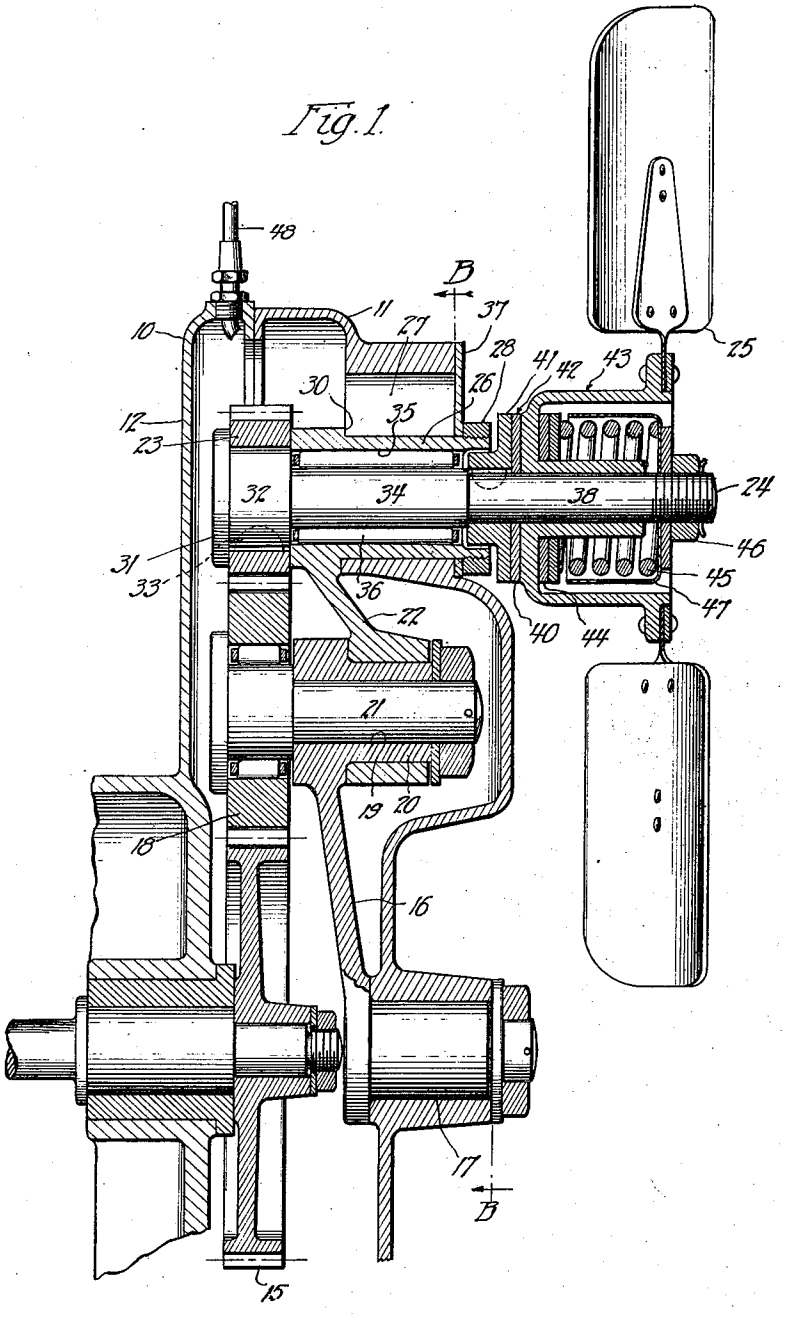
May 22, 1923. 1,455,910

G. V. DOMARUS, JR

ADJUSTABLE MOTOR FAN

Filed Feb. 12, 1921 2 Sheets-Sheet 1

Fig. 1.




Inventor.
George V. Domarus Jr.
By Otto M. Wernick Atty.

