Nov. 13, 1934. J. N. HELTZEL 1,980,523

ROAD BUILDING MACHINE

Filed Dec. 28, 1927 5 Sheets-Sheet 1

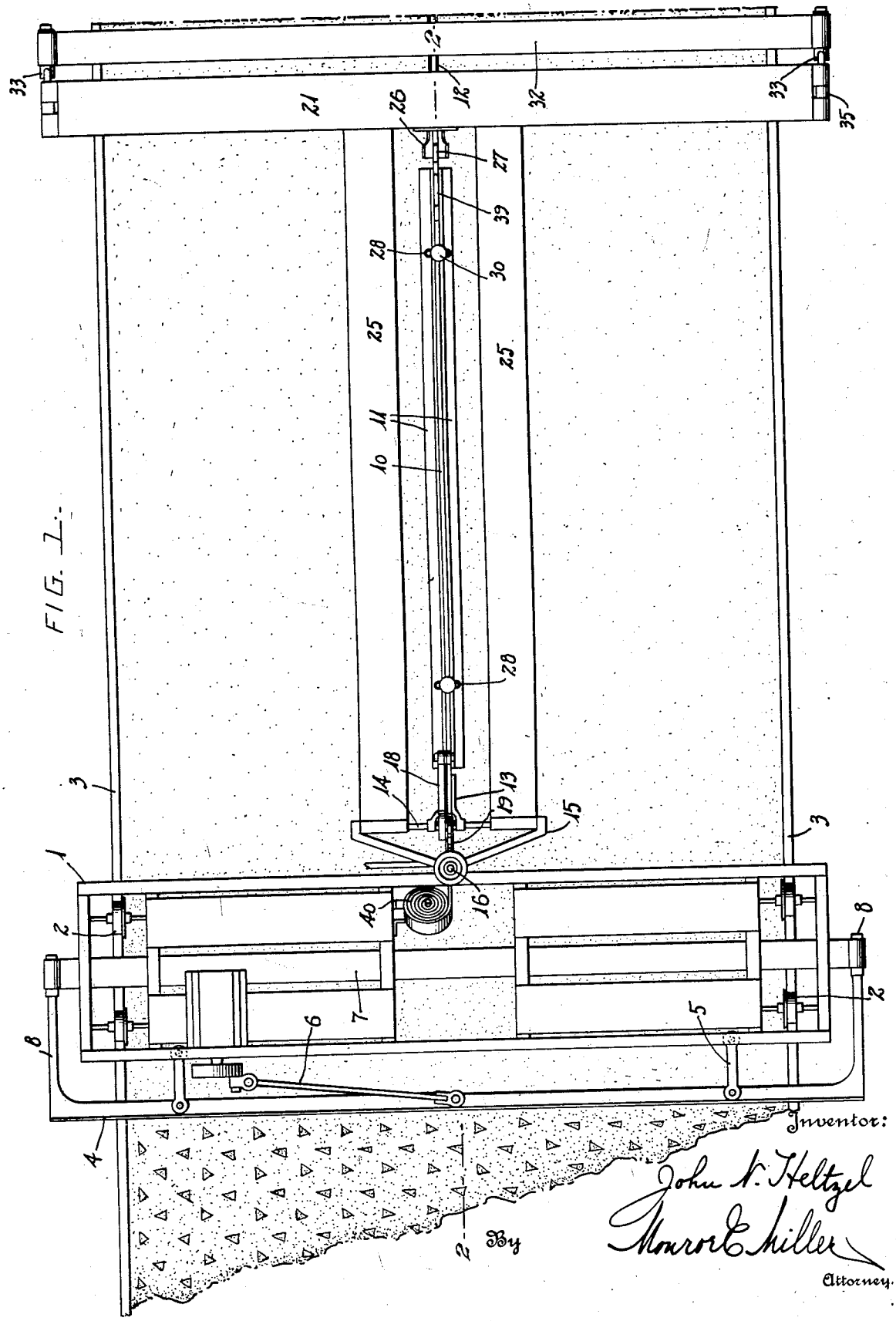


FIG. 1.

