Feb. 18, 1969 A. J. VAN DER MEIJDEN 3,427,936

METHOD FOR PAVING A STREET

Filed Aug. 1, 1966

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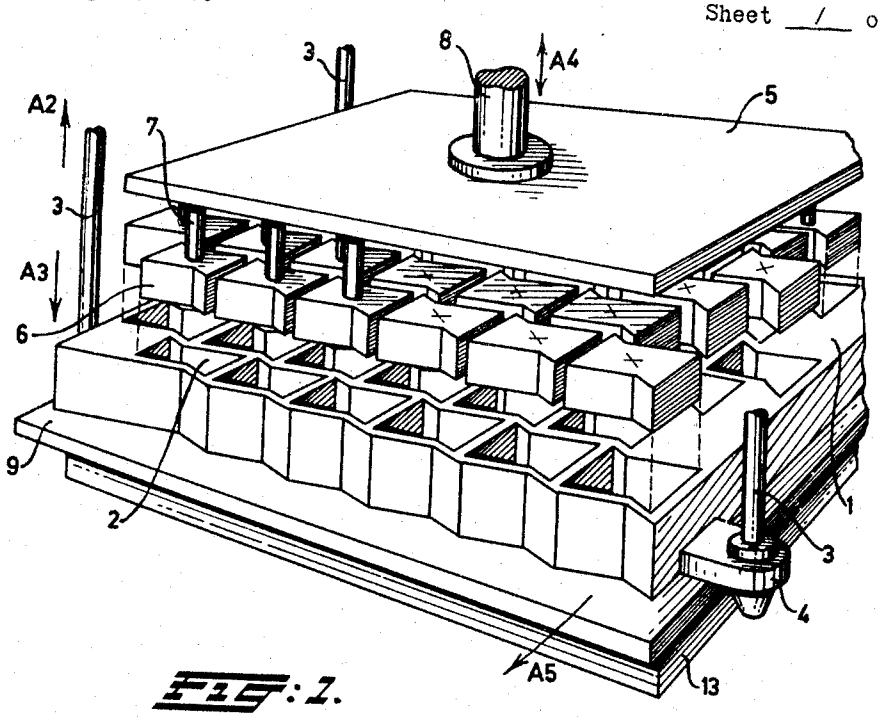


FIG: 1.

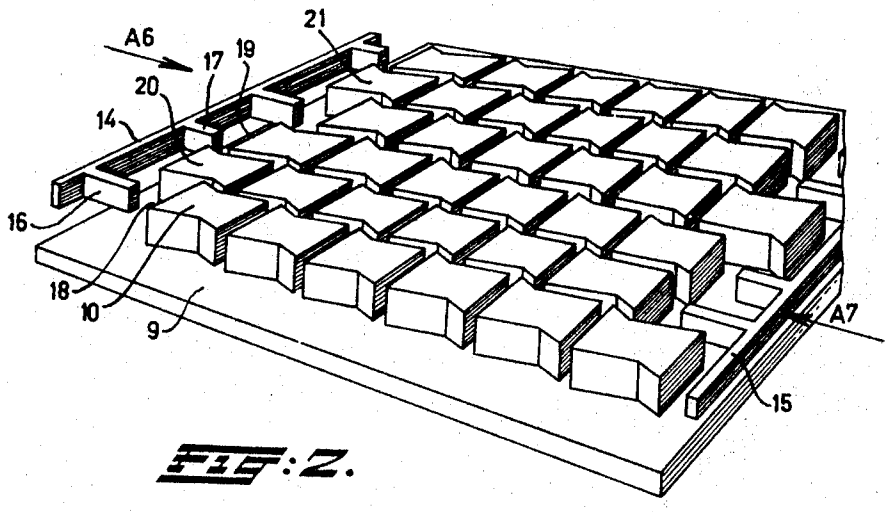


FIG: 2.

