Nov. 23, 1937. E. HANSMANN 2,100,188

WINDSHIELD CLEANER

Filed Oct. 17, 1934 4 Sheets-Sheet 1

Fig. 1.

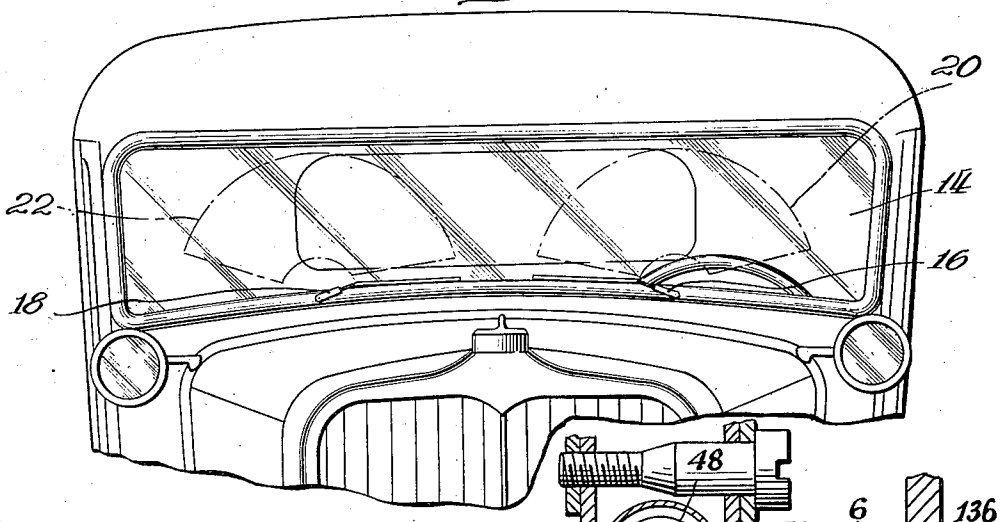


Fig. 2.

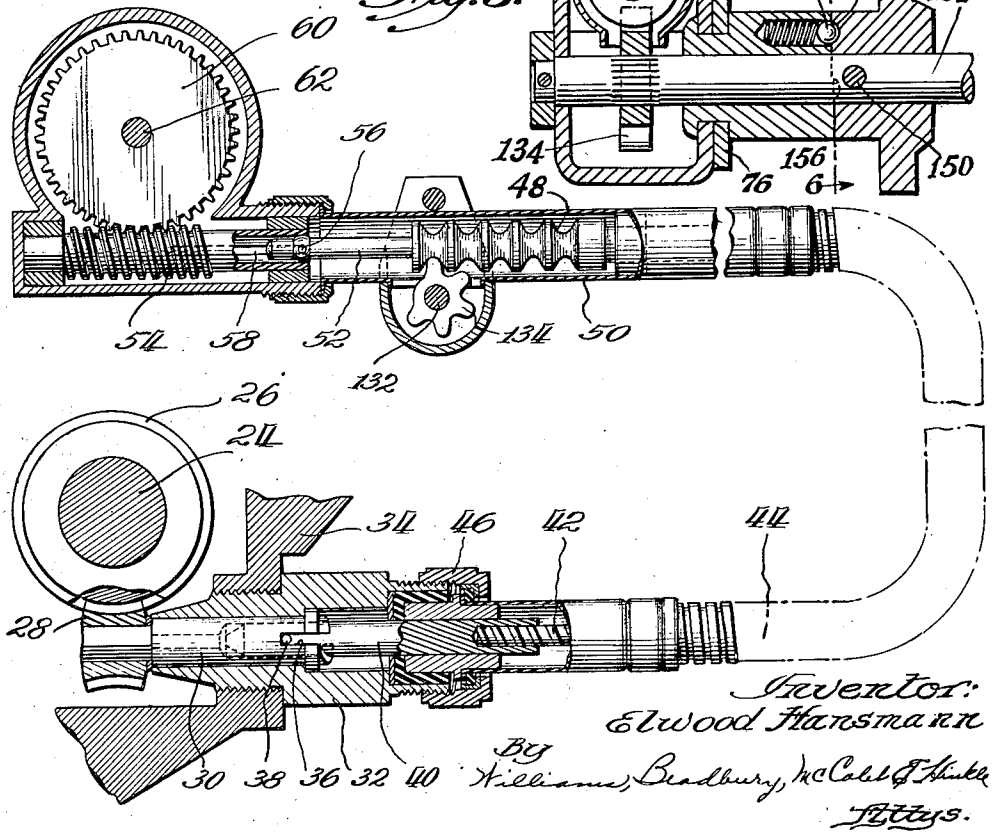


Fig. 5.