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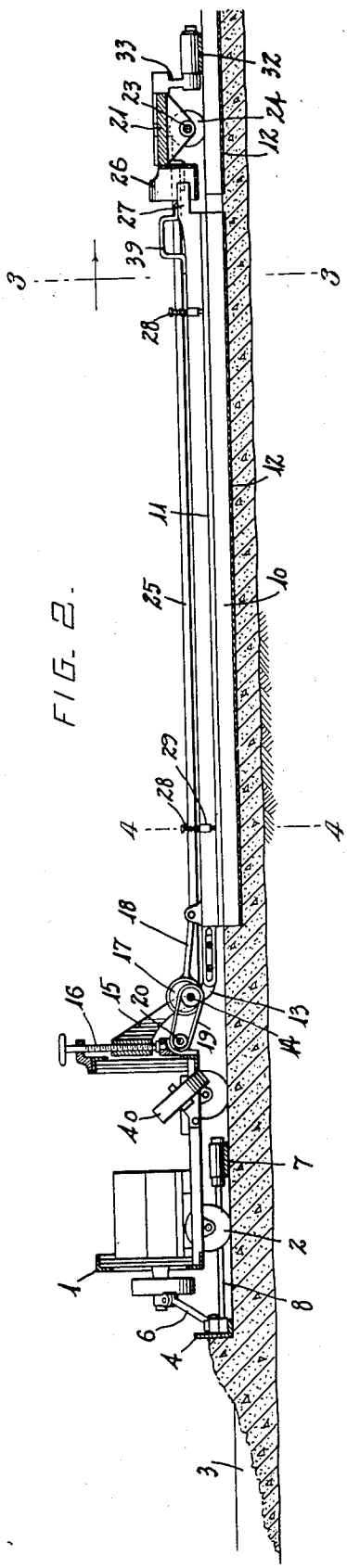


FIG. 2.

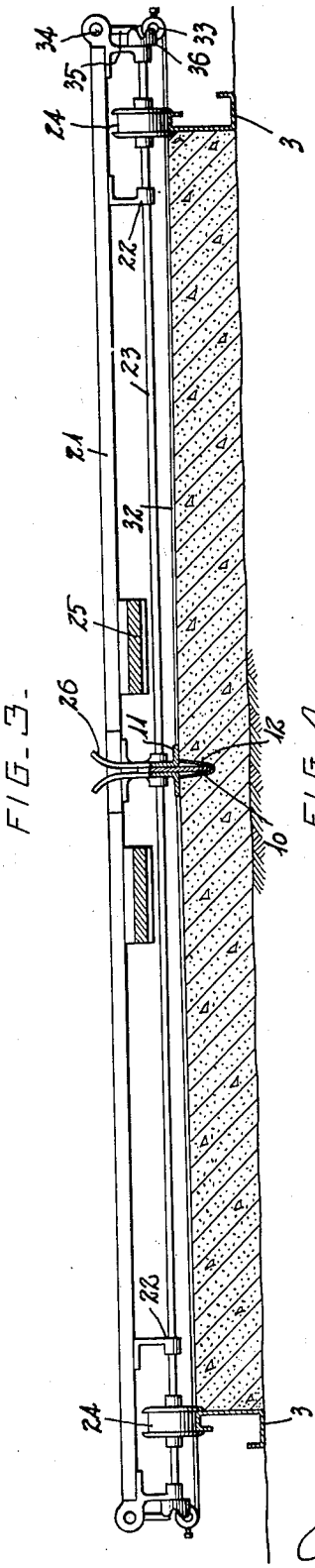


FIG. 3.

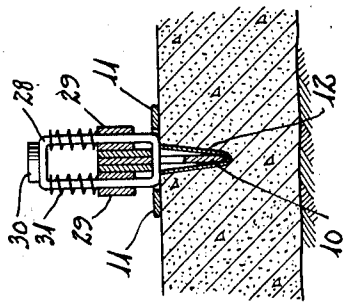


FIG. 4.

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ROAD BUILDING MACHINE.

