

May 1, 1923.

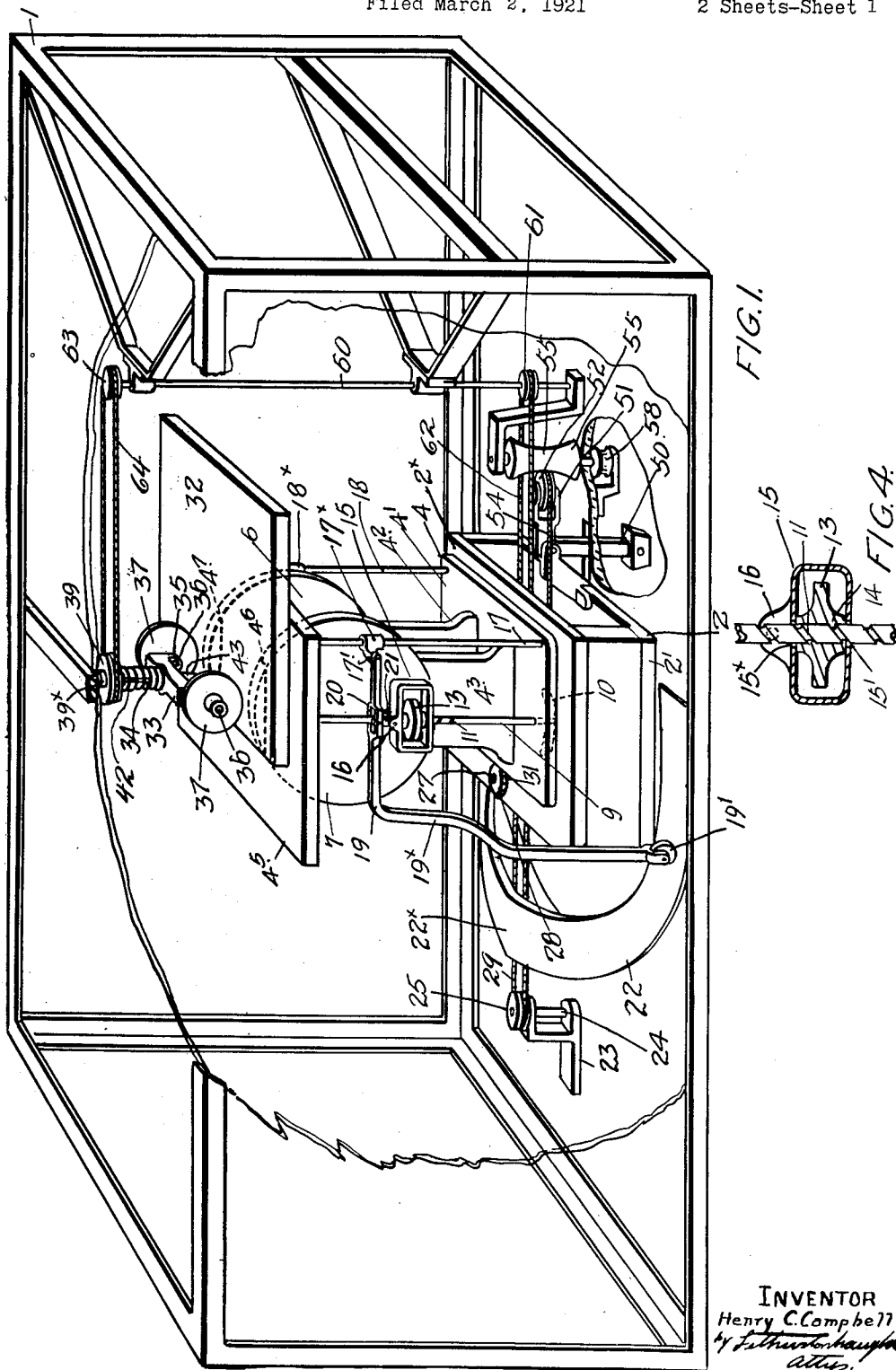
1,453,377

H. C. CAMPBELL

MAP DRAWING MACHINE

Filed March 2, 1921

2 Sheets-Sheet 1



May 1, 1923.

