

- (21) Application No 7921413
- (22) Date of filing
20 Jun 1979
- (23) Claims filed
29 Jun 1979
- (30) Priority data
- (31) 78/33973
- (32) 19 Aug 1978
- (33) United Kingdom (GB)
- (43) Application published
5 Mar 1980
- (51) INT CL³ B60S 1/24
- (52) Domestic classification
A4F 24B2A3A1E
24B2A3A2A
24B2A3A3C1
- (56) Documents cited
GB 1206190
GB 1051820
GB 1028830
GB 932728
GB 880764
GB 693957
- (58) Field of search
A4F
- (71) Applicant
Dudleys (Redditch)
Limited
Quadro Works
Brook Street
Redditch
Worcs B98 8NF
- (72) Inventor
Kemys Lloyd Morgan
- (74) Agents
Forrester Ketley & Co

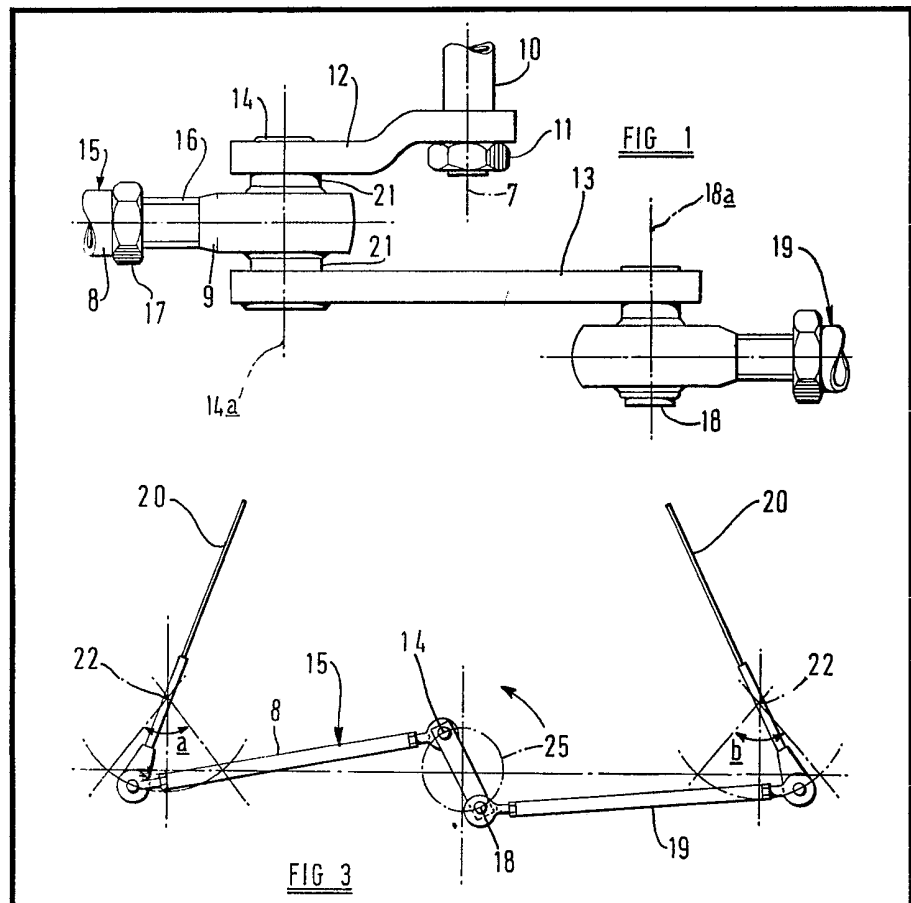
(54) Improvement relating to wiper drive assemblies