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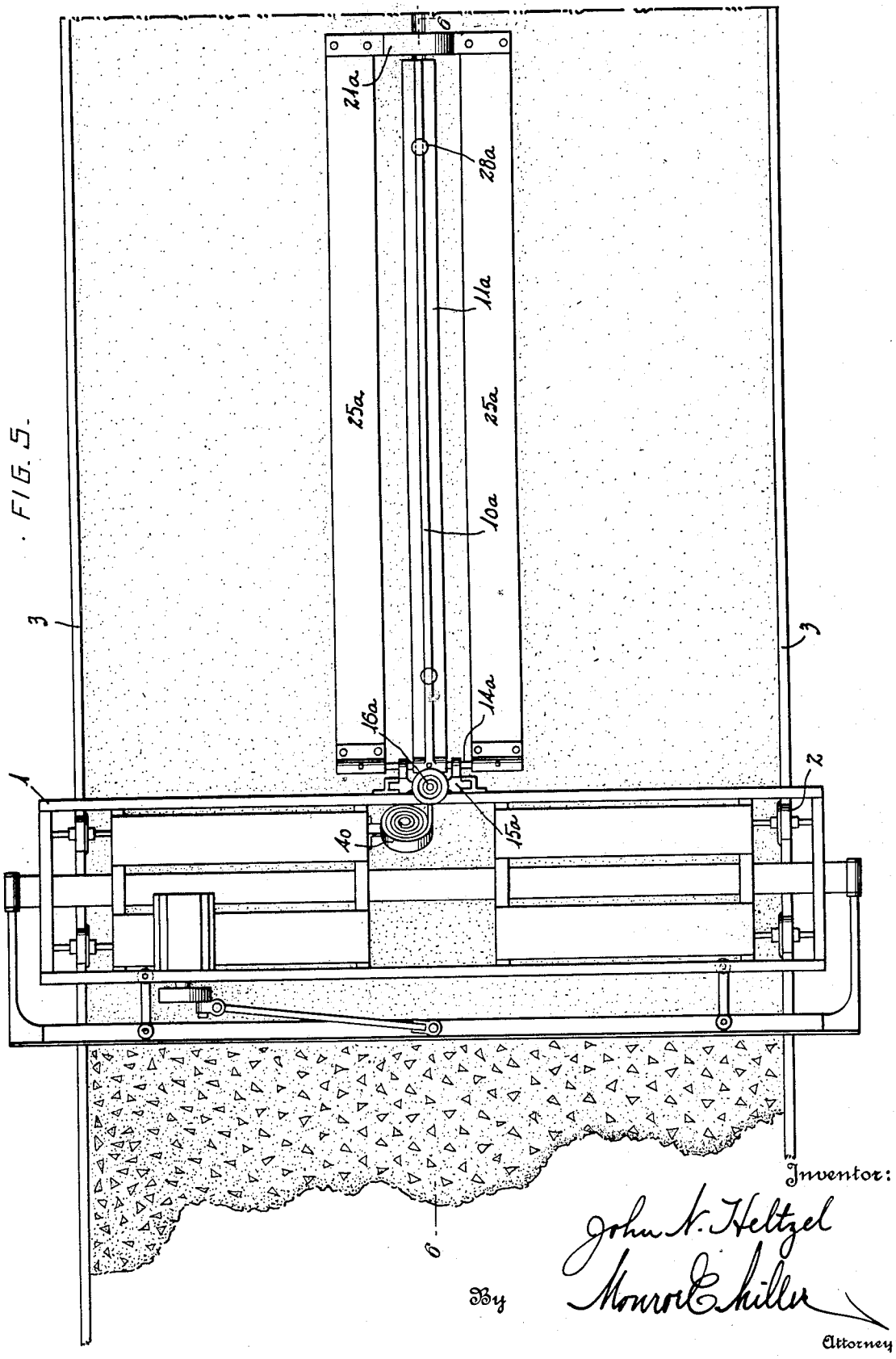


FIG. 5.

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Nov. 13, 1934. J. N. HELTZEL 1,980,523

ROAD BUILDING MACHINE

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FIG. 6.

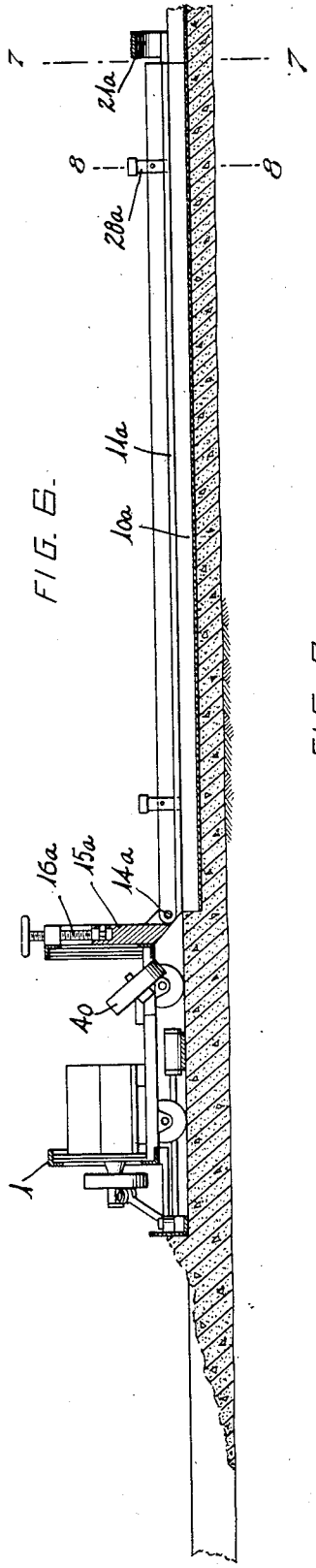


FIG. 7.