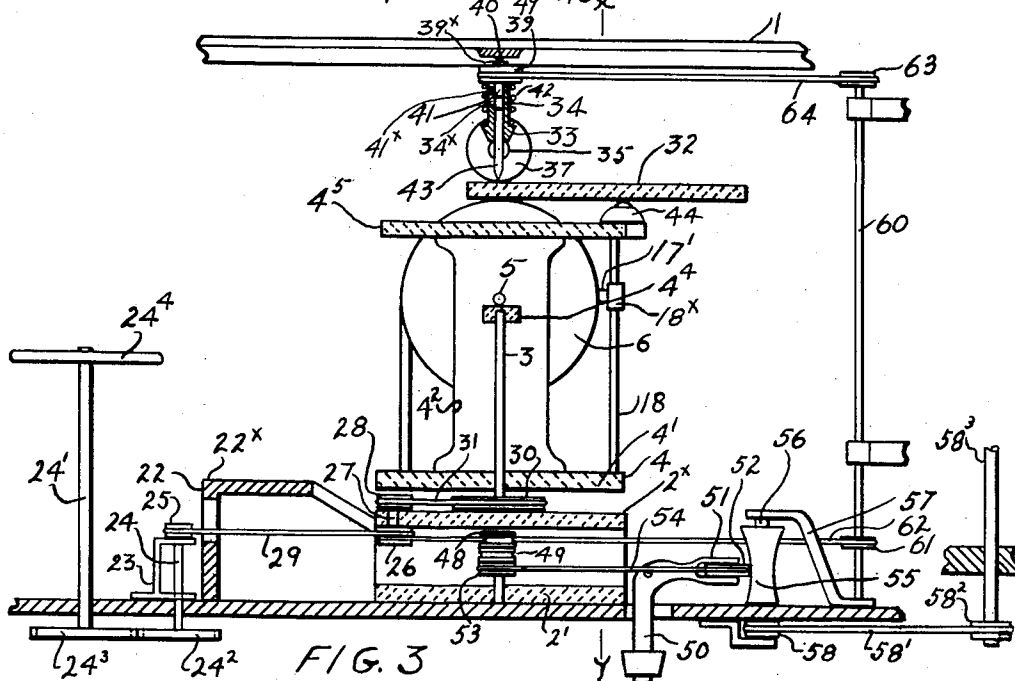
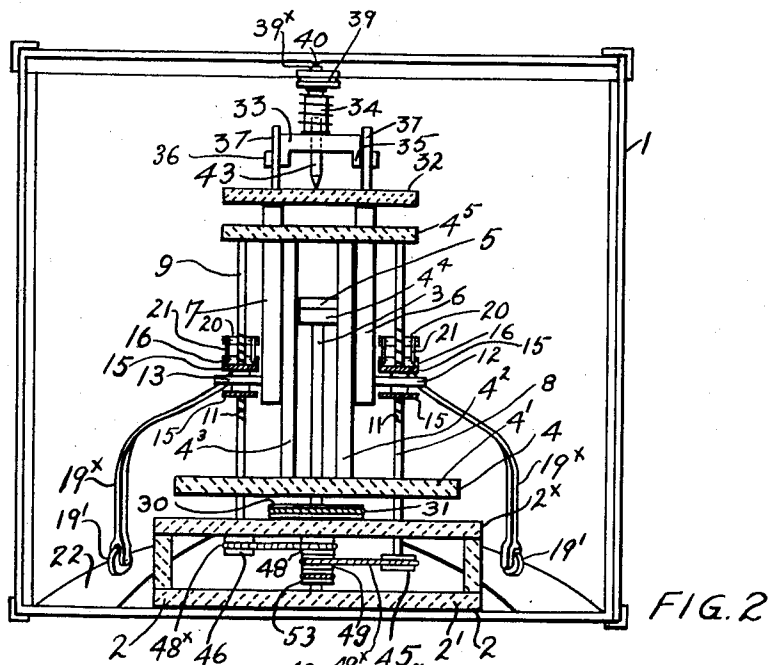
1,453,377

H. C. CAMPBELL

MAP DRAWING MACHINE

Filed March 2, 1921

2 Sheets-Sheet 2



Inventor

Henry C. Campbell
by *Lethaustonbaugh & Co.*
attys.

UNITED STATES PATENT OFFICE.

HENRY COVERLEY CAMPBELL, OF NEW YORK, N. Y.

MAP-DRAWING MACHINE.

Application filed March 2, 1921. Serial No. 450,166.

To all whom it may concern:

Be it known that I, HENRY COVERLEY CAMPBELL, of the city of New York, in the county of New York, State of New York, United States of America, have invented certain new and useful Improvements in Map-Drawing Machines, of which the following is the specification.

My invention relates to improvements in map drawing machines and the object of the invention is to devise a machine which may be connected to the driving and steering gear of a vehicle and which will automatically trace a scale map of the route of such vehicle upon a suitable reproducing surface and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly explained.

Figure 1 is a general perspective view of my device showing the exterior casing broken away.

Figure 2 is a cross sectional view on line *x-y*, Figure 3.

Figure 3 is a longitudinal sectional view through the central portion of my device and indicating diagrammatically the connections between the device and the steering wheel and the drive shaft of a vehicle.

Figure 4 is a detail perspective view of the supplemental adjusting gears and a portion of the supporting shaft thereof.

In the drawings like letters of reference indicate corresponding parts in the various figures.