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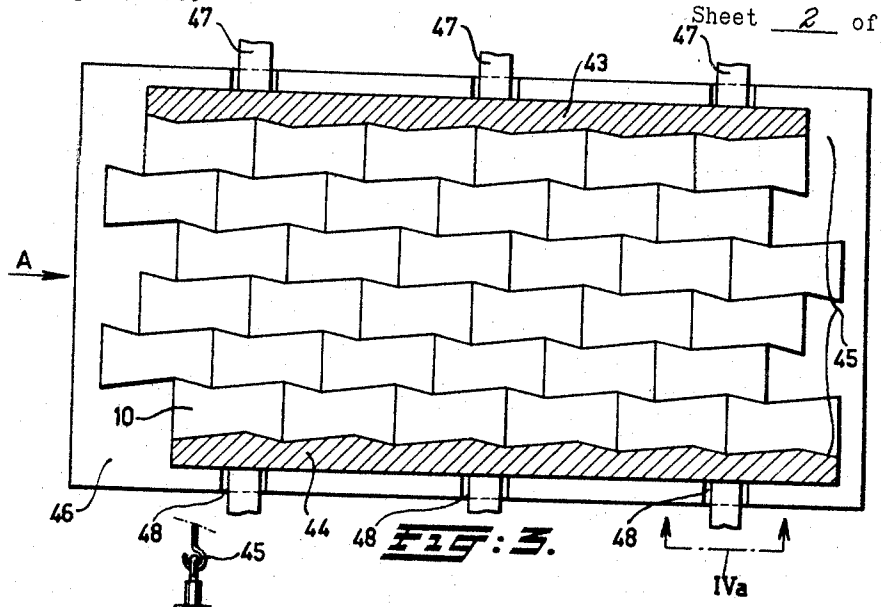


FIG: 3.

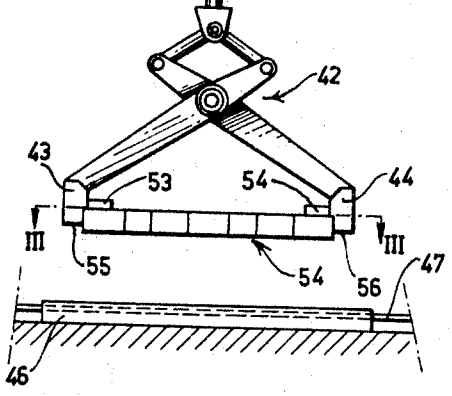


FIG: 4.

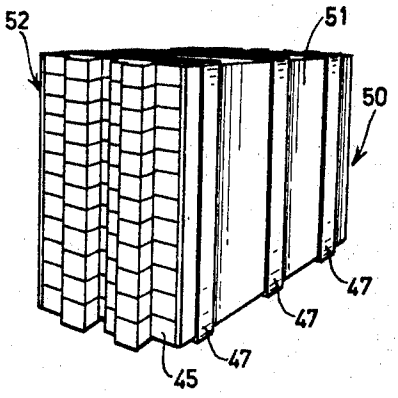


FIG: 5.

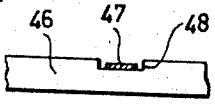


FIG: 4a.

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FIG: 6.

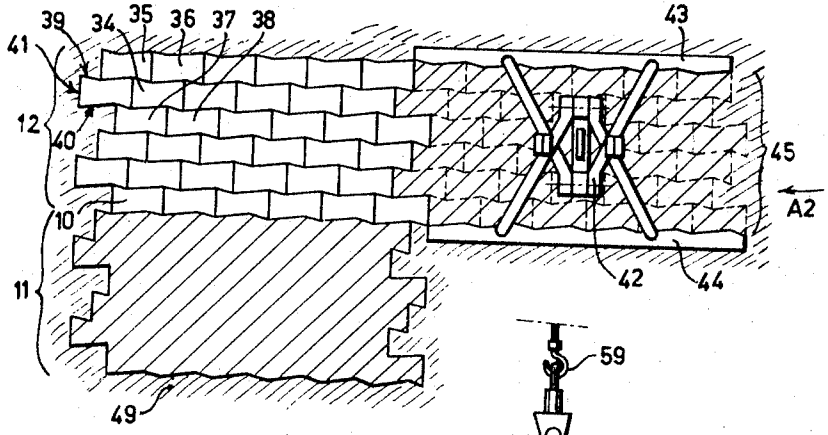
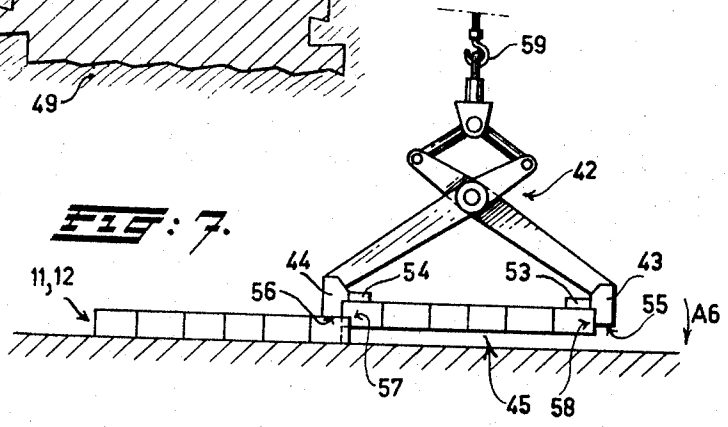


FIG: 7.