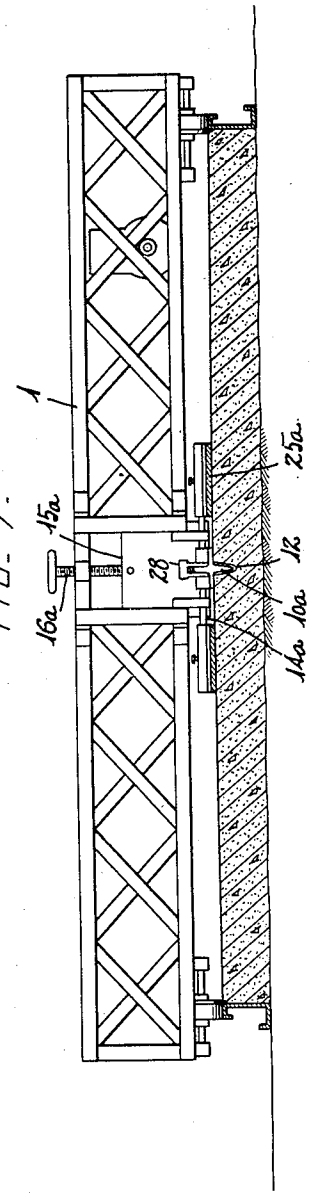


FIG. 10.

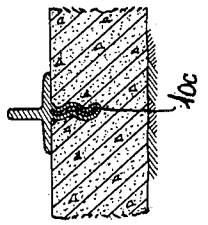


FIG. 8.

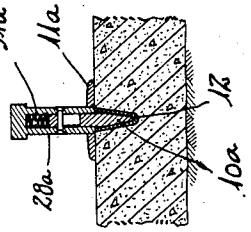
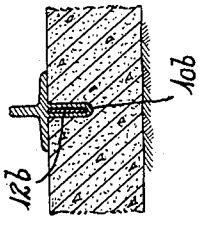


FIG. 9.



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ROAD BUILDING MACHINE

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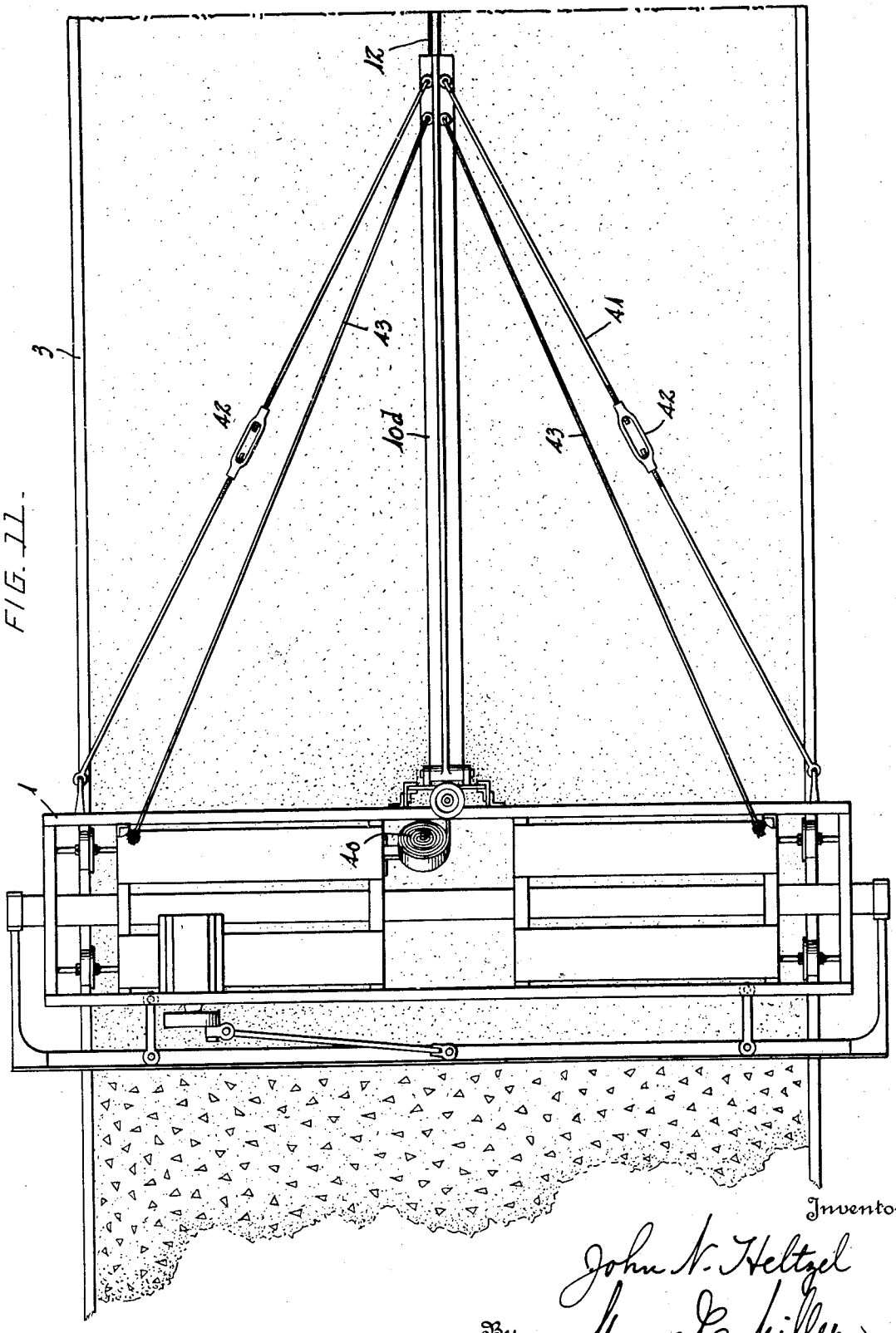


FIG. 11.