1 indicates a casing, the walls of which may be transparent if so desired. 2 indicates a rectangular frame secured to the bottom of the casing. 3 indicates a shaft journaled in the upper and lower members 2^x and 2^y of the frame 2. 4 indicates a frame comprising a base board 4¹ secured to the shaft 3, the standards 4² and 4³ extending upwardly from the base board connected together intermediately of their height by a cross piece 4⁴ in which the upper end of the shaft 3 is secured. 4⁵ indicates a top board carried by the upper ends of the standards 4² and 4³. The top board 4⁵ is provided with slots 4⁶ and 4⁷ for a purpose which will hereinafter appear.

5 indicates a cross shaft journaled in the standards 4² and 4³ immediately above the crosspiece 4⁴. The shaft 5 projects beyond the standards 4² and 4³ and 6 and 7 indicate friction gears carried by the projecting ends

of the shaft 5, the upper peripheral portions of which project through the slots 4⁶ and 4⁷ as clearly indicated in Figure 1, of the drawings.

8 and 9 indicate supplemental shafts extending at their lower ends through arc-shaped slots 10, which are concentric with the centre of the vertical shaft 3. The shafts 8 and 9 are journaled at their lower ends in the base board 4¹ and at their upper ends in the top board 4⁵. Each shaft 8 and 9 is provided with a spiral portion 11 (see Fig. 4). 12 and 13 indicate friction pinions, the hubs of which are provided with an inwardly extending projection 14 extending into the spiral groove 11.

15 indicates a frame which surrounds each of the gears 12 and 13 and is provided with vertically aligned orifices 15^x and 15^y through which the shafts 8 and 9 freely extend. Each frame 15 is provided with upwardly extending lugs 16. 17 and 18 indicate rods extending between the base board 4¹ and top board 4⁵, 17^x and 18^x indicate sleeves secured to the rods 17 and 18, from each of which extends a lug 17^y. To each lug 17^y is pivoted a lever arm 19 provided with a slotted enlargement 20 through which the shaft 8 or 9 extends.

21 indicate links connecting the side portions of the slotted enlargement 20 with the lugs 16. The free end of the lever arm 19 is provided with a downward extension 19^x carrying a cam roller 19^y at its lower end. 22 indicates a cam way, which is semi-circular in plan and gradually rises up towards the centre of the machine having its highest point at 22^x. Normally the cam rollers 19^y bear upon the cam way 22 at each side thereof and at an intermediate point.

23 indicates a bracket, which is secured to the bottom of the casing and in which is journaled a shaft 24, which is suitably geared to the steering shaft 24^y of the automobile by means of the gear 24² which engages a gear 24³ carried by the steering shaft 24¹. 24⁴ is the steering wheel. 25 indicates a pulley journaled at the upper end of the shaft 24. 26 indicates a pulley mounted on a shaft 27 journaled in the top board 2^x of the casing 2. 28 indicates a pulley mounted upon the upper end of the shaft. 27 and 29 indicates a cord connecting the pulleys 25 and 26. 30 indicates a pulley secured to the shaft 3 and 31 indicates a cord

connecting the pulley 28 with the pulley 30. By this means it will be seen that whenever the steering shaft 24¹ is turned the shaft 3 and frame 4 carried thereby are turned in a

5 corresponding direction.

32 indicates a drawing board, which rests normally in proximity to one edge thereof upon the upper peripheral portions of the gears 6 and 7 projecting through the slots 4⁶ and 4⁷. The drawing board is designed to carry paper on which the route map is designed to be traced. 33 indicates a casting provided with a hollow stem 34, the orifice of which extends down through the bottom of the casting. The ends of the casting 33 are provided with bearing lugs 35 provided with a stud shaft 36 on which are journaled wheels 37, which bear upon the upper face of the drawing board. 39 indicates a pulley provided with a cupped upper end 39^x bearing against the point bearing 40 carried by the frame. 41 indicates a stem extending downwardly from the pulley 39 and fitting within the hollow stem 34. The stem 34 is provided with a vertical slot 34^x and 41^x indicates a feather key extending from the stem 41 into the slot 34^x. 42 indicates a compression spring which extends between the top of the casing 33 and the lower face of the pulley 39. 43 indicates a pencil, which is held in a vertical position in the hollow stem 34, the point of which bears upon the board 32 in vertical alignment with the centre of the shaft 3. 44 indicates a ball bearing supporting the free end of the board in its normal position. 45 indicates a pulley secured to the lower end of the shaft 8. 46 indicates a pulley secured to the lower end of the shaft 9. 48 and 49 indicate pulleys mounted on the lower end of the shaft 3. 48^x indicates a cord connecting the pulleys 48 with the pulley 46 and 49^x indicates a cord connecting the pulley 49 with the pulley 45. 50 indicates a weighted rocking lever provided with a jawed end 51 in which is journaled a pulley 52. 53 indicates a pulley also mounted and secured to the pulleys 48 and 49 to the shaft 3. 54 indicates a cord connecting the pulley 53 with the pulley 52. 55 indicates a drum, the periphery of which is concave and concentric to the centre of swing of the weighted lever 50. The drum 55 is mounted upon a shaft 56 journaled in a bracket 57 secured to the casing of the machine. The lower end of the shaft 56 extends through the bottom of the casing and has secured thereto a pulley 58 which is connected by any suitable driving mechanism to the driving gear of the automobile. For instance by the cord 58¹ which engages a pulley 58² carried on the driving shaft 58³ of the automobile. 60 indicates a supplemental vertical shaft journaled in suitable bearings forming part of the main cas-