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Filed Oct. 17, 1934 4 Sheets-Sheet 2

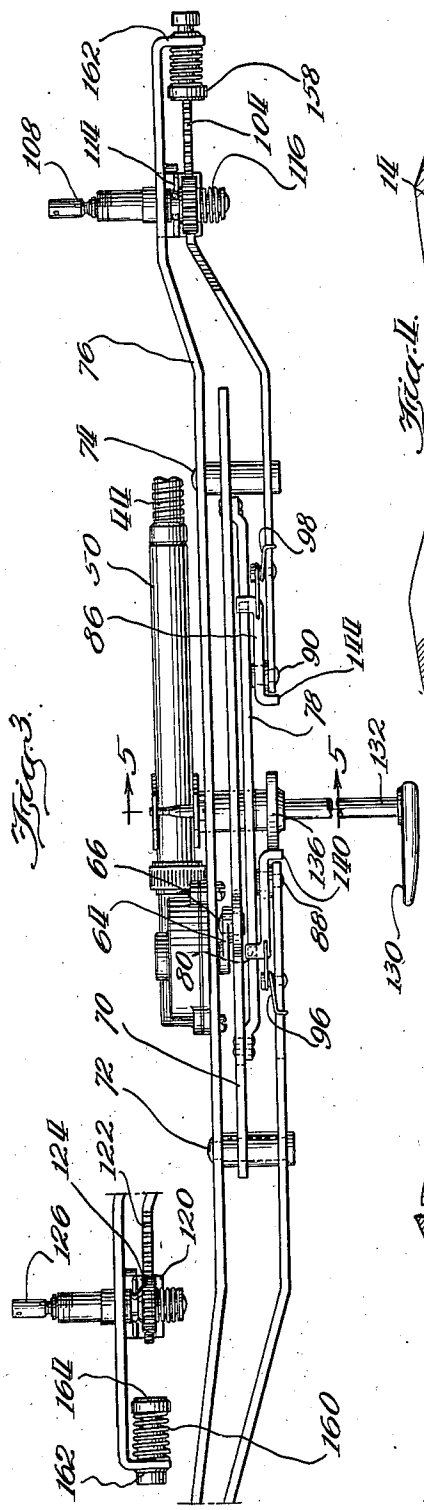


Fig. 3.

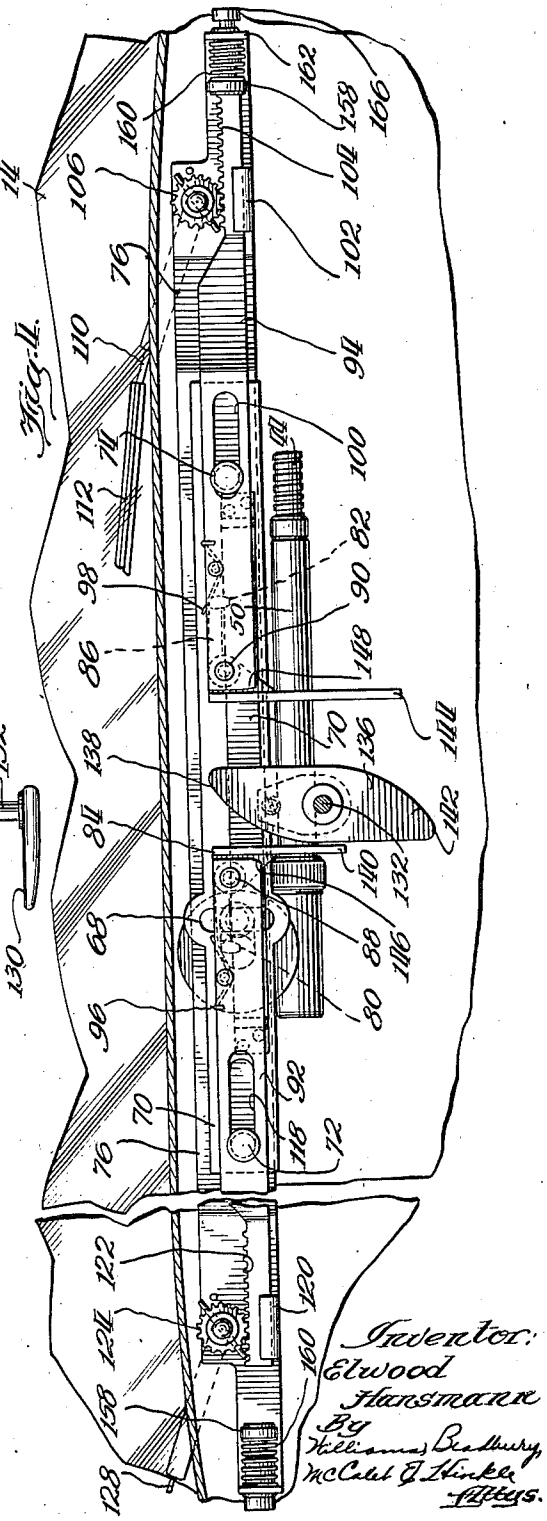


Fig. 4.