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Patented Nov. 13, 1934 1,980,523

UNITED STATES PATENT OFFICE

1,980,523

ROAD BUILDING MACHINE

John N. Heltzel, Warren, Ohio

Application December 28, 1927, Serial No. 242,985

31 Claims. (Cl. 94—51)

The present invention relates to road building and finishing machines, and aims to provide novel and improved means for producing or installing in a concrete road or similar surfacing structure a joint or traffic line, this invention being an improvement over the machines disclosed in my applications Serial No. 6,806, filed Feb. 4, 1925, Serial No. 24,801, filed April 21, 1925, Serial No. 223,161, filed Sept. 30, 1927 and Serial No. 235,977, filed November 26, 1927.

One object of the invention is the provision of a joint producing or installing blade or member capable of being swung upwardly and downwardly to be lifted from and forced into the plastic concrete.

Another object is the provision of joint installing or producing means adapted to be trailed from a finishing machine or carriage.

A further object of the invention is the provision of a joint producing or installing blade which is reciprocated longitudinally so as to have a sawing action when entering the concrete.

The invention also aims to provide novel means for mounting and guiding the joint installing blade, novel means for supporting workmen adjacent to said blade for attention thereto, and novel means for belting the surface of the concrete in rear of the blade.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a finishing machine embodying the joint installing equipment.

Fig. 2 is a longitudinal vertical section on the line 2—2 of Fig. 1.

Fig 3 is an enlarged cross section on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged cross section on the line 4—4 of Fig. 2.

Fig. 5 is a plan view of a modified form of equipment.

Fig. 6 is a longitudinal vertical section on the line 6—6 of Fig. 5.

Fig. 7 is a rear view of the machine, partly in section on the line 7—7 of Fig. 6.

Fig. 8 is an enlarged cross section on the line 8—8 of Fig. 6.

Figs. 9 and 10 are cross sections of modified forms of joint installing blades or members.

Fig. 11 is a plan view of another modified form of equipment.

The improvements are illustrated as being embodied in an attachment for a road finishing machine, comprising a carriage or bridge 1 having wheels 2 to travel on the side forms or rails 3 between which the road is built. The joint installing device may be attached to any suitable finishing machine or to a bridge or carriage movable over the plastic concrete.

The finishing machine illustrated has a screed or strike-off 4 extending across the rails 3 and connected by links 5 or otherwise with the frame of the carriage for reciprocatory movement, and the screed is reciprocated by suitable actuating means 6 driven by an engine. The finishing machine also includes a belt 7 extending across the rails 3 in rear of the screed, for belting or finishing the surface of the concrete, as well known. As shown, the belt is connected with arms 8 extending rearwardly from the ends of the screed 4 so that the screed and belt are reciprocated simultaneously as a unit.

The joint installer operates on the same general principle as the method and machine disclosed in my previous applications Serial Nos. 3,972 and 6,806, filed January 22 and February 4, 1925, respectively, and may also operate according to the general principle disclosed in applications Serial Nos. 24,801, 223,161 and 235,971. A longitudinal joint installing blade or member 10 is provided, which trails in rear of the carriage 1, and angle irons are welded or otherwise secured to the opposite sides of the blade 10 to provide outstanding flanges 11 to contact with the surface of the concrete when the blade is forced down into the concrete, as seen in Figs. 3 and 4, said flanges serving to smooth the concrete along the opposite sides of the groove. As shown in Figs. 2, 3 and 4, the blade 10 is employed for forcing or depositing a doubled joint strip 12 of V-shaped section in the plastic concrete.

The forward end of the blade 10 is connected, by a pin and slot or other joint, for longitudinal sliding motion with an arm or member 13 mounted for turning movement on a transverse shaft 14, thereby permitting the blade to be swung upwardly and downwardly away from and to the concrete. The sliding connection also permits the blade to be reciprocated longitudinally for the purpose which will hereinafter more fully appear. The shaft 14 is mounted in a bracket 15 that is hingedly connected with the carriage 1 for oscil-

lation about a vertical axis, thereby permitting the blade 10 to swing sidewise of the road, such as when negotiating curves. As shown, the bracket 15 is mounted on a vertical screw 16 which may be turned for adjusting the bracket 15 and forward end of the blade upwardly and downwardly, for the proper operation of the blade in the concrete.