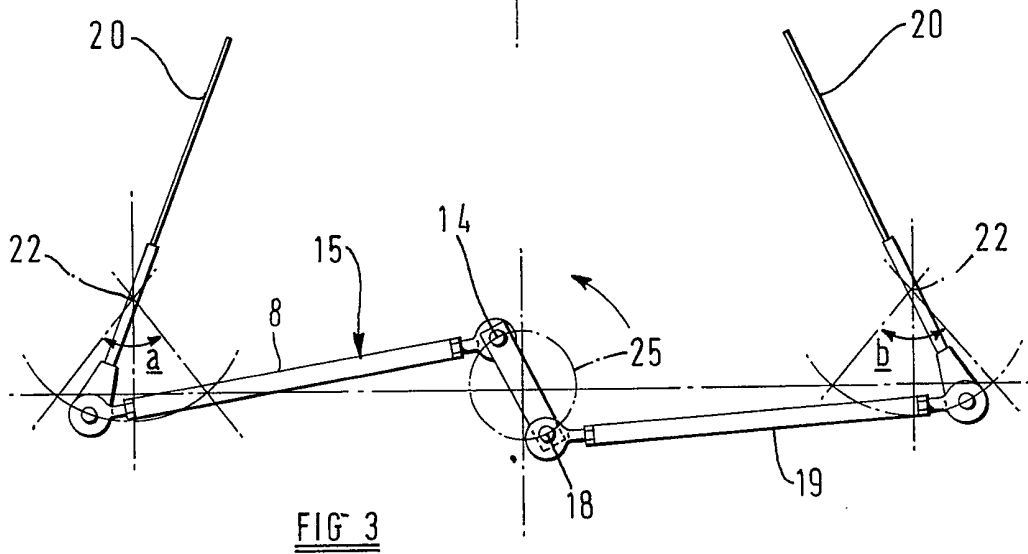
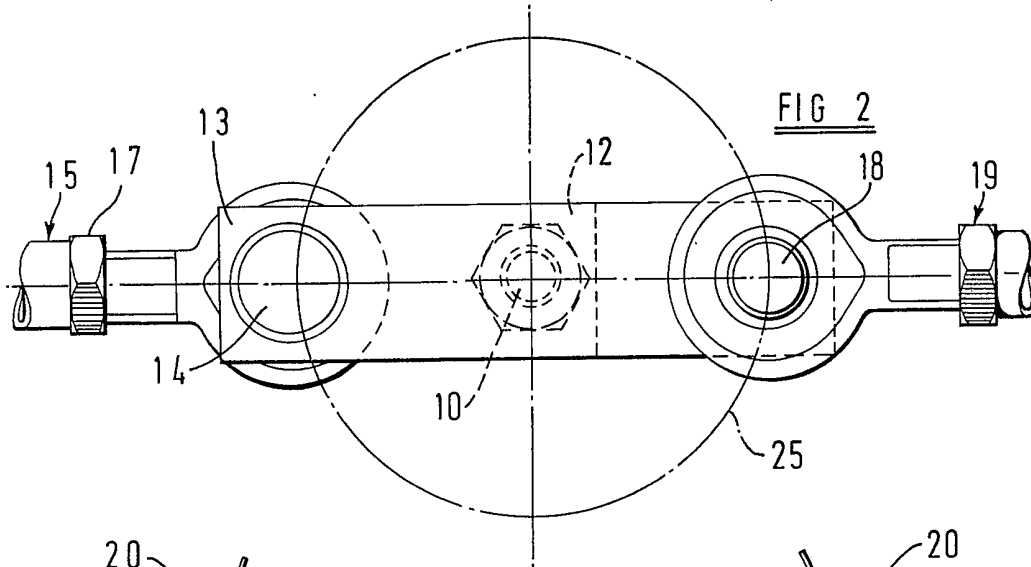
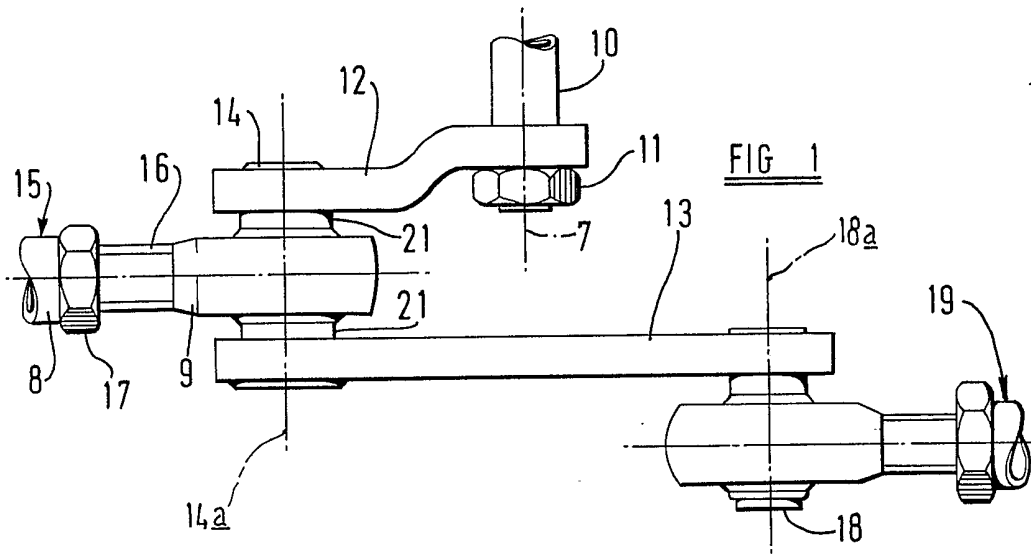
(57) This invention relates to wiper drive assemblies particularly for use as windscreen wiper drive assemblies.