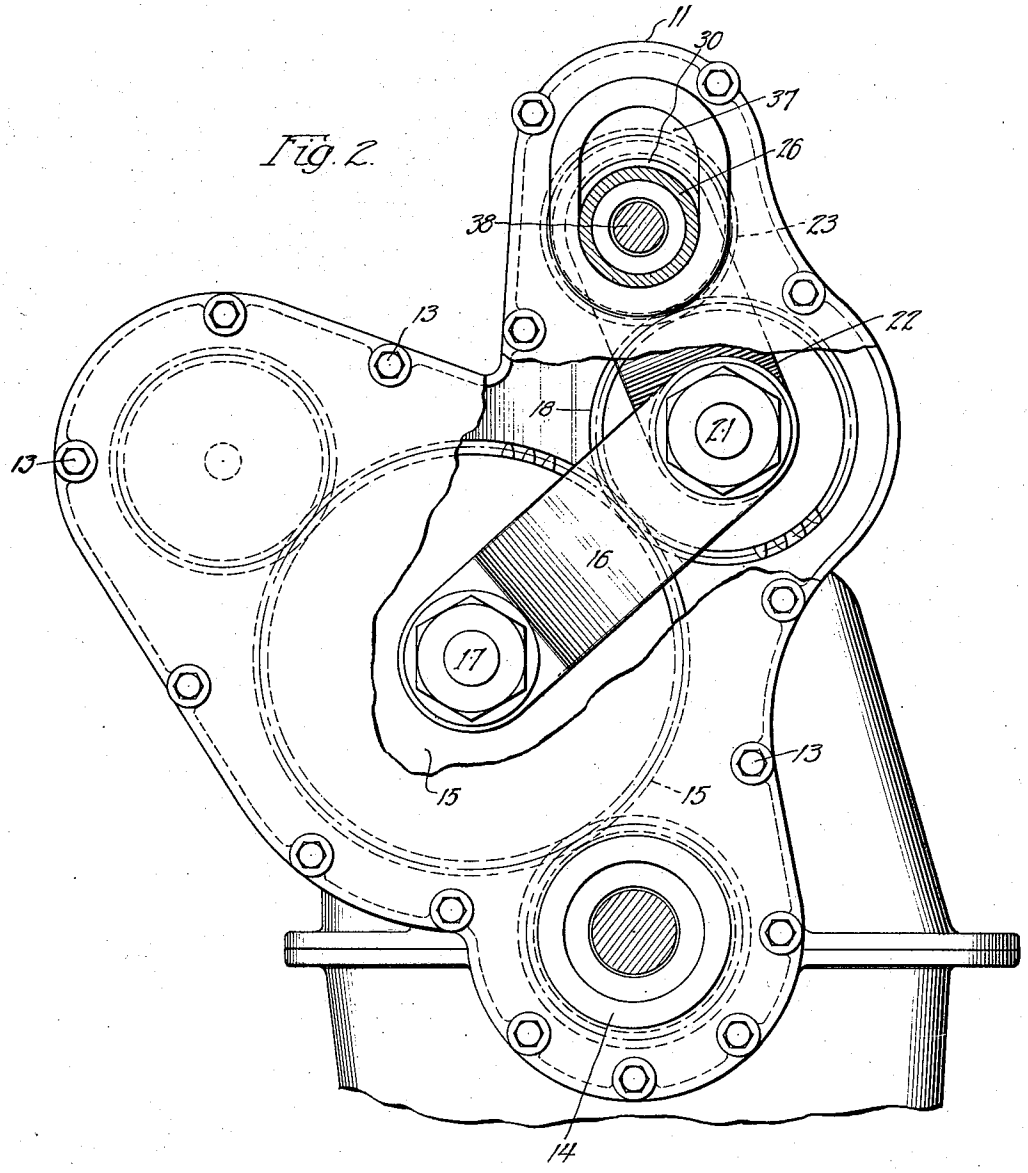
May 22, 1923. **1,455,910**

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ADJUSTABLE MOTOR FAN

Filed Feb. 12, 1921 2 Sheets-Sheet 2

Fig. 2.




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Patented May 22, 1923. 1,455,910

# UNITED STATES PATENT OFFICE.

GEORGE V. DOMARUS, JR., OF SAGINAW, MICHIGAN.

## ADJUSTABLE MOTOR FAN.

Application filed February 12, 1921. Serial No. 444,470.

*To all whom it may concern:*

Be it known that I, GEORGE V. DOMARUS, Jr., a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented a certain new and useful Improvement in Adjustable Motor Fans, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The invention relates to fan drive mechanisms, and has among its various objects the provision of an arrangement which eliminates the usual fan belt for driving the same, and substitutes therefor a positive connection between the drive shaft and the fan, so that the fan is positively driven, thus preventing slippage between the fan and the driving mechanism, and which at all times insures the proper fan speed and eliminates excessive heating of the cooling medium and consequent overheating of the engine.