In order to reciprocate the blade, an eccentric 17 is mounted on the shaft 14 and is connected by a rod 18 with the blade 10, and said eccentric is connected by a sprocket chain 19 or other suitable gearing with a shaft 20 on the carriage 1 which supplies the power. The blade may be swung upwardly and downwardly on the shaft 14 without interfering with the operative connection between the blade and shaft 20.

A transverse platform 21 is disposed in rear of the blade across the road, and has bearings 22 mounted on a shaft 23 on which wheels 24 are secured to move on the form rails 3, said wheels being adjustable on the shaft 23 for roads of different widths.

Longitudinal platforms 25 are disposed at the opposite sides of the blade, and their forward ends are connected with the shaft 14 and their rear ends are connected with the platform 21, so that said platforms are trailed from the carriage 1 and will support workmen at the sides and rear end of the blade for attention to the blade and joint produced thereby.

The platform 21 carries a guide 26 to receive a portion 27 extending from the rear end of the blade, so as to guide the rear end of the blade to proper position transversely of the road, thereby maintaining the blade in the proper longitudinal line.

The blade 10 has kick-off members for loosening the strip 12 from the blade. These members 28, as seen more clearly in Fig. 4, are of O shape and slide in guides 29 secured to the blade at opposite sides thereof above the flanges 11, and the lower portions of said members work in slots in the flanges 11 and blade 10 so as to contact with the edges of the strip 12. The members 28 have striking portions 30 at their upper ends to be hit by a hammer or other implement so as to drive the strip 12 from the blade. The members 28 are normally retracted by springs 31 thereon between the bearings or guides 29 and the upper ends of said members.

A belt 32 is disposed in rear of the platform or supplementary bridge 21 to finish the surface of the concrete after the joint is installed. The ends of the belt are connected to or wound upon crank arms 33 suspended from rock shafts 34 journaled in bearings at the ends of the platform 21, and said shafts have arms 35 engaged by cams 36 on the ends of the shaft 23, whereby the rotation of the wheels 24 will, through the cams 36 and arms 35, oscillate the arms 33 and thereby reciprocate the belt 32.

With the present machine, the joint is produced or installed immediately in rear of the finishing equipment. When the carriage 1 has advanced a distance slightly greater than the length of the strip or joint section 12 to be installed, with the blade 10 raised, said blade having a handle 39 for conveniently lifting it. The blade swings upwardly on the shaft 14, and the strip 12 may then be conveniently placed on the blade with its edges contacting with the flanges 11. The blade may then be swung downwardly forcibly or may be permitted to swing downwardly by gravity so that the strip 12 is forced down into the plastic concrete. The reciprocation of the blade 10 will also reciprocate the strip 12 as the strip is forced down into the plastic concrete, thereby creating a sawing action to facilitate the movement of the blade and strip into the concrete. The extension 27 of the blade moving down into the guide 26 will bring the rear end of the blade and strip into registration with the previous strip 12 installed, there being a slight clearance between the strips to permit the strip which is being installed to be reciprocated. When the strip has been installed, the kick-off members 28 are struck, so as to loosen the strip from the blade, and the blade may then be raised to receive the next strip.

It is also possible to swing the platforms upwardly on the shaft 14, and the blade will be raised with the guide 26, the lower end of said guide being closed for the contact of the extension 27. Thus, the blade or the platforms and blade may be raised upwardly off the road, when desired.

Said blade and platforms trail from the carriage 1 in order that the machine may negotiate curves in the road.

Figs. 5, 6, 7 and 8 illustrate a modification. The blade 10*a* has integral outstanding flanges 11*a* at opposite sides, and has its forward end mounted on a transverse shaft 14*a* carried by a vertical slide 15*a* mounted on the carriage 1. Said slide is adjusted vertically by an adjusting screw 16*a*.

The longitudinal platforms 25*a* are connected at their forward ends with the shaft 14*a* and ride on the concrete, and the rear ends of said platforms are connected by a yoke 21*a* bridging the joint in rear of the blade 10*a*. The blade and platforms may be independently raised on the shaft 14*a*.

The kick-off members 28*a* are bifurcated to straddle the blade 10*a* and slide through the flanges 11*a*, and the springs 31*a* are confined within said members and seat on the blade 10*a*, as seen in Fig. 8. The vertical movement of the members 28*a* may be limited by pin and slot connections between said members and blade, as seen in Fig. 8.

