by the workman.

Under some weather conditions it may be desirable to temporarily hold the strips of sheet material on to the surface of the concrete as they are laid thereon and to this end the bridge or carriage 3 has the bracket portions 5 extending rearwardly, one at each side of the bridge or carriage, as indicated at 15 and to the end portions of these extensions are secured trailing chains 16. In the present instance, the two extensions 15, one at each side of the bridge or carriage have extending between them the chain bar 17, which affords a convenient means for attaching the chains 16 to the carriage or bridge at intervals thereof, the construction being such that as the strips of sheet material are delivered to the surface of the concrete the chains 16 will drag thereover and temporarily hold the strips of sheet material on to the surface of the freshly laid concrete.

One of the important features of the present invention consists in bonding or sealing the outer side edges of the strip material to the edge portions of the concrete to prevent displacement of the strip material by wind or other disturbing causes and while this may be accomplished in a variety of ways, the drawings show one means of carrying out the present invention which provides a trough or hopper 18 mounted on the rear portion of the carriage or bridge and extending downwardly from the hopper 18 are the delivering nozzles or chutes 19, the lower end portions of which are closely adjacent to the place where the sealing material should be delivered.

Extending transversely of the hopper 18 is a valve shaft 20 which is supported at each end of the hopper and also at the centre, as indicated in Fig. 3, and secured to the valve shaft 20 are a series of valves 21, one for each of the delivering nozzles 19, the construction being such that the delivery of the bonding material to the edges of the strip material may be interrupted at intervals by closing the valves and as a convenient means to this end the present invention provides a handle or crank 22, which may be grasped by a workman and turned to thereby either close or open the nozzles. In some instances it may be desirable to omit the centre valve, so that the bonding material delivered to the upper surface of the overlying ply of the adjacent edges of the strip material may be continuous.

As hereinbefore noted, it is desirable to form passage ways or openings through the edge bond to permit water, due to rain or other causes, to flow from the top of the sheet material and the valve means hereinbefore described affords a convenient means to this end. However, the passage ways in the edge bond may be formed in a variety of ways, as for instance, a workman could remove a portion of the bond at intervals along the edges, and in case the bond is formed by cement or concrete this could be conveniently done by a pressure of the finger on the plastic bonding material.

As indicated in Figs. 5 and 6 more clearly, the bonding material 23 along the outer edges of the strip material will overlie a portion of the edge of the concrete thereby forming a complete and safe bond between the two to prevent passage of air currents or wind.

In order that the bond along the outer edges of the strip material may not be ruptured or interrupted by expansion or contraction of the sheet material under varying weather conditions, the overlapping edges 8 and 9 of the strip materials are supplied with a bond 24 which may be constituted of cement, concrete or other granular material, and it will be noted that the bond 24 does not extend over the edge of the top layer of the strips, but rather acts as a weight to hold the two edges in close contact to prevent the ingress of air currents while at the same time providing an expansion joint.

From the construction thus far described it will be apparent that during the contraction and expansion of the sheet material the bond 24 will not prevent slipping between the overlapping edges of the sheet material and yet will prevent the ingress of the air currents, the result being

that the bond 23 along the outer edges of the strip materials and the edge portions of the concrete will remain uninjured and the sheet material will not be drawn from the bond or seal. Thus, regardless of weather conditions the strips of sheet material, as hereinbefore described, with the bond relation as described offer a complete and uninterrupted covering for the surface of the concrete during the entire concrete curing period.

It is desirable to permit the strips of sheet material to remain upon the concrete for several days, or until the concrete is set, whereupon the covering strip material may be removed. Where the bonds 23 and 24 are formed of low grade concrete or cement a slight hammered blow will effectively detach them and permit the sheet material to be again rolled up ready for another operation.

The interruption of the edge bond 23 at intervals to allow the passage of water from the surface of the sheet material may be variously contrived and as herein shown, Fig. 6, the passage ways 25 are distributed along the edge seal at appropriate intervals.