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WINDSHIELD CLEANER

Filed Oct. 17, 1934 4 Sheets-Sheet 3

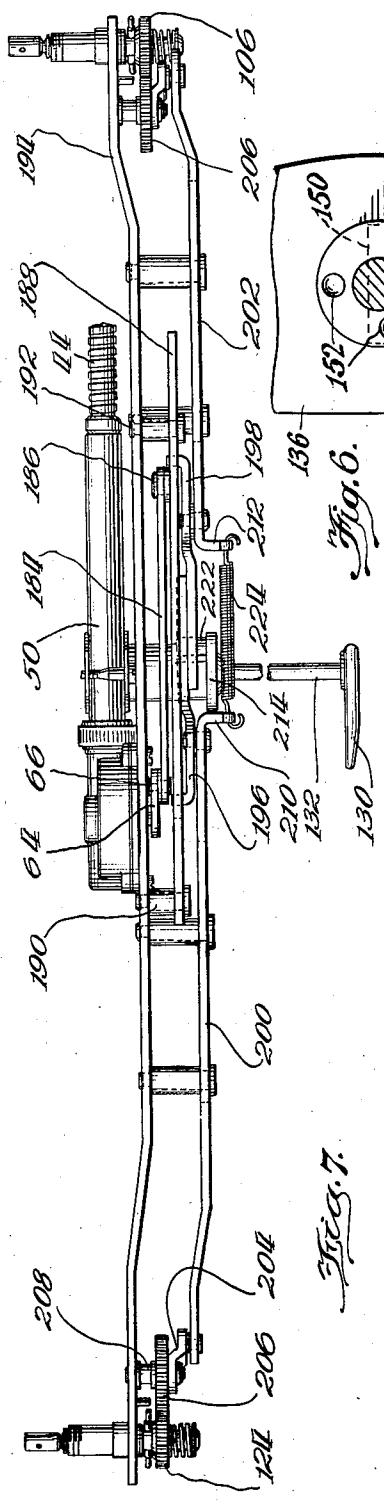


Fig. 7.

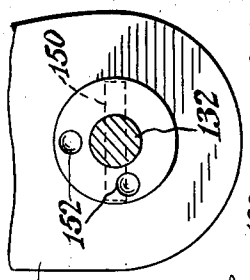


Fig. 6.

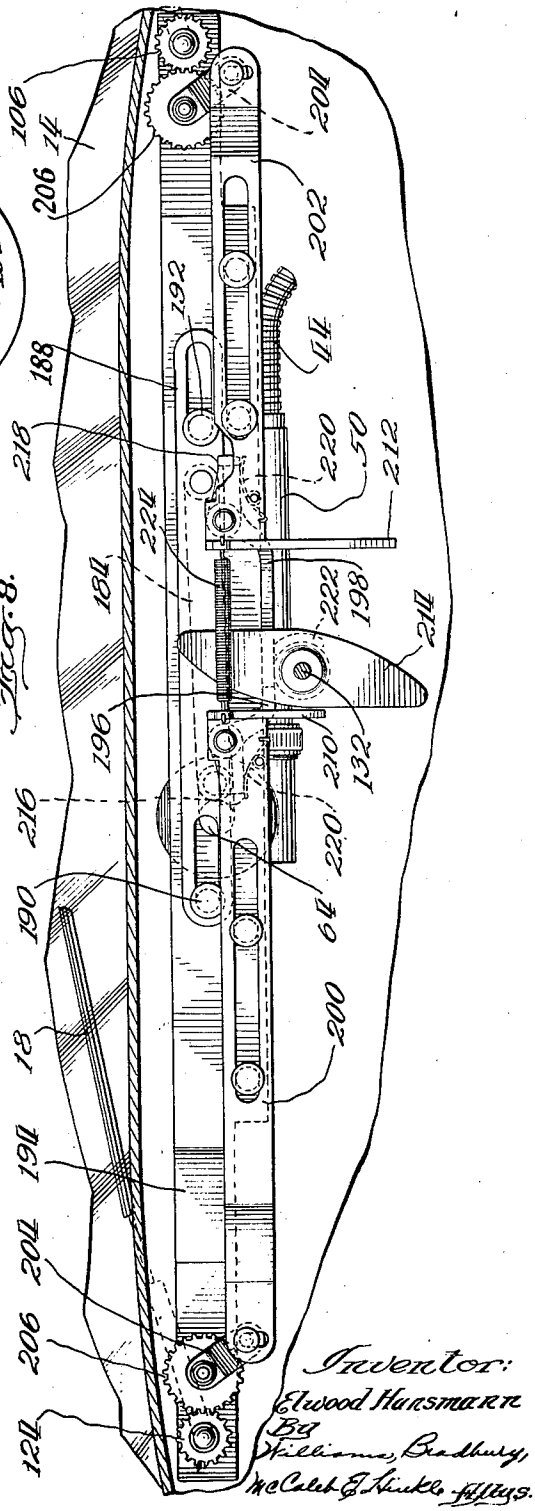


Fig. 8.