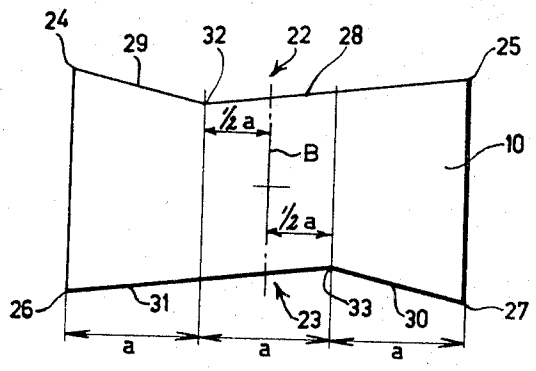


FIG: 8.

BY Breitenfeld + Levine

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3,427,936

METHOD FOR PAVING A STREET

Antonius Johannes Van der Meijden, Boslaan 63, Son, Netherlands

Filed Aug. 1, 1966, Ser. No. 569,515
U.S. Cl. 94—22 1 Claim
Int. Cl. E01c 5/04, 5/06; B28b 15/00

ABSTRACT OF THE DISCLOSURE

Bricks are formed in mold having a plurality of rows of cavities mutually arranged according to the arrangement of bricks in the paved street. Mold removed while bricks still soft, and after bricks dry they are pushed together to form paving unit. Paving units piled on one another to form transportable stack. At the site, paving units are grasped by a clamp and deposited one after another on to the street bed.

My invention relates to a method for paving a street by means of paving bricks and to paving bricks adapted for use in this method.

In the past, bricks were deposited one by one in a suitable configuration on the street bed, which required much manual labour in open air under varying circumstances of weather.

It is an object of the invention to avoid manual labour to a great extent in paving streets by means of bricks.

It is a further object of the invention to make favourable use of the fact that modern means allow the street bed to be prepared in such a way, that bricks can be laid on the bed without the necessity of bedding each brick in the underlayer: it is sufficient to fill the joints between the bricks with sand spraying devices and other known means when the pavement has been laid.

It is another object of the invention to have the greater part of the work of composing a street pavement from bricks carried out in a central workshop and under more favourable working conditions than on the street in open air.

It is also an object of the invention to execute the work of brick-laying by mechanical means which are movable on the pavement already laid so that the prepared street bed is left undisturbed by machinery and workers. Until now the brick laying work was always done from the side of the unpaved street bed where the workers kneeled to add stones to the end of the pavement already laid.

These and other objects of the invention and the method and means by which they are obtained will become more clear from the following description which is given by way of example and with reference to the figures of the drawing.

FIGURE 1 is a perspective view of a mould wherein bricks are manufactured in a shape, number and mutual arrangement so as to make it possible to achieve the inventive method of paving streets in a simple and effective way;

FIGURE 2 is a perspective view of a brick bearing plate after removal from the mould;

FIGURE 3 is a top view and partly a cross section in a plane as indicated by the line III—III in FIGURE 4 of a similar group of bricks clamped between transport means above a plate arranged for packaging purposes;

FIGURE 4 is a side view of a smaller scale than FIGURE 3 viewed in the direction of the arrow A in FIGURE 3;

FIGURE 4*a* is a side view of a detail which is indicated in FIGURE 3 by IV*a*;

FIGURE 5 is a perspective view of a pile of pavement parts tied up as a transportable parcel, each pavement

part corresponding to a layer or group of bricks as shown in FIGURE 3;

FIGURE 6 is a schematic top view of three pavement units composed of bricks showing how these units are arranged on the street bed;

FIGURE 7 is a side view of FIGURE 6 in the direction of the arrow A2 in FIGURE 6;

FIGURE 8 is a top view of a larger scale on a brick which is shaped for the purposes of the present invention.