The invention provides an assembly comprising two parallel crank members (12, 13) rigidly spaced apart by a first crank pin (14) on which a connecting rod (15) is pivoted. A second crank pin (18) is provided on the opposite side of the crank member (13) to the first crank pin (14) and a second connecting rod (19) is pivoted thereon. The connecting rods (14, 18) are in turn pivotally connected to windscreen wiper arms.

The crank members are rotated by a motor drive shaft (10) and thus the rotary movement of the motor is converted into reciprocating

movement of the connecting rods which is in turn converted into a wiping motion of the wiper arms (20).





SPECIFICATION

Improvements relating to wiper drive assemblies

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This invention relates to wiper drive assemblies and in particular, but not exclusively, to windscreen wiper assemblies.

10 There are two basic types of known wiper drive assemblies.

First, there are those which are driven by a motor having a rotatably reciprocable drive shaft. These comprise a crank member rigidly attached to the drive shaft of the motor, two crank pins being mounted on the crank member on the same side or opposite sides of the axis of rotation thereof, each pin having one end of a connecting rod pivotally attached thereto and the other end of each connecting rod being attached to a wiper arm. Thus the reciprocating movement of the motor is transmitted to the wiper arms which undergo a wiping action.

Secondly, wiper drive assemblies are known which comprise two crank pins on opposite sides of the axis of rotation of a gear, the gear being driven from a gear or gears on the drive shaft of a rotary motor. Again, one end of a connecting rod is pivotally attached to each of the pins and the other ends of the rods are attached to wiper arms. Thus the rotational movement of the motor drive shaft is transformed by the mechanism into reciprocating movement of the connecting rods and thus a wiping action of the wiper arms.

Both of these known types of wiper drive assemblies involve the use of expensive specialised equipment. In the first case, a motor having a rotatably reciprocable drive shaft, and in the second case a gear box with a crank on each of two opposite sides thereof.

An object of the invention is to provide a new and improved wiper drive assembly.

According to a first aspect of the invention we provide a wiper drive assembly comprising a drive shaft rotatable about an axis and a first crank member rigidly attached to the drive shaft, the first crank member having connected thereto, one end of a crank pin, the crank pin extending therefrom on the opposite side of the first crank member to the drive shaft, the other end of the crank pin being connected to a second crank member the first and second crank members being fixed relative to one another, the second crank members having a further crank pin extending therefrom on the opposite side to the crank pin connecting the first and second crank members, the crank pins each having an axis, the axes of the drive shaft and each of the crank pins being substantially parallel and spaced apart, each of the crank pins having connected therewith, a connecting rod, each connecting rod also being connected to a wiper arm which is adapted to undergo a

wiping action, whereby rotational movement of the drive shaft is connected to a reciprocating movement of the connecting rods which is in turn transmitted to a wiping movement of the wiper arms.

Each of the wiper arms may be pivoted along its length so that the reciprocating movement of the connecting rods is converted into a "clap-hand" movement of the wiping arms.

The distance between the connecting rod and the pivot of the wiper arm, or the distance between the crank pin and the axis of rotation of the crank member may be varied for a particular application to achieve a desired sweep of the wiper arms.

The drive shaft may be the output shaft of a motor or alternatively the drive shaft may be driven by any other means such as a pulley or gear driven directly or indirectly from a motor.

The invention will now be described by and with reference to the accompanying drawings in which :

Figure 1 shows a plan view of a windscreen wiper drive assembly according to the invention,

Figure 2 is a side view of the assembly of *Fig. 1*, and,

Figure 3 is a side view of a typical linkage system as may be used in accordance with the invention.

Referring to *Figs. 1* and *2* of the drawings, there is shown a windscreen wiper drive assembly for use in a vehicle, the assembly comprising a drive shaft 10 of a rotary motor (not shown) which is rigidly attached to a first crank member 12 by a nut 11 and is rotatable about an axis 7. A second crank member 13 is rigidly attached parallel to and spaced from the first crank member 12, by a crank pin 14, having a central axis 14a. Pivoted on the pin 14 is one end of a connecting rod 15.

