May 11, 1926. 1,583,915

G. A. COATS

PAVEMENT HEATER

Filed Feb. 10, 1925 2 Sheets-Sheet 1

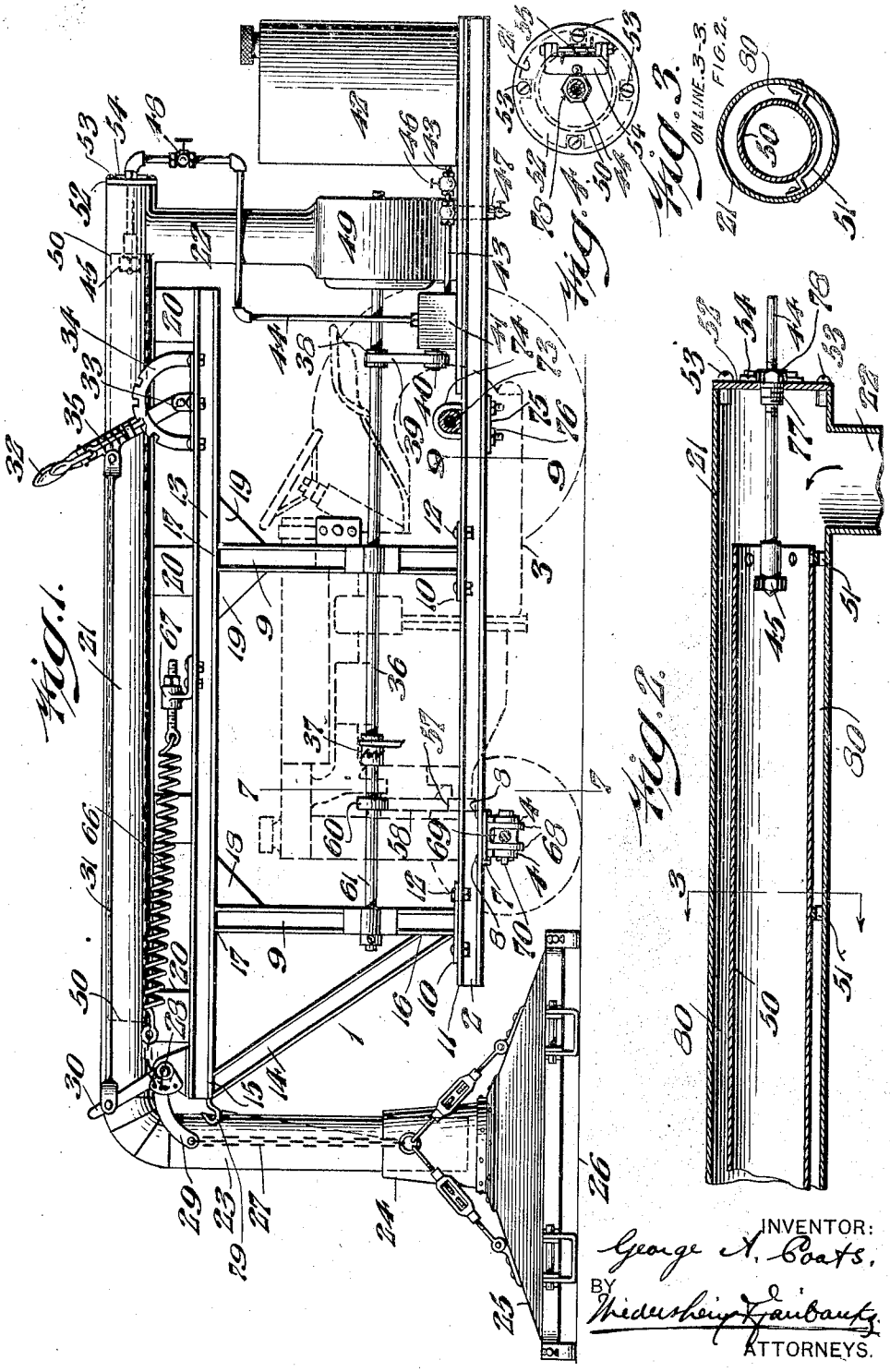


Fig. 1.