In FIGURE 1 a mould **1** comprises a number of cavities such as indicated by **2**. The mould **1** is movable in an upward and downward direction (see arrows A2, A3) by means of bars **3** which are fixed to the mould **1** as indicated at **4**. A plate **5** carries a number of dies such as indicated by **6** by means of bars such as indicated by **7** for the die **6**. Bars **7** have been drawn in FIGURE 1 for some of the dies **6**, for other dies only the spot where a bar **7** would be fixed to the die is indicated by a small cross. As usual for a die mould the outer dimensions of each die **6** correspond to the inner dimensions of a mould cavity **2**. The die bearing plate **5** is movable in upward and downward direction (see arrow A4) by means of a bar **8** which is fixed to the middle of the plate **5**. FIGURE 1 is only intended to illustrate the general shape and arrangement of the cavities in a mould for the purposes of the invention and therefore the bearing means have been shown only partly and schematically. It will be understandable that driving and guiding means as known in the art of die mould presses, which are not shown in the drawing, can be applied.

In FIGURE 1 the mould **1** is shown in its lowest position wherein it rests upon a common bottom plate **9** for the cavities **2**. For moulding bricks these cavities are filled with a brick forming mass, e.g., of water, cement and additional substances whereupon this mass is pressed by means of the dies **6** in a downward movement of the plate **5**. Thereupon the mould **1** is moved in upward direction, the dies being kept in position which causes brick shaped bodies such as indicated by **10** in FIGURE 2 to be left behind on the plate **9** having undamaged surfaces though they have been removed from the mould immediately after their moulding. It will be clear from FIGURE 1 that for this purpose the dies **6** are fixed by means of bars **7** at such a distance from the lower side of the plate **5** that the mould **1** can be moved upward along the dies **6** in their lowered position until the lower edges of the cavities **2** have left the upper surface of the moulded brick shaped bodies **10**.

Now referring also to FIGURE 6 it can be seen that in the street pavement each unit of bricks, such as indicated e.g. with hatched lines at **11** and drawn out at **12** comprises six longitudinal rows of bricks, which are in mutual engaging position corresponding with the desired bond in the street pavement. These units are laid down each as a whole on the street bed and they have obtained the desired arrangement of the mutual engaging bricks in each unit already in the mould **1** of FIGURE 1 wherein the bricks were manufactured.

In FIGURE 1 the press foundation **13** upon which the bottom plate **9** rests can be thought of as a part of a track along which each plate **9** after the moulding of stones thereon is shoved in the direction of the arrow from under the press and followed up by another similar plate which is shoved from the back side in FIGURE 1 after the plate **9** under the press when the dies have been moved upward after a pressing operation.

In a hardening process of the bricks **10** on the plate **9** in FIGURE 2 the spaces between the bricks may be used for blowing hot air therethrough in order to shorten the hardening process.

FIGURE 2 shows also schematically rulers **14** and **15** which are horizontally movable in the direction of arrows

A6 and A7, respectively, in order to press the bricks against each other in the longitudinal direction of the brick-rows until the small end faces of the bricks meet each other. The rulers are provided with inwardly directed legs such as **16** and **17** of different lengths which meet the indented faces of bricks at the same time that the inner side of the ruler **14** meets the end faces of the bricks **20** and **21**. In some cases when the joints between the bricks are small, however, the rulers **14** and **15** can be omitted and the transport of a unit can be carried out with the sole clamping means as will be described hereinafter.

However, for a good understanding of the engagement between the bricks of adjoining rows the shape of the bricks will be described which is favourable for a simple manner of transport of the units. As appears from FIGURE 8 two opposite sides **22** and **23** of the brick **10** each taper inwardly from the corners **24**, **25** and **26**, **27**, respectively, along straight faces **28**, **29** and **30**, **31**, respectively, meeting each other at points **32** and **33**, respectively, at a distance ½ *a* from the middle plane of the brick indicated by the dotted line B, wherein *a* is ⅓ of the length of the brick. This length (from corner **24** to corner **25**) is in a practical example 21 cm. and the width (**25–27**) 12 cm. The meeting point **33** is at a distance of 7 cm. from the small end face **25–27** of the brick and at a distance of 1.75 cm. from the horizontal line **26–27** and the dimensions on the other side **22** or the stone are the same for the point **32** with respect to the end face **24–26** and the line **24–25** respectively. The face **28** is parallel to the face **31** and the face **29** is parallel to the face **30**.

