Oct. 14, 1930. W. S. EDGE 1,778,451

METHOD OF AND APPARATUS FOR FORMING CONCRETE ROADWAYS

Filed Dec. 10, 1928

Fig. 1.

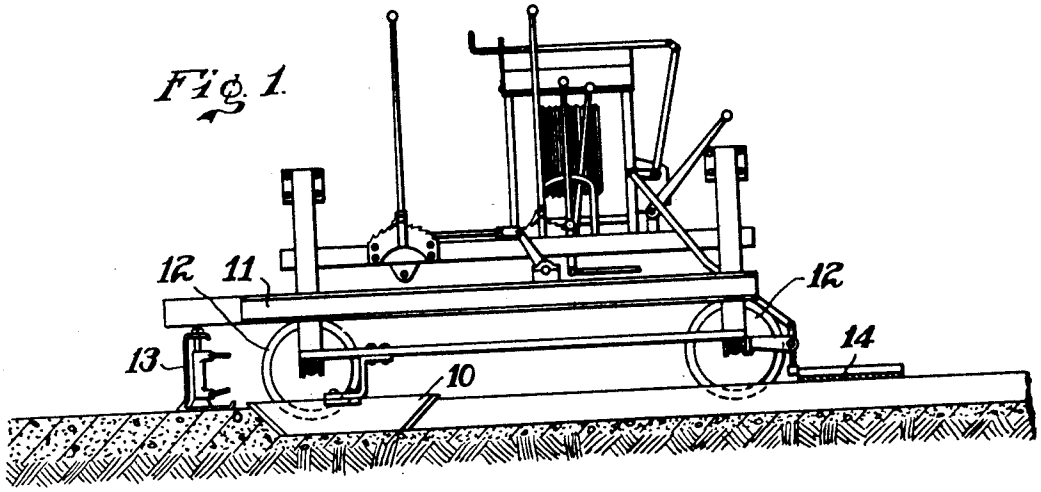


Fig. 2.

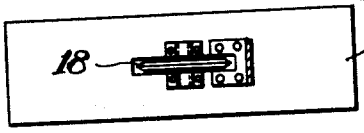


Fig. 3.

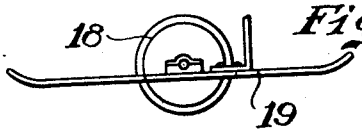


Fig. 4.

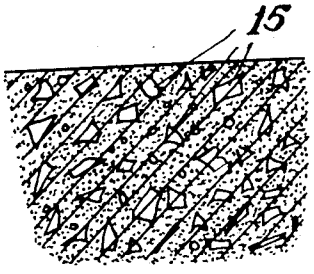


Fig. 5.

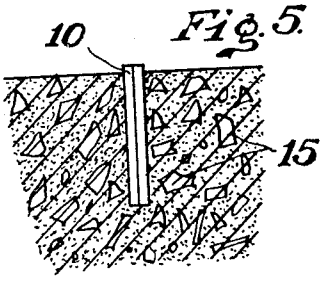


Fig. 6.

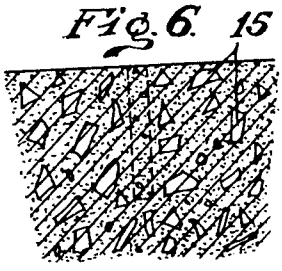


Fig. 7.

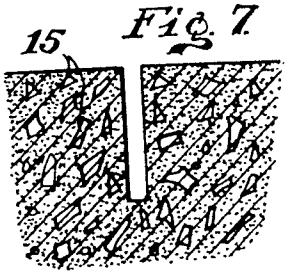
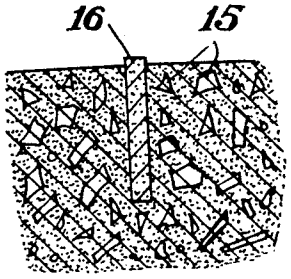


Fig. 8.



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Patented Oct. 14, 1930 1,778,451

UNITED STATES PATENT OFFICE

WALTER S. EDGE, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO NATIONAL STEEL FABRIC COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

METHOD OF AND APPARATUS FOR FORMING CONCRETE ROADWAYS

Application filed December 10, 1928. Serial No. 324,911.

My invention relates to a method of forming concrete roadways and the like, and more particularly to concrete roadways of the center line type wherein there is a weakened longitudinal line of division that is filled with asphalt or similar material, for the purpose of preventing visible cracking of the concrete through expansion and contraction, but it will be understood that the invention may be employed in other concrete structures.

In the making of concrete roadways, it has been common practice to form a longitudinal center joint by spiking a deformed steel plate of light gage to the subgrade, pouring concrete at each side of the plate, finishing the section smooth, forming a shallow groove over the top of the plate with a finishing tool and finally pouring the groove thus formed with tar.

Another method of procedure involves the cutting or otherwise forming of a slot after the concrete has been poured and finished, and then filling the slot with asphalt or the like.