Fig. 2.

Fig. 3. ON LINE 3-3. FIG. 2.

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Fig. 5.

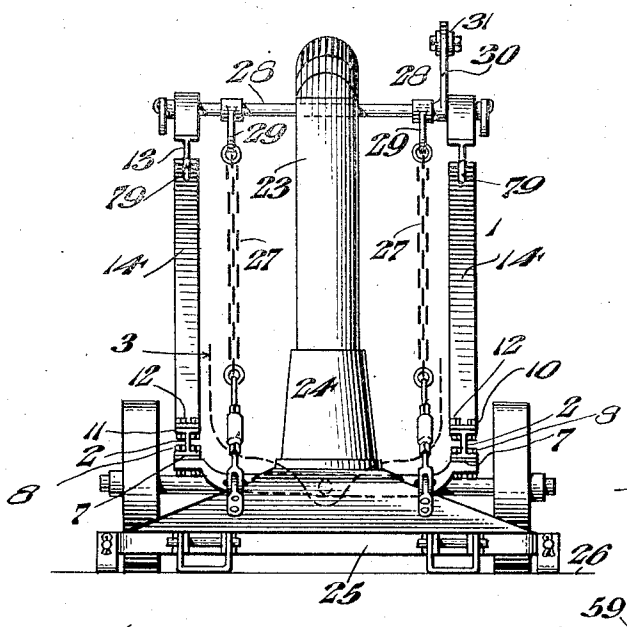


Fig. 7.

ON LINE 7-7. FIG. 1.

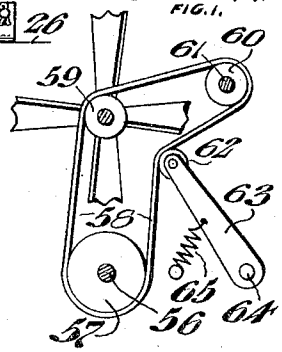


Fig. 6.

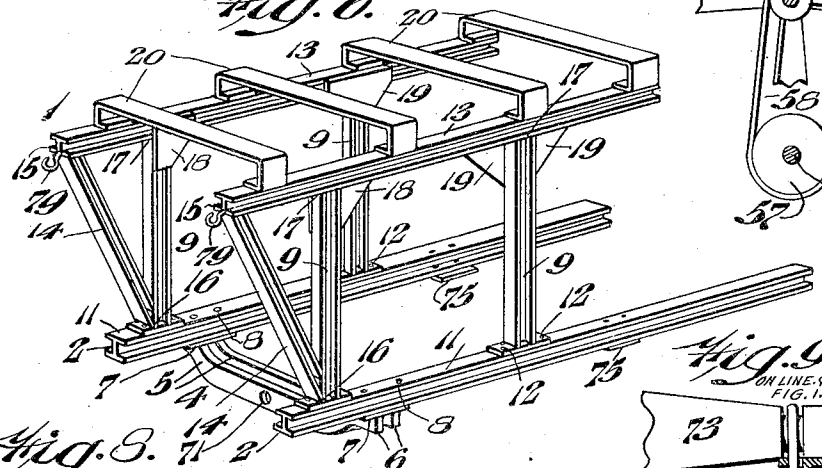


Fig. 9.

ON LINE 9-9. FIG. 1.

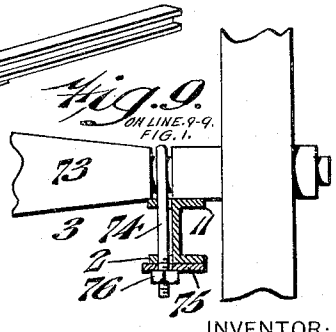
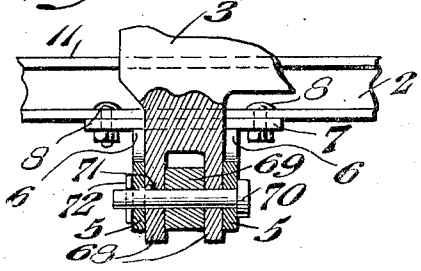


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PAVEMENT HEATER.