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WINDSHIELD CLEANER

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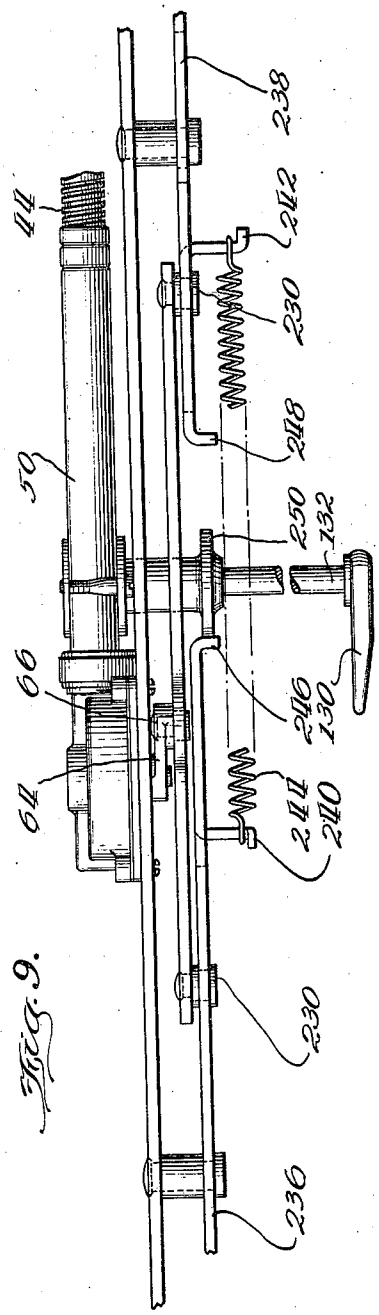


Fig. 9.

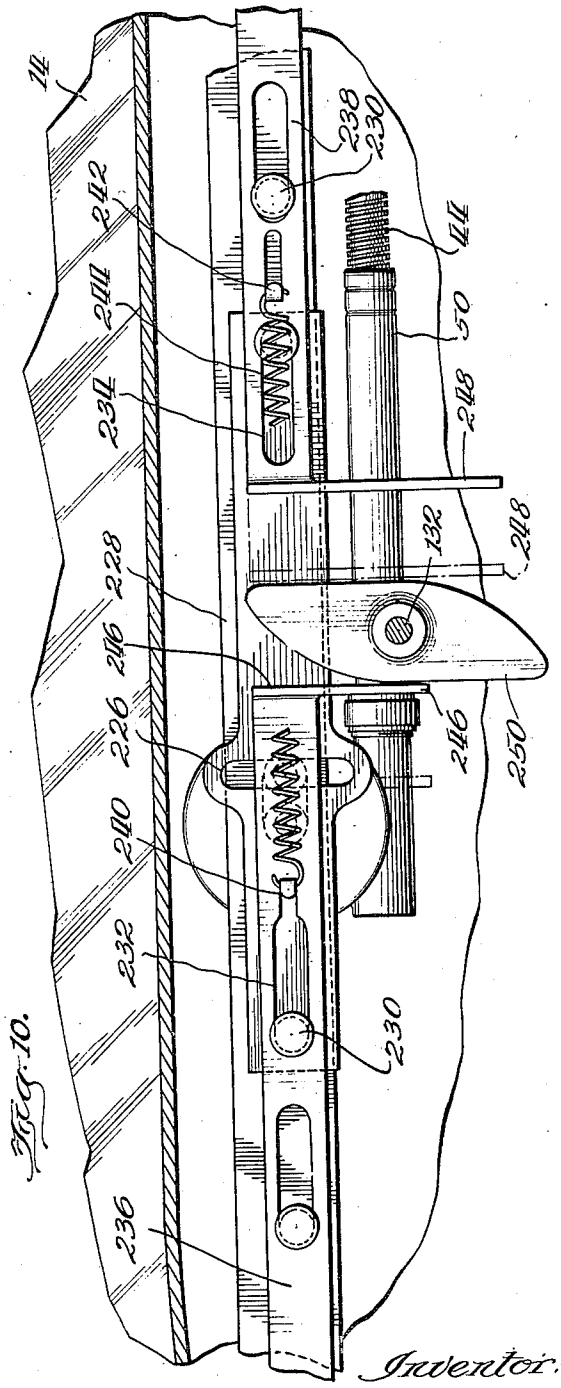


Fig. 10.