In the latter method of procedure, there is danger of unduly disturbing the concrete and causing portions along the center line to spall off under traffic, due to the extra finishing required. This effect is also more pronounced where coarse broken stone aggregate is used in the concrete.

One object of my invention is to form a slot such that there is little or no danger of breaking or damaging the concrete adjacent to the walls of the slot.

Another object of my invention is to provide a method wherein the finishing operation upon a concrete surface may be performed without interference through the presence of dividing plates or other slot forms and whereby the filling material may be introduced along the line of the slot with a minimum disturbance of the concrete material.

Still another object of my invention is to improve generally the method of forming roadways of the type referred to.

Briefly stated, my invention contemplates the displacement of the coarser particles of concrete material from the zone which is to be occupied by the slot, before the concrete has become set; thereafter finishing the concrete and permitting the finishing grout and the smaller concrete particles to replace the displaced coarser particles, and finally inserting in such zone the asphalt slabs or other filling material, the slot being actually formed after the finishing operation, under some conditions, and other conditions permitting the insertion of the asphalt slab without the necessity of actually shaping the slot.

In order that my invention may be more easily described, reference will be had to the accompanying drawing wherein Figure 1 is an elevational sectional view of a road-finishing machine; Fig. 2 is a plan view showing a cutter of different form than that shown in Fig. 1; Fig. 3 is a side elevational view of the device of Fig. 2; Fig. 4 shows a cross sectional view of a portion of a roadway in its natural condition; Fig. 5 shows the manner in which the cutting plate of Fig. 1 may be utilized to effect the displacement of the coarser particles of aggregate along the line desired for the slot and the filling material; Fig. 6 shows the condition of the concrete section of Fig. 5 after the cutter has been removed and the completion of the surface-finishing operation; Fig. 7 shows a slot formed in the section of Fig. 6, immediately previous to insertion of the filling material, and Fig. 8 shows a slab of filling material in place in the slot, but without the upper edge of the slab ironed down.

While it is not essential that my invention be employed in connection with a finishing machine, since the displacement of the coarse aggregate could be effected independently of such machine, I find it convenient to mount a cutter or dividing plate 10 on a finishing machine as shown in Fig. 1, for instance. The finishing machine may be of any well-known type having a framework 11 mounted upon flanged wheels 12 which travel along the side forms of the roadway, behind the mixing and pouring machine. At the front of the machine, a screed 13 is usually employed to level off the concrete as it is dumped upon the roadway, while at the rear end of

a machine a belt 14 is carried which is moved over the surface of the concrete to smooth the same. These parts are well-known in the art and need not be here described in detail.

To the rear of the screed 13 and approximately along the center line of the machine, I mount the cutting plate 10 which is beveled at its ends and as the machine moves along the roadway it will effect displacement of the coarser particles 15 from the zone in which the slot is to be formed.

The small particles of aggregate and the water and grout tend to fill the space left behind the cutter 10 as it moves along, thus leaving a substantially unbroken cross section of concrete whose surface may be finished without regard to the line of the slot and without interference from dividing plates such as heretofore employed.

The cutter 10 is moved forwardly and backwardly through the concrete one or more times, during the finishing operation and while the concrete is soft, hence there is no tearing or breaking up of the body while, at the same time, there is usually sufficient rigidity in the mass at the time the screed passes over the same as to prevent the coarser particles from settling back into the places which they occupied before they were displaced by the cutter.

After the surface of the concrete has been finished by the machine, the section will have the appearance shown in Fig. 6, whereupon the slot can be reformed as shown in Fig. 7, either by a hand tool or otherwise, and will frequently be reformed from a finishing bridge which is mounted upon the tracks that support the truck wheels 12 of the finishing machine, the finishing bridge being properly guided with respect to the side forms and serving as a guide for locating the line of the slot.

When the slot has been reformed as shown in Fig. 7, a slab 16 of asphalt or other suitable joint material is inserted therein. In some cases, the slab may be inserted in the section of Fig. 6 without the necessity of actually reforming the slot, since the material to be displaced may be sufficiently soft and of such fine texture as to permit it to be forced aside through the insertion of the slab.

In Figs. 2 and 3, I show a modified form of cutter for forcing aside the coarse aggregate. This cutter may be used instead of the blade 10 and comprises a wheel 18 which is journalled on a plate 19 and extends through a slot formed in the slot. The plate 19 will be suspended from the finishing machine and as the machine moves along the concrete, the wheel will function as does the blade 10. The ends of the plate 19 are curved upwardly so that they will not break up the surface of the concrete, but will keep the surface smooth and will assist in bringing grout and mortar into the groove. Such a cutter will operate satisfactorily when no belt is employed on the finishing machine and, in some instances, will operate better if no belt is used.

I claim as my invention:—

1. The method which comprises forming pavements of plaster material having fine and coarse particles, displacing the coarser particles of the material transversely of a desired dividing line, finishing the surface of the material and causing finer portions of said material to enter the space previously occupied by the said coarser particles, and thereafter displacing at least a portion of the said finer portions while the material is plastic and inserting filling material in the said space.