Application filed February 10, 1925. Serial No. 8,154.

My invention relates to a novel construction of a pavement heater and its adjuncts, whereby I am enabled to equip a tractor or self propelled vehicle of a conventional or standard type, with a novel supporting framework, upon which can be mounted the blower, fuel feeding and fuel burning elements together with the combustion chamber, which discharges the products of combustion into the adjustable hood, said framework being adapted to be readily installed upon a conventional tractor without change or alteration in the standard tractor construction.

To the above ends, my invention consists of a novel construction of a demountable or detachable frame, constructed of upper and lower I beams, channel beams, or the like, which are provided with uprights, gussets and other strengthening and reinforcing members welded or otherwise secured together whereby the upper portion of the frame can be placed in position or dismounted as a unit, from the lower pair of horizontal supporting beams, which are carried by the axle housings or lower portion of the tractor.

It further consists of a novel manner of supporting and mounting with respect to a tractor, the pair of lower horizontally disposed beams tied together at their front ends by a suitable yoke, said beams serving as a support for the upper removable sides or frame members and also serving to support the fuel tank, fuel pump and blower, which latter discharges into an upper elongated combustion chamber, which may be supported above or below the top of the demountable frame.

It further consists of novel means for obtaining power from the tractor engine shaft, whereby the fuel pump and the blower are operated, in conjunction with a suitable clutch, which renders the auxiliary shaft, which drives the fuel pump and blower inoperative when desired.

It further consists of a novel means for raising and lowering the hood with respect to the pavement and of novel means for counterbalancing the weight of the hood during the raising and lowering or actuation thereof.

It further consists of a novel construction of an elongated combustion chamber leading to the adjustable hood and a novel manner of collocating within said combustion chamber the burner and internal sleeve or inner flue and of novel means for supporting the latter. It further consists of novel means for detachably connecting the frame to the front and rear axle housings of the tractor.

It further consists of other novel features of construction and advantage, all as will be hereinafter fully set forth and pointed out in the claims appended hereto.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

Fig. 1, represents a side elevation of a pavement heater, embodying my invention, the tractor to which the same is applicable being shown in dotted lines.

Fig. 2, represents on an enlarged scale, a longitudinal sectional view of a portion of the elongated combustion chamber and the inner sleeve or flue therein.

Fig. 3, represents a section on line 3—3, Fig. 2.

Fig. 4, represents an end view of Fig. 2 showing the manner of attaching the combustion chamber head and the door therein for giving access to the burner seen in Fig. 2.

Fig. 5, represents a front view of Fig. 1.

Fig. 6, represents a perspective view of the demountable frame in detached position.

Fig. 7, represents on an enlarged scale a section on line 7—7 of Fig. 1, showing the belting or driving means for the fan shaft, and auxilliary shaft, which latter actuates the fuel pump and the fan or blower.

Fig. 8, represents a side elevation partly in section of the coupling means for securing the demountable frame to the front of the tractor.

Fig. 9, represents a section on line 9—9, Fig. 1.

In carrying out my invention I employ a novel construction of demountable frame 1 which consists of the pair of lower horizontal beams 2, which may be I beams or