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Patented Nov. 23, 1937

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UNITED STATES PATENT OFFICE

2,100,188

WINDSHIELD CLEANER

Elwood Hansmann, Glencoe, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill., a corporation of Virginia

Application October 17, 1934, Serial No. 748,628

6 Claims. (Cl. 15—255)

My invention pertains to wind-shield cleaners and is particularly concerned with a wind-shield cleaner for automobiles wherein means is provided for automatically parking the wiper blades beyond the line of vision of the occupants of the automobile when the control handle for the wind-shield cleaner is turned to off position.

In wind-shield cleaners of the multi-blade type, it is preferable to have the blades oscillate in parallel while the wind-shield cleaner is operating, but it is a difficult problem to park these blades in inconspicuous positions when the wind-shield cleaner is idle. An object of my invention is to provide simple, inexpensive, compact and reliable means for automatically parking the wind-shield cleaner blades in inconspicuous positions beyond the normal line of vision of the occupants of an automobile when operation of the wind-shield cleaner is discontinued.

Other objects and advantages will appear as the description proceeds.

Referring to the drawings,

Figure 1 is a frontal view showing the upper part of an automobile and indicating particularly one parking position for the blades of the wind-shield cleaner;

Figure 2 is a view showing the driving mechanism for operating the wind-shield cleaner from the automobile engine;

Figure 3 is a top plan view of that part of the operating mechanism which is located just above or below the wind-shield of the automobile;

Figure 4 is a front elevation of the mechanism shown in Figure 3;

Figure 5 is a sectional view showing a detail and is taken on the line 5—5 of Figure 3;

Figure 6 is a section taken on the line 6—6 of Figure 5;

Figures 7 and 8 are a top plan view and a front elevation, respectively, of a further modification; and

Figures 9 and 10 are, respectively, a partial top plan view and a partial front elevation of a still further modification.

Referring to the drawings, I have shown, in Figure 1, an automobile having a wind-shield 14 provided with a wind-shield cleaner in the form of two wiper blades 16 and 18 which are illustrated in parked position. The normal field of movement of the wiper blade 16, when operating, is indicated by the area 20 enclosed in dot and dash lines, and the area 22 similarly enclosed indicates the normal range of movement of the wiper blade 18. It is to be noted that in parked position the wiper blades 16 and 18 are outside of their normal operating ranges and do not obstruct the vision of the occupants of the automobile.

In Figure 2 I have indicated a shaft of the automobile engine 24 as being provided with a worm 26 which drives a worm-wheel 28 non-rotatably mounted on a clutch member 30 carried by a bearing member 32 threadedly engaged with the automobile crankcase 34. Clutch member 30 is provided with a slot 36 for receiving the cross-pin 38 carried by a complementary clutch member 40 which is attached to one end of a flexible drive shaft 42 enclosed in a flexible sheath 44. A noise insulating coupling 46 is interposed between the sheath 44 and the bearing member 32 to prevent the transmission of vibration and noise from the automobile engine to the dash and associated parts.

The other end of the drive shaft 42 is connected to a rack 48 which is rotatable and slidable in a housing 50 attached to the other end of the sheath 44. The rack 48 has an extension 52 which is slidably received in the hollow shaft of a worm 54, the extension 52 being provided with a cross-pin 56 which engages a slot 58 in the worm 54 to transmit rotative movement from the extension 52 to the worm 54.

Worm 54 drives worm-wheel 60 mounted on shaft 62 provided with crank-arm 64 (Figure 3) carrying a crank-pin 66 which is received in the slot 68 of a cross-head member 70 slidably mounted on pins 72 and 74 carried by a supporting frame 76 which is attached to the automobile just above or below the wind-shield.

A bar 78 is riveted or otherwise attached to the cross-head member 70 and has a portion spaced therefrom, this portion being provided with notches 80 and 82 for receiving, respectively, an end of dogs 84 and 86 which are, respectively, mounted by pivots 88 and 90 to operating arms 92 and 94. Springs 96 and 98 normally hold the aforesaid ends of the dogs 84 and 86 in engagement with the notches 80 and 82. In this position of the dogs the operating arms 92 and 94 are connected to the cross-head member 70 and reciprocate therewith.

Operating arm 94 has a slot 100 for receiving the end of the pin 74 which acts as a guide for this operating arm. The other end of the operating arm is guided by a finger 102 which is rigid with and may be an integral part of the frame 76. This end of the operating arm 94 is shown as provided with a rack 104 which engages a pinion 106 of a rock shaft 108 carrying the bent arm 110

of a wiper blade 112 which may be the usual rubber squeegee.