The connecting rod comprises a shaft 8 having an internally threaded bore into one end of which a screw threaded part 16 of a pivot member 9 is threadedly engaged. Anti-friction bearings 21 are provided between the pivot member 9 and the crank pin 14 to facilitate relative rotation between the pivot member 9 and the crank pin 14. A lock nut 17 is also provided on the threaded part 16 to lock the pivot member 9 in the shaft 8.

The end of the connecting rod 15 remote from the pivot member 9 is pivotally connected to a wiper arm 20 at 22, but may alternatively be connected to a lever (not shown) connected to the wiper arm 20.

The second crank member 13 is provided with a second crank pin 18 having an axis 18a, the pin 18 extending therefrom on the opposite side of the crank member 13 to the first crank pin 14.

The pin 18 has a second connecting rod 19 similar to the first connecting rod 15, pivoted thereon, the rod 19 being pivotally attached

to a wiper arm 20 at its other end. The axis of the drive shaft 10, and the axis 14a, of the first crank pin 14, and the axis 18a of the second crank pin 18, are parallel but spaced
5 apart, the axis 14a and 18a being equi-distant from the axis of rotation 7 of the drive shaft 10.

In use, the drive shaft 10 rotates the crank members 12 and 13 about axis 7 and thus
10 the pins 14 and 18 will move as indicated by the circle 25 (Fig. 2) and thus the connecting rods 15, 19 will be reciprocated simultaneously in opposite directions. As the wiper arms 20 are pivoted along their length at 22,
15 they will undergo a "clap-hand" movement.

This movement of the wiping arms 20 defines sweep angles *a* and *b* (Fig. 3) which may be increased or decreased for a particular application by selecting the lengths of the
20 wiper arms 20, and the position of pivot 22, and the distance of the crank pins 14 and 18 from the axis of rotation 7 of the drive shaft 10, to achieve a desired sweep.

The drive shaft 10 need not be attached to the first crank member 12 by a nut, but may be welded or riveted for example or attached
25 in any other manner.

The drive shaft 10 need not be the output shaft of a motor, but may be rotated by any
30 other means such as a pulley or gear driven directly or indirectly by a motor.

The crank members 12 and 13 may be substantially rectangular in side view as shown in Fig. 2 of the drawings, or may be
35 elliptical, semi-circular or any other desired shape.

The connecting rods 15 and 19 need not comprise a shaft 8 and pivot member 9, but may be made in one piece, and/or comprise a
40 solid rectangular bar or any other elongate member.

CLAIMS

1. A wiper drive assembly comprising a
45 drive shaft rotatable about an axis and a first crank member rigidly attached to the drive shaft, the first crank member having connected thereto, one end of a crank pin, the crank pin extending therefrom on the opposite
50 side of the first crank member to the drive shaft, the other end of the crank pin being connected to a second crank member the first and second crank members being fixed relative to one another, the second crank members having a further crank pin extending
55 therefrom on the opposite side to the crank pin connecting the first and second crank members, the crank pins each having an axis, the axes of the drive shaft and each of the
60 crank pins being substantially parallel and spaced apart, each of the crank pins having connected therewith, a connecting rod, each connecting rod also being connected to a wiper arm which is adapted to undergo a
65 wiping action, whereby rotational movement

of the drive shaft is connected to a reciprocating movement of the connecting rods which is in turn transmitted to a wiping movement of the wiper arms.

70 2. A wiper drive assembly according to Claim 1 wherein each of the wiper arms is pivoted along its length so that the reciprocating movement of the connecting rods is converted into a "clap-hand" movement of the
75 wiping arms.

3. A wiper drive assembly according to Claim 1 or Claim 2 wherein the distance between the connecting rod and the pivot of the wiper arm is variable for a particular
80 application to achieve a desired sweep of the wiper arms.

4. A wiper drive assembly according to Claim 1 or Claim 2 wherein the distance between the crank pin and the axis of rotation
85 of the crank member is variable for a particular application to achieve a desired sweep of the wiper arms.

5. A wiper drive assembly according to any one of the preceding claims wherein the
90 drive shaft is the output shaft of a rotary motor.

6. A wiper drive assembly according to any one of claims 1 to 4 wherein the drive shaft is driven directly or indirectly from a
95 rotary motor.

7. A wiper drive assembly substantially as hereinbefore described with reference to the accompanying drawings.

8. A vehicle having a wiper drive assembly according to any one of the preceding
100 claims.