While the machine hereinbefore described constitutes a simple form of mechanism for laying the sheet material on to the concrete and sealing the edges of the sheet material for the purposes hereinbefore stated, the present invention may be carried into effect by other means involving operations in applying the seal, and interrupting it at intervals for the passage of water.

It is preferable that the centre bond 24 should be only sufficiently heavy to maintain the overlapping edges of the sheet material together to prevent the ingress of air currents and permit the edges of the sheet material to slip, one relative to the other during expansion and contraction.

While the preferred method of the present invention contemplates that the bond or seal 23 should actually bond the edges of the strip material and edge portions of the concrete together, the advantages of the present invention may be secured in some instances by depositing the edge bead entirely upon the strip of sheet material and forming it of sufficiently greater weight than the centre bead 24 to hold the outer edges of the strip material securely in place so that the shrinking slip may be confined to the overlapping edges of the strips of sheet material. In some instances also the centre bead 24 need not be continuous, a condition which may contribute beneficially to the shrinkage slip and provide for drainage.

Where the present invention is practiced by the mechanical means hereinbefore described, or similar equivalent means, the strips of sheet material will be drawn from the bridge or carriage as the latter is progressed along its track ways and the controlling chains will temporarily press the strips of sheet material on to the surface of the concrete and hold the strips in place until the side edge and centre seals or bonds are delivered on to the paper strips to hold the latter during the concrete curing period.

What is claimed is:—

1. In a machine for curing concrete, the combination of a bridge or carriage movable along the roadway, a package of sheet material mounted on the bridge or carriage, and means supported on the bridge or carriage for delivering granular material from the bridge or carriage to the side edges of the sheet material as the bridge or carriage is moved along the roadway to bond the side edges of the sheet material to the concrete and prevent displacement of the sheet material by air currents during the concrete curing period.

2. In a machine for curing concrete, the combination of a bridge or carriage movable along the roadway, a package of sheet material mounted on the bridge or carriage, means acting upon the strips of sheet material as they are progressively laid upon the concrete to temporarily hold them in place as laid, and means for delivering granular material from the bridge upon the edges of the sheet material as the bridge or carriage is moved along the roadway for bonding the side edges of the sheet material to the side edges of the concrete to seal the edges of the sheet material from displacement by air currents during the concrete curing period.

3. In a machine for curing concrete, the combination of a bridge or carriage movable over the roadway, two or more packages of sheet material mounted on the bridge or carriage with their adjacent edges in overlapping relation, a hopper for granular material mounted on the bridge or carriage, and chutes extending from the hopper for delivering a seal of granular material along the edges of the sheet material as it is laid upon the concrete.

4. In a machine for curing concrete, the combination of a bridge or carriage movable over the roadway, two or more packages of sheet material mounted on the bridge or carriage with their adjacent edges in overlapping relation, means for applying a temporary pressure to the sheet material as it is laid upon the concrete to hold it in place, a hopper for granular material mounted on the bridge or carriage, and chutes extending from the hopper for delivering a seal of granular material along the edges of the sheet material as it is laid upon the concrete.

5. In a machine for curing concrete, the combination of a bridge or carriage movable over the freshly laid concrete, two or more rolls of sheet material mounted on the bridge or carriage for delivering strips of sheet material to the surface of the concrete, and means mounted on the bridge or carriage for delivering beads of bonding material to the edges of the strip material as the bridge or carriage is moved over the concrete.

6. In a machine for curing concrete, the combination of a bridge or carriage movable over the freshly laid concrete, two or more rolls of sheet material mounted on the bridge or carriage for delivering strips of sheet material to the surface of the concrete, and means mounted on the bridge or carriage for delivering beads of bonding material to the edges of the strip material as the bridge or carriage is moved over the concrete, and means for interrupting the flow of bonding material at intervals to form drain passage through the bead of bonding material.

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