Now in the rows of bricks in the pavement units such as **12** (FIG. 6) each brick such as **34** is engaged by two bricks **35**, **36** and **37**, **38** on each of two opposite longitudinal sides **39**, **40** of the considered row **41**. From FIGURES 6 and 8 it becomes clear that for the border line **24**, **29**, **32**, **28**, **25** along which a brick **34** in one row **41** is engaged by two bricks **35** and **36** in an adjoining row is triangular and that each of the last mentioned bricks covers one side of the triangle **24**(**32**, **25** by a part of its corresponding border line.

Because the spots **32** and **33** defining the places where the sides **22** and **23** reach their most inward point are shifted in opposite directions from the middle plane B the mutual engagement is obtained without diminishing the cross section of the brick at any place to an undesirable extent.

The engagement between the rows as described enables the transport of brick units by clamping means which engages only two opposite longitudinal outer sides of two outer rows without danger that bricks would fall out from the open ends of the unit.

The clamping means consist, as shown in FIGURES 3, 4, 6 and 7, in a scissor-mechanism **42** comprising two jaws **43** and **44**. The scissor device has been drawn only in the way of a very general indication, in practice different constructions of this general type can be applied which are known in the art. The main point is that the jaws **43**, **44** can be brought each along one of opposite sides of a unit of bricks as shown in FIGURES 3 and 6 and the unit will be clamped automatically between the jaws when the device **42** is lifted by means of a hook **59** which is a part of a derrick.

In FIGURES 3, 4 and 4*a* the unit indicated by **45** in these and following figures is being replaced from the plate **9** of FIGURE 2 to a plate **46** wherein tie means such as metal ribbons **47** are arranged in grooves **48** of the plate. Several layers of bricks, each arranged as a part of a continuous street pavement to be laid down on a street bed **49** as shown in FIGURE 6, are piled one upon the other in order to shape a parcel **50** for transport as shown in FIGURE 5. In this example the parcel

50 comprises 12 layers and the straps **47** are tied up along the longitudinal sides of the parcel **50** after covering these sides by boards **51** and **52** which are tied within the parcel. The piling can be done directly upon a break down lorry which can be driven with a full load of brick parcels to the part of the street pavement which has been finished already. The parcels are untied there and the units such as **45** are clamped one by one by similar means as shown in FIGURES 3 and 4, for which a derrick on the break down lorry can be used and unloaded directly on their definite spot in the street pavement as shown in FIGURES 6 and 7.

FIGURE 7 shows at the same time that inwardly protruding stop members **53**, **54** on the inner sides of the jaws **43**, **44** come to rest upon the upper edge of the unit of bricks **45** so that there is some distance between the lower sides **55**, **56** of the jaws and the lower edge of the brick unit. Thanks to that arrangement the left hand side of the unit **45** can be brought into catching engagement with the right hand side of the unit **12** before the hook **59** of the scissors-device **42** is let down so far that the jaws **43**, **44** loosen their grip in the unit of bricks **45**. This will occur in a position wherein the unit **45** has made a small turn in the direction of the arrow A6 around the edge **57** where the lower side **56** of the jaw **44** rests upon the unit **12** until the edge **58** of the unit is supported by the street bed.

Having thus described the invention and manner of its operation what I claim as my invention is:

1. A method of paving a street with paving units made up of prearranged bricks, comprising the steps of molding a plurality of rows of bricks constituting a paving unit in a cellular mold, the walls of each cell converging from its ends toward its center and the cells in each two adjacent rows being offset with respect to one another to approximate the pattern in which the bricks are laid on the street bed; removing the cellular mold to leaves spaces between the bricks; curing the bricks, the spaces between the bricks assisting in the curing process; pushing the ends of all the rows of bricks inwardly simultaneously until the opposed ends of the bricks in each row contact each other; engaging the sides of the paving unit by means of a brick carrier thereby pushing the bricks inwardly until the opposed sides of the rows of bricks contact each other to produce the final brick arrangement of the paving unit; piling a number of the units one upon another to form a stack; transporting the stack to a street bed to be paved; grasping the units of the stack in succession between clamping jaws acting on the outer faces of the outer rows of bricks in the unit; and depositing the units one after another onto the street bed in side-by-side and end-to-end relation.

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JACOB L. NACKENOFF, *Primary Examiner.*

U.S. Cl. X.R.

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