The pinion 106 is connected to rock shaft 108 through the medium of a separable clutch comprising a cross-pin 114 extending through the rock shaft 108 and aligned notches in the hub of the pinion 106 which receive the ends of the pin 114. A spring 116 maintains this clutch engagement throughout the normal operation of the wind-shield cleaner.

The operating arm 92 is similarly provided with a slot 118 for receiving the end of the pin 72 which forms a guide therefor and is also guided by finger 120 rigid with the frame 76. Rack 122 engages pinion 124 to operate rock-shaft 126 and thereby oscillate the wiper blade attached to the end of the arm 128. Clutch mechanism like that previously described is interposed between pinion 124 and rock-shaft 126.

The operation of the wind-shield cleaner is controlled by a handle 130 on a shaft 132 carrying a mutilated gear 134 (Figure 2) which engages the rack 48. In Figure 2 the parts are shown in the position which they assume when the wind-shield cleaner is operating. When it is desired to stop the operation of the wind-shield cleaner, the handle 130 is turned so that rack 48 is moved toward worm 54, and pin 38 of clutch member 40 is withdrawn from slot 36 of clutch member 30.

Shaft 132 carries a cam 136 having an end 138 adapted to engage the offset end 140 of dog 84, and a second end 142 adapted to engage the offset end 144 of dog 86. In Figure 4 cam 136 is in the idle position which it assumes when the wind-shield cleaner is operating. In this position the cam 136 is just beyond the inward limits of movement of the ends 140 and 144 of the dogs 84 and 86.

When handle 130 is turned to disconnect the drive for the wind-shield cleaner, as previously described, end 138 of cam 136 engages the offset end 140 of dog 84 and oscillates this dog about its pivot 88, thereby withdrawing the opposite end of the dog from the notch 80 in operating arm 92, and thereby disconnecting this operating arm from cross-head member 70. Continued rotation of cam 136 presses the offset end 140 of the dog against the corner 146 of the operating arm 92. This corner forms a stop for the dog 84 so that, after engagement with this stop, the dog 84 in effect becomes a rigid part of operating arm 92. Further movement of cam 136 moves operating arm 92 to the left, as viewed in Figure 4, thereby moving pinion 124, rock-shaft 126, and wiper blade arm 128 in a clockwise direction.

In Figure 4 the mechanism is shown with the operating arms 92 and 94 at the rightward limit of their range of movement under the influence of crank-arm 64, and therefore the end 142 of cam 136 does not engage the offset end 144 of dog 86 until shortly before the operating handle 130 has completed its movement.

Because it is desirable to park the wiper blades beyond their normal range of movement, the ends of the cam 136 are made of such length that they move the operating arms 92 and 94 a greater distance outward, that is, away from shaft 132, than does the crank-arm 64. Because of this fact, end 142 of the cam engages offset end 144 of dog 86, oscillates this dog to withdraw its opposite end from notch 82 and engage end 144 with corner 148, and moves operating arm 84 beyond its normal range of movement before handle 130 reaches its extreme position. This additional movement of operating arm 94 under the influence of cam 136 causes additional movement of wiper blade 112 which positions this wiper blade beyond its normal range of operation. When handle 130 reaches its full off position operating arms 92 and 94 have been disconnected from their driving mechanism and moved beyond their normal ranges of movement, the two wiper blades have been moved toward each other to positions which are beyond their normal ranges of movement, and clutch members 30 and 40 have been separated to disconnect the flexible drive shaft 42 from the automobile engine.

I preferably provide means for yieldingly holding the handle 130 in either of its extreme positions, this means being best shown in Figures 5 and 6. The cam 136 may be fastened to the shaft 132 by a pin 150. The hub of the cam 136 is provided with two depressions 152 which alternately cooperate with a ball detent 154 mounted in a bearing sleeve 156 which is rigidly attached to the frame 76. One of the notches 152 corresponds to the position of the handle 130 when the wind-shield cleaner is operating, and the other notch 152 corresponds to the position of the handle 130 when the wiper blades are in their parked position.

When the wiper blades are in parked position, the outer ends of the operating arms 92 and 94 are in engagement with spring-pressed plungers 158 and maintain the springs 160 thereof in compressed condition. These springs 160 are seated against turned-over ends 162 of the frame 76, these turned-over ends also forming guides for the plungers 158. The plungers 158 may be provided with facings 164 of leather, rubber, fiber or other suitable material which will eliminate noise when engaged by an end of an operating arm. The plungers 158 have shafts provided with stops 166 which limit the inward movements of the plungers under the influence of their springs 160 when the ends of the operating arms are disengaged from the plungers.