any other suitable channelled beams, of a greater length than the tractor or other self propelled vehicle 3 shown in dotted lines in Fig. 1, said lower beams being arranged on each side of the tractor and tied together at their front ends by the transverse yoke 4, which is composed of the pair of bars 5, upon whose outer ends 6 are welded or otherwise secured the plates 7, which support the front ends of said lower I-beams 2, which are bolted or otherwise secured in position by the bolts 8 or the like. 9 designates a plurality of uprights, which are preferably four in number although more may be employed if desired, said uprights having the bottom feet or flanges 10, which are bolted or otherwise secured to the upper flanges 11 of the lower horizontal beams 2 by the bolts 12. 13 designates the upper horizontal beams, which are positioned on the top of the uprights 9, and in order to give additional strength and rigidity to the whole structure, I employ the front rearwardly inclined reinforcing beams 14, which inclined rearwardly from the front ends 15 of the upper beams 13, down to the lower ends 16 of the front uprights 9. At the points 15 and 16 the contiguous ends of the beams are preferably welded or otherwise secured together and at the points 17, the contiguous portions of the upper ends of the uprights 9, and the horizontal upper beams 13 are also welded or otherwise secured together and the angle pieces 18 and 19 and the cross members 20 are also welded into the position seen, so that each side frame composed of the parts 14, 9, 13 and the gussets, is not only very rigid and strongly reinforced, but in addition can be removed or replaced as a unit with respect to the lower horizontal supporting beams 2. 20 designates the upper transverse bars whose preferred shape will be understood from Fig. 6, said bars being positioned upon the top of the upper beams 13 and secured thereto in any suitable manner, and serving as supports for the longitudinally extending elongated combustion chamber 21, which has the air inlet pipe 22 at its rear end, while its forward end leads the heated products of combustion to the pendant or front conduit 23, which telescopes into the upper outer member 24 of the hood 25, which is adapted to be vertically adjusted with respect to the pavement surface 26, by means of the connections 27, the bell crank 28 suitably fulcrumed and composed of the arms 29 and 30, and the link 31, whose front end is pivoted to the arm 30 and its rear end to the lever 32, fulcrumed at the point 33, and provided with the quadrant 34 and the spring actuated locking means 35. The spring 66 which has its front end attached to the bell crank 28, and its rear end to a point 67 serves to counter balance the weight of the hood 25, during the operation of the same. 36 designates an auxiliary shaft in line with the shaft 61 and having the clutch mechanism 37 at its front end, the rear of said shaft 36 carrying the pulley 38, which drives the belt 39 which drives the pulley 40, which actuates the fuel pump 41, (which is preferably a rotary pump) and withdraws the fuel from the tank 42 through the suction pipe 43, and forces it through the discharge pipe 44, upwardly to the burner 45. The suction pipe 43 is provided with the valve 46, and the valved drip or drain pipe 47, while the discharge pipe is provided with the valve 48, to regulate the flow of the fuel to the burner. The rear end of the shaft 36 actuates the fan member of the blower 49, which forces air into the conduit 22 already referred to, which leads to the combustion chamber 21. 50 designates an inner sleeve or flue positioned within the combustion chamber 21 and supported on the transverse cradles or spacers 51, which are secured to the inner periphery of the combustion chamber 21, as will be understood from Fig. 3.

The cradles 51 are concave or trough shaped, as will be understood from Fig. 3, so that the inner flue 50 is properly centered and supported with respect to the elongated combustion chamber 21. In Fig. 4 I have shown a preferred form of combustion chamber head 52 which serves as a closure for the rear end of the elongated combustion chamber 21, said head being secured in position by the bolts 53 and having a central opening through which the fuel pipe 44 passes.

In order to give ready access to the rear end of the combustion chamber, so that the burner 45 can be readily ignited, I provide the small door 54 seen in Figs. 2 and 4 which is provided with a knob for opening it and with a spring 55 for retaining said door normally closed. When it is desired to light the burner 45, the operator can readily open the door 54 and insert his hand sufficiently to light said burner, as is obvious.

In Fig. 7, I have shown the means for rotating the shaft 61, wherein 56 designates the engine shaft carrying the pulley 57 around which passes the belt 58, which passes over the fan belt pulley 59, said belt also passing over the pulley 60, which is attached to the shaft 61, which is in alignment with the shaft 36, it being understood that the shaft 61 is rotating so long as the engine and fan shaft are running, and that through the medium of the clutch mechanism 37, the shaft 61 can be thrown into or out of engagement with the shaft 36, when desired.