Fig. 9 illustrates a tubular blade or member 10*b* through which a strip 12*b* of suitable material may pass to be deposited in the concrete in rear of the blade as disclosed in applications Serial Nos. 24,801, 223,161 and 235,977. With this type of blade or installer the blade need not be lifted from the concrete, such as when using the strips 12. The blade may be of various formations or cross-sections. For example, Fig. 10 shows the blade 10*c* corrugated longitudinally in order that the strip will be of similar cross-section when deposited in the concrete. The strip may be supplied from a roll 40 mounted on the carriage 1, as seen in Figs. 1, 2, 5 and 6, and when using the hollow blade through which the strip passes, the kick-off members are not used. The roll 40, as seen in Figs. 1, 5 and 11, is supported on a suitable bracket, and the strip may pass from the roll into the hollow blade without difficulty, the strip being bent between the roll and blade so as to enter the blade. The different blades may be used interchangeably under different conditions and for producing the different types of joints. The joints may also serve as traffic lines, and will control the longitudinal breaking of the concrete, the fractures occurring below the joint. When using the strips or joint forms 12, they are removed after the concrete has set, and the grooves are filled with

tar, asphalt or other suitable sealing material.

Fig. 11 illustrates a joint installing blade 10*d* trailed from the carriage 1, and oblique braces or stays 41 connect the rear terminal of the blade and the carriage 1 to maintain the rear end of the blade in proper position transversely of the road in the longitudinal line of the joint. Said braces have turnbuckles 42 for adjustment. Cables 43 are connected with the blade and frame 1 for raising the blade to receive the joint strip thereon.

The joint producing or installing device may be attached to any suitable concrete finishing machine, concrete mixer, or other device movable over the road under construction, or on the subbase or form rails. The longitudinal blade may also be trailed from the finishing machine, carriage, or the like, to separate the stones and other coarser aggregate. Thus, in the separation of coarser aggregate, into which separation the cement and finer material may flow, there may be deposited a joint form or a premolded joint strip. The joint form may be subsequently removed to provide an open groove which may be filled with suitable plastic material, or an open groove may be formed by the blade to be filled with such plastic material. The premolded joint strip when forced into the groove or separation may be permanently left in place to provide the joint.

It is understood that when the type of joint is used as disclosed in Figs. 8 and 9, the longitudinal joint member 11*a* may be swung upwardly radially from the pivot 14*a*. The joint material may be attached to the longitudinal joint member 11*a* and the member raised out of contact with the concrete radially from the pivot point 14*a* and dropped from a convenient height and the impact by the falling force of the blade in the plastic concrete will shear the concrete, forcing the joint strip into the plastic material, or if the joint strip is not attached to the blade 11*a*, the blade may be used for producing a cleft in the plastic concrete by the blade as described.

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

1. A carriage movable over plastic concrete, a joint installing blade hingedly connected at one end with the carriage to swing upwardly and downwardly, and means for positioning the free end of the blade when the blade enters the concrete.

2. A carriage movable over plastic concrete, a joint installing blade having one end hingedly connected with the carriage for the upward and downward swinging movement of the blade, and means for guiding the free end of the blade into a predetermined line when the blade is moved to the concrete.

3. A carriage movable over plastic concrete, a joint installing means trailing from the carriage, and a platform trailing from the carriage adjacent to said means, said means and platform being free at their rear portions for movement with reference to the carriage.

4. A carriage movable over plastic concrete, a joint installing blade trailing from the carriage, and platforms at opposite sides of said blade also trailing from the carriage, said blade and platforms being free at their rear portions for movement relatively to said carriage.

5. A carriage movable over plastic concrete, a blade hingedly connected with and trailing from the carriage to swing upwardly downwardly, and a platform trailing from the carriage, said platform having guiding means for the free end of the blade.

6. A carriage movable over plastic concrete, a joint installing blade hingedly connected with and trailing from said carriage, a platform hingedly connected with and trailing from the carriage, said carriage and platform having wheels to travel on side form rails.

7. A carriage having wheels to move on side form rails of a concrete road under construction, a joint installing blade trailing from the carriage, longitudinal platforms at opposite sides of the blade also trailing from the carriage, means connecting said blade and platforms with the carriage for upward and downward and transverse swinging movements, a transverse platform connected to the rear ends of the longitudinal platforms and having wheels to move on said rails, and a guide for the rear end of the blade carried by said platforms.

8. A carriage movable over plastic concrete, a joint installing blade hingedly connected at one end with the carriage so that its opposite end may be swung upwardly and downwardly, and means for reciprocating said blade longitudinally.

9. A joint installing blade to receive a joint and deposit same in plastic concrete, and kick-off means carried by the blade operable to loosen the strip therefrom.

10. A carriage movable over plastic concrete, joint installing means trailing from the carriage, a platform also trailing from the carriage adjacent to said means, said means and platform being free at their rear portions for movement with reference to said carriage, and belting means carried by the platform to operate on the plastic concrete in rear of said means.