When the handle 130 is turned from off to on position, the rack 48 (Figure 2) is moved toward the right and the cross-pin 38 on one clutch member is moved into the slot 36 in the other clutch member, thereby connecting crank-arm 64 with a rotating part of the automobile engine. At the same time the cam 136 is disengaged from the ends 140 and 144 of dogs 84 and 86 and is returned to the position shown in Figure 4. As soon as the ends of cam 136 disengage dogs 84 and 86, operating arms 92 and 94 are moved toward each other by springs 160 of plungers 158. The springs 160 move the operating arms 92 and 94 inward to such an extent that as bar 78 is reciprocated the notches 80 and 82 thereof will pass under the cooperating ends of the dogs 84 and 86 and be engaged thereby, whereupon the operating arms 92 and 94 assume the reciprocating movement of bar 78 and cross-head member 70.

When the stops 166 are in engagement with the turned over ends 162 of the frame 76, the plungers 158 are in a position to be engaged and moved slightly by the operating arms 92 and 94 as they reach the outer extremes of their movement under the influence of the crank-arm 64. Instead of being a disadvantage, this is an advantage since at each extreme of movement of the operating arms 92 and 94, one of the springs 160 is compressed and assists the

driving mechanism in reversing the direction of movement of the operating arms 92 and 94. As the greatest burden occurs on the driving mechanism during the reversal of movement of the arms 92 and 94, the springs 160 assist in overcoming this burden.

From the foregoing description of one embodiment of my invention, it will be apparent that I have provided a simple and efficient mechanism whereby the wind-shield wiper blades will be automatically parked in unobtrusive positions when the wind-shield cleaner is disconnected from the automobile engine. One important advantage of my invention lies in the fact that the handle 130 may be turned to off position at any time, that is, without waiting for the wiper blades to assume any certain position, and as the operating handle is turned to off position the wiper blades are moved to parked position so that as soon as the operating handle reaches its off position the wiper blades reach their full parked positions.

In the particular embodiment just described, the wiper blades are oscillated in parallel during their normal operation but are parked with their extreme ends pointing toward each other which is advantageous with certain types of wind-shields. If it be desired to park the wiper blades with their ends pointing away from each other, it is only necessary to put the racks 104 and 122 above instead of below their respective pinions 106 and 124. While I have illustrated the wiper blades in Figure 1 as being driven from below the wind-shield, it is to be understood that my invention is equally adapted for installations in which the wiper blades are driven from above the wind-shield.

The modification shown in Figures 7 and 8, like the embodiment of Figures 3 and 4, is designed for a wind-shield cleaner wherein the wiper blades operate in parallel but are parked in non-parallel relationship. In Figures 7 and 8 the crank-pin 66 is connected to a link 184 pivotally connected at 186 to a slide 188 supported on pins 190 and 192 attached to the frame 194. Dogs 196 and 198 normally connect the slide 188 to the operating arms 200 and 202, respectively.

In this form of my invention, the operating arms 200 and 202 are not connected to the pinions 106 and 124 by means of racks but instead the ends of the operating arms are connected to cranks 204, each crank being attached to a large gear 206 mounted on a stud 208 carried by the frame 194. Each gear 206 is larger than and in engagement with one of the pinions 106 and 124.

The inner ends of operating arms 200 and 202 are offset as indicated at 210 and 212, and these offset portions are adapted to be engaged by the cam 214 on the shaft 132 of the operating handle 130. In this form of my invention the slide 188 is provided with notches 216 and 218, each notch being normally engaged by one end of one of the dogs 196 and 198, springs 220 being provided to maintain this engagement. The other ends of the dogs 196 and 198 overlie the shaft 132 and are adapted to be engaged and move by a cam 222 on the shaft 132. If desired, cams 214 and 222 may be formed as parts of an integral member.

The parts are shown in Figures 7 and 8 as being in the positions which they assume when the wind-shield cleaner is operating. When the handle 130 is turned to off position, cam 222 engages the adjacent ends of dogs 196 and 198 and disconnects them from the notches in the slide 188. Thereafter cam 214 engages the turned-over ends 210 and 212 of the operating arms 200 and 202 and separates these arms, each arm being moved outward to a position slightly beyond the limit of its outward movement under the influence of the crank-pin 66.

The ends 210 and 212 of the operating arms are connected by a spring 224 which may be under no appreciable tension when the wind-shield cleaner is operating, but as the arms 200 and 202 are moved to parking positions the spring 210 is placed under tension. When the handle 130 is again moved to operating position, spring 224 pulls operating arms 200 and 202 towards each other so that the dogs 196 and 198 may engage the notches 216 and 218 in the slide 188 as the latter is reciprocated by the crank-pin 66 and link 184.