2. The method which comprises forming pavements of plastic material having fine and coarse particles, displacing the coarser particles of the material transversely of a desired dividing line, finishing the surface of the material and permitting finer portions of said material to enter the space previously occupied by the said coarser particles, forming a slot along the zone previously occupied by the displaced coarser particles, while the material is still plastic, and thereafter inserting the filling material in the slot.

3. The method which comprises forming a slot in concrete roadways during the process of building the same and before the material has become set, finishing the surface of the material and permitting the slot to become refilled by said material, reforming the slot after the finishing operation and while the material is still plastic, and thereafter inserting a filling material in the slot.

4. The method of forming lines of division in pavements of plastic material having fine and coarse particles, which comprises passing a cutting tool back and forth through said material along a given line, while the material is plastic, and at such rate of speed that the coarser particles of material are displaced from said line and replaced by finer particles, and thereafter displacing the said finer particles to permit the insertion of filling material.

5. The method of forming pavements of plastic material having fine and coarse particles, which comprises passing a cutting tool back and forth through said material along a given line, while the material is plastic, and at such rate of speed that the coarser particles of material are displaced from said line and replaced by finer particles, finishing the surface of said material, and thereafter displacing the said finer particles.

6. The method of forming pavements of plastic material containing a mixture of fine and coarse particles, which comprises displacing the coarser particles from the vicinity of a given line and causing the said

coarser particles to be replaced by the finer particles, and thereafter displacing the finer particles while the material is still plastic.

7. The method of forming pavements which comprises smoothing plastic concrete containing fine and coarse materials, slotting said concrete along a given line until the coarse material has been permanently displaced from said line, and finishing the surface over the line of the slot after completion of the slotting operation, and while the concrete is sufficiently fluid to effect uniting of the cleft surfaces by the fine material.

8. The method of forming pavements which comprises alternately smoothing and cleaving plastic concrete containing fine and coarse materials until the coarse material has been permanently displaced, and finishing the surface over the line of cleavage after completion of the cleaving operation.

9. The method of forming pavements which comprises alternately smoothing and cleaving plastic concrete containing fine and coarse materials until the coarse material has been permanently displaced, and performing a smoothing operation on the surface of the concrete, in a direction across the line of the slot and for the full width of the pavement.

In testimony whereof I, the said WALTER S. EDGE, have hereunto set my hand.

WALTER S. EDGE.

DISCLAIMER

1,778,451.—*Walter S. Edge*, Pittsburgh, Pa. METHOD OF AND APPARATUS FOR FORMING CONCRETE ROADWAYS. Patent dated October 14, 1930. Disclaimer filed November 9, 1933, by the assignee, *Pittsburgh Steel Company*.

Hereby enters this disclaimer to that part of the claims in said specification which appears in the following words, to wit:

"1. The method which comprises forming pavements of plaster material having fine and coarse particles, displacing the coarser particles of the material transversely of a desired dividing line, finishing the surface of the material and causing finer portions of said material to enter the space previously occupied by the said coarser particles, and thereafter displacing at least a portion of the said finer portions while the material is plastic and inserting filling material in the said space.

"2. The method which comprises forming pavements of plastic material having fine and coarse particles, displacing the coarser particles of the material transversely of a desired dividing line, finishing the surface of the material and permitting finer portions of said material to enter the space previously occupied by the said coarser particles, forming a slot along the zone previously occupied by the displaced coarser particles, while the material is still plastic, and thereafter inserting the filling material in the slot.

"3. The method which comprises forming a slot in concrete roadways during the process of building the same and before the material has become set, finishing the surface of the material and permitting the slot to become refilled by said material, reforming the slot after the finishing operation and while the material is still plastic, and thereafter inserting a filling material in the slot."

"6. The method of forming pavements of plastic material containing a mixture of fine and coarse particles, which comprises displacing the coarser particles from the vicinity of a given line and causing the said coarser particles to be replaced by the finer particles, and thereafter displacing the finer particles while the material is still plastic.

"7. The method of forming pavements which comprises smoothing plastic concrete containing fine and coarse materials, slotting said concrete along a given line until the coarse material has been permanently displaced from said line, and finishing the surface over the line of the slot after completion of the slotting operation, and while the concrete is sufficiently fluid to effect uniting of the cleft surfaces by the fine material.

"8. The method of forming pavements which comprises alternately smoothing and cleaving plastic concrete containing fine and coarse materials until the coarse material has been permanently displaced, and finishing the surface over the line of cleavage after completion of the cleaving operation.

"9. The method of forming pavements which comprises alternately smoothing and cleaving plastic concrete containing fine and coarse materials until the coarse material has been permanently displaced, and performing a smoothing operation on the surface of the concrete, in a direction across the line of the slot and for the full width of the pavement."

[*Official Gazette December 12, 1933.*]