In order to keep the belt 58 taut, I employ a belt tightening device, comprising

the roller 62 mounted on the arm 63, which is pivoted at the point 64 and provided with a spring 65, whose tension keeps the roller 62 in contact with the belt 58 and keeps the latter taut at all times, as will be understood from Fig. 7. The frame 1 and its adjuncts can be readily attached to the tractor by any suitable means as will be apparent from Figs. 1, 8 and 9, and in installing my invention upon the tractor, the bars 5 of the yoke 4 are placed in the position seen in Figs. 1 and 8, so as to engage the central pendant forked arms 68, of the tractor 3, which embrace the front axle 69, as seen in Fig. 8. The locking pin 70 is then passed through the holes 71 of the yoke bars 5 (see Fig. 6), and also through the arms 68 and front axle 69, and secured by the cotter pin 72, as seen in Figs. 1 and 8. The top flanges of the rear of the lower beams 2, are positioned under the rear axle housings 73, (see Figs. 1 and 9) and the parts are securely held in assembled position by the U shaped yokes 74, whose tops engage said housings and whose legs pass through the flanges of the beams 2, and through the bottom plates 75 against which the nuts 76 are tightened, as will be understood from Fig. 9.

It will be apparent from the foregoing that since the front ends of the beams 2 are tied together by the yoke 4, that said beams can be effectively secured to the lower portion of the tractor, by the above means although other equivalent fastening devices may be employed if desired. The lower beams 2 having been secured in position, the upper frame work can be readily assembled thereon, as seen in Fig. 6, by means of the bolts 12 it being understood that I preferably assemble the parts 14, 9, 13, 18, 19, and 20 so that they can be handled as a unit. While I have descibed these elements as being preferably welded together, it is apparent that they may be bolted or otherwise assembled, if desired. The superstructure composed of the above mentioned parts having been placed in position, it is apparent that the elongated combustion chamber 21 and its adjuncts can be readily placed in position, and the fuel tank, blower and fuel pump can be assembled as seen in Fig. 1. The shafts 61 and 36, having been lined up in their bearings, as seen in Fig. 1 and the proper connection made to the fuel pump 41 and blower 49, it will be apparent that the rotation of said shaft will force the fuel, which may be any of the heavier hydrocarbons, into the burner 45, and simultaneously the blower 49, will force the requisite amount of air through the pipe 22 into the combustion chamber 21, the highly heated air and products of combustion being forced forwardly into the conduit 23 and hood 25, to the desired point of impingement upon the pavement. The flow of the hydrocarbon to the pump and burner can be readily regulated by the valves 46 and 48 seen in Fig. 1, and the desired position of the hood 25, can be assured by the actuation of the lever 32, the weight of the hood being obviously counterbalanced by the spring 66, whose tension can be readily adjusted by the means shown. Any suitable or conventional clutch mechanism can be employed at the point 37, it being understood that the belt 58 and shaft 61 are revolving in unison with the engine shaft at all times, but that the auxiliary shaft 36 resolves only when the clutch members are in engagement. When it is desired to stop the rotation of the auxiliary shaft 36, the clutch members are manually disengaged, The collocation of the elongated combustion chamber, 21, the inner flue 50, the burner 45 and the large air inlet conduit 22, results in the production of an extremely hot flame, whose intensity can be controlled by regulating the fuel feed by the valve 48. By manipulating the nuts 77 and 78 the burner 45 can be longitudinally adjusted in the combustion chamber 21, as is evident. The inner flue 50 may be of varying lengths but I preferably proportion the same about as seen in Fig. 1. By collocating the parts substantially as seen in Fig. 1, it will be apparent that the weight of the hood and its adjuncts is substantially counterbalanced by the weight of the pump, blower and fuel tank at the opposite end of the device, so that the weight of the entire apparatus is equably distributed over the tractor. Hooks 79 may be employed, as seen in Figs. 1 and 5, upon which the chains 27 may be hooked, when the apparatus is in use, thereby relieving the strain upon the bell crank 28, the spring 66 and its adjuncts. It will be apparent that by my novel construction of combustion chamber and inner flue and removable head I am enabled readily to replace the inner flue when it burns out at a comparatively slight expense. It will be understood that a very intense heat is produced within my novel combustion chamber by reason of the commingling of the products of combustion and air as above described and the provision of the annular air space 80 around the inner flue causes the incoming air current through the conduit 22 to be divided, a portion thereof being discharged directly into said inner flue and commingling directly with the products of combustion, while the remainder of the incoming air current flows forwardly in the annular chamber 80 and cools said inner flue and in addition prevents the intense heat current flowing towards the hood from heating the combustion chamber to an injurious extent, which is an important item in practice, since I have found from practical experience that at intervals the inner flue 50 has