In the further modification shown in Figures 9 and 10, the crank-pin 66 travels in a slot 226 of a cross-head member 228 having a pin 230 at each end thereof. The pins 230 are received in slots 232 and 234 provided in operating arms 236 and 238, respectively. These operating arms are provided with fingers 240 and 242 for receiving the ends of a relatively heavy spring 244 which pulls the operating arms towards each other until the outer ends of their slots 232 and 234 abut the pins 230, in which position the operating arms are maintained throughout the normal operation of the wind-shield cleaner.

The inner ends of the operating arm are offset as indicated at 246 and 248, these offset arms being adapted to cooperate with a cam 250 on the shaft 132 of the operating handle 130. When the operating handle is moved to off position, the cam 250 engages the ends 246 and 248 of the operating arms, and separates these arms against the resistance of the spring 244. The operating arms 236 and 238 are to be understood as being connected to the rock shafts and wiper blades by any suitable mechanism as, for example, either by the rack and pinion drive shown in Figures 3 and 4, or by the alternative driving connections shown in Figures 7 and 8, and as the operating arms 236 and 238 are spread apart by the cam 250 the wiper blades are moved to their parking positions. When the wiper blades are in parked position, the thrust of the spring 244 is exerted on the opposite ends of the cam 250 so that there is no tendency for the handle 130 to be moved from off position under the influence of spring 244. When the handle 130 is returned to operating position, the spring 244 returns the operating arms 236 and 238 to the positions shown in Figures 9 and 10.

While I have described only a few embodiments of my invention, it is to be understood that my invention is capable of assuming numerous forms, and that the scope of my invention is to be limited solely by the following claims.

I claim:

1. In wind-shield cleaners of the class described, the combination of a plurality of wiper blades, common driving means therefor, a separable detachable connection connecting each blade with said driving means, respectively, a handle having parts positioned to be movable thereby into engagement with the parts of said connections secured to the wiper blades respectively, for detaching both of said detachable connections and simultaneously moving said blades to parked position.

2. In wind-shield cleaners of the class described, the combination of a plurality of wiper blades, reciprocable racks for actuating said blades, driving means therefor, means establishing a connection between the driving means and racks in operation of the wiper, said means comprising a pivoted dog connecting each wiper blade with said driving means, respectively, a cam engageable with the pivoted dogs to disconnect the racks from the driving means by continued movement to advance the racks so disconnected from the driving means to move said wiper blades to parked position, a single handle for operating said cam, a clutch under control of said handle for connecting said driving means with a source of power, and for disconnecting it therefrom when the said cam is turned to move the wiper blades to parked position.

3. In wind-shield cleaners of the class described, the combination of a plurality of wiper blades, operating mechanism therefor, a separable connection between each blade and said mechanism, respectively, a source of power for said operating mechanism, a clutch connecting said mechanism with the source of power, a cam for disconnecting said connections and moving said blades to parked position, a cam operator with means movable upon its actuation to disengage said clutch, and resilient means for returning said blades to operating positions.

4. In wind-shield cleaners of the class described, the combination of a plurality of blades, driving mechanism therefor, a clutch for connecting said mechanism with a source of power, a separable connection between said mechanism and each of said blades respectively, a cam for separating said connections, and moving said blades to parked position, a handle connected to said cam, a pinion carried by said handle and engaging a rack for actuating said clutch, and resilient means for returning said blades to operating position.

5. In wind-shield cleaners of the class described, the combination of a plurality of blades, a rock shaft supporting each respective blade, a pinion carried on each rock shaft, an operating arm for each blade having a rack engaging the pinion associated therewith, driving mechanism for said arms, a dog connecting each arm with said driving mechanism, respectively, a clutch connecting said driving mechanism with a source of power, a handle, means movable with said handle for disengaging said clutch, a cam carried by said handle and moved thereby to disengage said dogs and move said arms to place said wiper blades in parked position, spring and plunger means positioned to engage each arm when said arms are moved to place said wiper blades in parked position to move said arm and its associated blade from parked position, and resilient means for reengaging said dogs.

6. In wind-shield cleaners of the class described, the combination of a crank-pin, driving means therefor, a clutch connecting said driving means with a source of power, a cross-head member having a slot receiving said pin, said member being reciprocated thereby, a pair of slidable bars, a latch connecting each bar with said member respectively for reciprocation therewith, a rack carried by each bar, a pinion engaging each rack, a rock shaft oscillated by each pinion, a wiper blade carried by each rock shaft, a spring-pressed plunger engaged by each bar during each outward movement of said bar under the influence of said crank-pin and tending to urge the respective bars to normal position, a cam positioned between said bars for disengaging the latches and separating said bars, said cam moving said bars beyond their range of movement under the influence of said crank-pin, and a handle for operating said cam and disengaging said clutch.

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