ing. 61 indicates a pulley secured in proximity to the lower end of the shaft 60. 62 indicates a cord connecting the pulley 61 with the pulley 26. 63 indicates a pulley secured on the upper end of the shaft 60 and 64 indicates a cord connecting the pulley 63 with the pulley 39. By this means it will be seen that when the frame 4 is turned by means of the steering gear as above described, the wheels 37 will also be turned in a corresponding direction by means of the pulley drive 62, 61, shaft 60, pulley 63 and cord 64 to the pulley 39.

As will be understood the drum 55 having the convex periphery will be driven continuously from the driving gear 58² of the automobile or other vehicle when such vehicle is running and that, therefore, the pulley 52 will be driven therefrom and that shafts 8 and 9 rotated from the pulley 52 by means of the cord 54 mounted upon the pulley 53 on the shaft 3, and pulleys 48 and 49 connected thereto and from thence through the cords 48^x and 49^x to the pulleys 45 and 46 carried by the shafts 8 and 9. The friction pinions 12 and 13 being mounted upon the shafts 8 and 9 in contact with the gears 6 and 7 rotate such gears gradually feeding the drawing board 32 forward. As the drawing board 32 is fed forward the pencil 43 makes a straight track upon the board.

In order to trace curves in the route the following operation takes place.

When the steering shaft 24¹ is turned the shaft 3 and frame 4 carried thereon is also turned and with it is carried the lever arms 19 carrying the cam rollers 19¹. As the frame 4 is turned one cam roller mounts up the cam way towards the high point 22^x and the other cam roller descends away from such high point thereby raising one lever arm 19 and depressing the other. By such operation one frame 15 is drawn upward and the other frame 15 drawn downward thereby forcing the friction pinions 12 and 13 in a corresponding direction, the spiral grooves in the shafts 8 and 9 allowing for this movement.

It will thus be seen that the drive between one pinion 12 or 13 and its corresponding friction gear 6 or 7 is increased and the corresponding drive at the opposite side of the machine decreased and that, therefore, as the drive from the driving gear of the automobile continues through the drum 55 to the friction gears 6 and 7 one side of the board 32 is carried forward more rapidly than the other side and, therefore, the pencil point 43 will trace a curve upon the board corresponding to the curve in the route over which the automobile or other vehicle is travelling. When the curve is passed, of course, the steering gear is brought back to its normal position and the pencil will con-

tinue to track a straight line swinging the lever 50 carrying the pulley 52 into engagement with the concave drum 55, allowing for the increase or decrease in drive necessary when going up or down a hill.

From this description it will be seen that I have devised a very simple device whereby a route map may be automatically drawn by a suitable reproducing instrument, which will be an accurate scale map of the route passed over by the vehicle in which such device is located.

What I claim as my invention is:

1. In a map drawing machine, the combination with the driving gear and steering gear of an automobile, of a pair of suitably mounted vertically set gears, a drawing board resiliently held in contact with the peripheries of said gears, a pencil point resiliently held against the board, a friction pinion held in engagement with the face of each of said gears, means for driving said pinions operated from the driving mechanism of the vehicle, and means for moving said pinions radially of the gears in opposite

directions operated from the steering mechanism of the vehicle.

2. In a map drawing machine, the combination with the driving gear and steering gear of an automobile, of a pair of suitably mounted vertically set gears, a drawing board resiliently held in contact with the peripheries of said gears, a pencil point resiliently held against the board, a friction pinion held in engagement with the face of each of said gears, a supporting shaft for each of said pinions having a spiral groove therein, a projection extending from the pinions and engaging the spiral groove, a frame surrounding each of said pinions, an inclined face cam located at each side of the mechanism, a pivoted lever connected to each of the frames surrounding each pinion, and a cam lever carried by each lever in engagement with the corresponding face cam.

HENRY COVERLEY CAMPBELL.

Witnesses:

GEO. W. COURTRIGHT,
MICHAEL J. EAGAN.