11. A device of the character described comprising a carriage, joint installing means, means for guiding one end thereof, and means for connecting the other end of said joint installing and the guiding means with said carriage for the upward and downward swinging movement of said installing means.

12. A device of the character described comprising a carriage joint installing means, and means for hingedly connecting said means with said carriage so that the installing means trails from the carriage and is movable transversely of the carriage at the rear end of the installing means.

13. A device of the character described comprising a carriage, joint installing means, a guide for one end of said means, means for supporting said guide from the side rails of a road under construction, and means for connecting said installing and second-named means with said carriage for trailing motion to permit said means to move transversely of the carriage.

14. A device of the character described comprising a carriage, joint installing means, and means connecting one end of said joint installing means with the carriage so that the other end of said joint installing means may be swung downwardly and upwardly into and from the concrete.

15. A device of the character described comprising a carriage, joint installing means trailing from said carriage, and means connecting the forward end of said joint installing means with the carriage for the transverse movement of the rear end of said joint installing means relatively to the carriage.

16. A device of the character described com-

prising a carriage, a joint installing blade, and means hingedly connecting the forward end of the blade with the carriage for the downward and upward swinging movement of the blade into and from the concrete.

17. A device of the character described comprising a carriage, joint installing means, and means connecting the forward end of said joint installing means with the carriage so that the rear end of said joint installing means may be moved upwardly, downwardly and transversely relatively to the carriage.

18. A device of the character described comprising a carriage, a joint installing blade, and means hingedly connecting the forward end of said blade with the carriage so that the rear end of the blade may be swung upwardly, downwardly and transversely relatively to the carriage.

19. A device of the character described comprising a wheeled frame and reciprocating trailing joint blade and means hingedly connecting the forward end of said blade with the frame so that the rear end of the blade can be swung transversely and relatively to the frame.

20 A device of the character described, comprising a wheeled frame spanning a roadway; a longitudinal reciprocating blade, having spaced side walls, and joint strip, passing longitudinally between the side walls, to be deposited in the plastic concrete, the reciprocating blade agitating the concrete to solidify the material and prevent voiding or honeycombing of the material adjacent to the blade and joint strip.

21. The method of producing joints in a concrete surfacing structure, consisting of applying a joint member to a longitudinal blade, dropping the blade and member by gravity or force into plastic concrete, finishing the material adjacent to the blade, then releasing the joint member from the blade, raising the blade from the plastic material, leaving the joint member deposited in the plastic concrete.

22. A machine of the character described, comprising a frame adapted to be supported by side forms, a cutting device carried by said frame and arranged to cut both forward and backward, means for spacing said cutting device a predetermined distance from side forms with which the frame is employed, a transversely-oscillating finishing screed, and a transversely oscillating finishing belt carried by said frame.

23. A machine of the character described comprising a frame adapted to be supported by side forms, a joint slot cutting device carried by said frame and arranged to cut both forward and backward, a transversely-oscillating finishing screed, and a transversely-oscillating finishing belt carried by said frame.

24. A grooving device for plastic material comprising means arranged to cut both forward and backward to form a joint slot, and finishing means movable transversely on the surface of the material in front of and behind said first means.

25. A machine of the character described comprising a carriage, a transversely-moving screed on the forward portion of the carriage, finishing means on the carriage behind the screed, and a longitudinal cutting device arranged to cut both forward and backward on the carriage between the screed and finishing means.

26. A machine of the character described comprising a carriage, a screed on the carriage, a transversely-moving finishing means on the carriage back of the screed, and a longitudinal cutting device arranged to cut both forward and backward between the screed and finishing means.

27. A grooving device for plastic roads comprising means arranged longitudinally of the road to cut both forward and backward, and finishing means following the cutting means and moving across the longitudinal cleavage.

28. A grooving device for plastic roads comprising a longitudinal cutter arranged to cut both forward and backward, means whereby said cutter is moved forward and backward, and a transversely-moving finishing means operating over the longitudinal cleavage made by said cutter.

29. The method of grooving plastic roads which consists in transversely screeding the plastic material, moving a cutting tool forward and backward in a direction longitudinally of the road in the plastic material following the screeding action, and finishing the surface of the material by transverse movement over the longitudinal cut.

30. A machine of the character described, comprising a wheeled carriage supported on side forms and spanning a road under construction, a joint grooving implement carried by the machine arranged to cut backward and forward longitudinally of the road, a transversely oscillating screed carried forwardly of the machine in advance of the grooving implement, and a transversely oscillating surfacer to float the plastic concrete rearwardly of the said grooving implement.

31. A machine of the character described, comprising a wheeled carriage supported on side forms and spanning a road under construction, a joint cutting device carried by the machine arranged to cut both forward and backward, means for supporting the cutter a predetermined distance from the side forms, a transversely oscillating screed, and a transversely oscillating finishing belt carried by the carriage.

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