to be replaced, which can be done at a cost of about seventy five dollars, by merely removing the head 52, withdrawing longitudinally the inner flue, replacing it with a new one, and then replacing said head. The combustion chamber casing has to be made of a specially treated steel, and if it were not for the provision of the inner flue, which renders the replacement of the outer shell or casing unnecessary, it would be necessary at intervals to replace said outer casing at a cost approximating one thousand dollars. By my novel construction the life of the outer casing is prolonged and preserved indefinitely.

The advantages of being able to equip a conventional or standard tractor with my novel invention will be apparent, since such tractor can be purchased in the open market and my invention installed therein in a very short time without the aid of skilled labor. The work on pavements, such as replacing, resurfacing them and the like is usually done by contractors and municipalities in the spring, summer and fall months, and for obvious reasons in numerous localities this work must be suspended in the winter months. A tractor with my invention thereon, can readily have my novel supporting frame and all the heating appurtenances readily removed or disconnected therefrom in an hour's time, whereupon the tractor is immediately available for various other purposes during inclement weather or the winter months, as is evident.

It will now be apparent that I have devised a novel and useful construction which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description and while I have in the present instance shown and described the preferrd embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirt or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a pavement heater, a tractor, a supporting frame detachably connected to said tractor, a hood at one end of said frame, an elongated combustion chamber mounted on said frame and communicating with said hood, an inner flue for said combustion chamber, a burner for said combustion chamber, a fuel pump mounted on said frame, a blower also mounted on said frame, and means on said frame for actuating said fuel pump and blower simultaneously.

2. In a pavement heater a tractor, a supporting frame detachably mounted upon said tractor, an elongated combustion chamber supported on the top of said frame, blowing devices and fuel feeding devices mounted on said frame and adapted to discharge into said combustion chamber, a hood located at one end of said frame and in communication with said combustion chamber, mechanism mounted on said frame for raising and lowering said hood, and a counterbalancing spring connected with said mechanism and adapted to counterbalance the weight of said hood.

3. In a device of the character stated, a tractor, supporting frame detachably connected to said tractor, an elongated combustion chamber mounted upon said frame, a blower discharging into the rear end of said combustion chamber, a fuel pump mounted on said frame, a burner positioned within said combustion chamber into which said fuel pump discharges, an inner flue in said combustion chamber having its rear end in proximity to said burner, and a hood connected to one end of said elongated combustion chamber and adapted to receive products of combustion therefrom.

4. In a device of the character stated, a tractor, a supporting frame detachably connected to said tractor, an elongated combustion chamber mounted upon said frame, a blower discharging into the rear end of said combustion chamber, a fuel pump, a burner positioned within said combustion chamber into which said fuel pump discharges, an inner flue in said combustion chamber having its rear end in proximity to said burner, a hood connected to one end of said elongated combustion chamber and adapted to receive products of combustion therefrom and means on said frame for raising and lowering said hood and for counterbalancing the weight of said hood.

5. In a device of the character stated, a tractor, a supporting frame detachably connected to said tractor, an elongated combustion chamber mounted upon said frame, a fuel pump mounted on said frame, a burner positioned within said combustion chamber into which said fuel pump discharges, a hood connected to one end of said elongated combustion chamber, and means mounted on said frame for raising and lowering said hood and for counterbalancing the weight of said hood.

In witness whereof, I have hereunto set my hand.

GEORGE A. COATS.