In addition the invention has as an object the provision of an arrangement whereby the fan center may be varied to align it with the center of the particular radiator with which the fan is to be associated. By providing a device having a variable fan center, a motor manufacturer is saved the trouble and expense of providing a separate bracket or fan support for each particular automobile or tractor with which the motor is to be associated, and permits the fan to be properly arranged with respect to the center of the radiator, so as to meet the various conditions and requirements of manufacturers who purchase the motor and associate it with their particular chassis and radiator.

It is a further object of the invention to provide a connection between the fan and driving mechanism which will properly hold the fan so that it will at all times rotate at its proper speed, when driven by the driving mechanism, yet will permit the fan to rotate with respect to this driving mechanism should the motor or driving mechanism be brought to a sudden reduced speed or an abrupt or sudden stop. This last mentioned structure is provided to prevent what is known in the art as caving in or crumbling. In other words the fan blades or associated mechanism is by virtue of this construction prevented from being broken or snapped off due to any sudden cessation of rotation of the fan.

In addition to the above enumerated objects, it is an object to provide an arrangement which can be readily adjusted without any great inconvenience and without changing the fan speed, this being at all times maintained regardless of the particular position or adjustment of the fan.

An added feature of the invention is the provision of a means whereby the fan may be conveniently locked in position, yet readily released so as to permit of its manipulation to adjust it with relation to the radiator.

The invention has these and other objects all of which will be explained in detail in conjunction with the accompanying drawings, which illustrate one embodiment of the invention, it being understood however that the invention is not limited to this particular arrangement, as it is susceptible of changes and modifications without departing from the spirit of the invention as expressed in the appended claims forming a part hereof.

In the drawings Fig. 1 is a sectional view taken on line A—A of Fig. 2; and

Fig. 2 is a section taken on line B—B of Fig. 1.

The mechanism whereby the invention is accomplished is preferably confined within a casing generally designated 10, and is arranged at one end of the motor, the outermost portion 11 thereof being separably connected to the part 12 by means of the bolts 13.

This casing confines various instrumentalities which cooperate with each other to drive the fan and to also permit the adjustment thereof, so that it may be properly positioned with respect to the center of the radiator without demanding the separation of the casing to permit of this and without changing the fan speed. This casing is provided with a slot to accommodate the fan shaft which is adjustable in a vertical plane along the slot, it being constructed to be locked to the casing when the proper adjustment has been made.

In the particular structure illustrated in the drawings an arrangement is shown which includes a pinion 14 which is secured to the crank shaft of the engine. This

pinion in turn meshes with a gear 15 which is driven thereby. An arm 16 is utilized and has one end thereof journalled concentrically with the cam shaft gear 15 at 17 in the casing 12. The opposite end of this arm has the pinion 18 secured to it and permits this pinion to revolve around the periphery of the relatively larger gear 15. This end of the arm 16 is provided with a bore 19 and a boss 20, the bore being provided for the reception of the stub shaft 21 upon which the pinion 18 is journaled. Another arm 22 is pivotally connected to that end of the arm 16 adjacent the pinion 18, this arm being journaled upon the extension 20 of the arm 16. The opposite end of this arm 22 carries a pinion fixed to the shaft 24 which is journaled in this end of the last mentioned arm and has the fan 25 connected thereto. An extension 26 projects outwardly from this portion of this arm and extends through the vertical slot 27 of the casing and is provided with a lock nut 28 whereby the fan, arms and pinions may be locked in adjusted position with respect to the casing.

From the foregoing general description it is evident that by releasing the lock nut 28, the fan, pinion 23, arm 22, pinion 18 and arm 16 may be moved with respect to the casing and gear 15 and locked in ad justed position, which thus permits the fan to be adjusted with respect to the radiator of the particular automobile or tractor with which the engine having the fan is to be associated. The extension 26 is provided with the annular shoulder 30 which bears against the innermost face of the material in which the slotted aperture 27 is formed, and limits the outward movement of the arm when the lock nut is drawn up to lock the arm with relation to the casing. The fan shaft 24 is provided with the enlarged portion 31 which bears against the pinion 23, and is further provided with the portion 32 having a key slot for the reception of the key 33 whereby this pinion is fixed to the shaft. This shaft is again reduced as shown at 34, so as to provide a space between it and the bore 35 for the reception of suitable roller bearings 36. A plate 37 is arranged upon the extension 26 and forms a closure for the slot 27, it being held in position by the lock nut 28.

The outermost end of the fan shaft is again reduced as shown at 38 and has mounted thereon a clutch 40, tension means for the clutch and also the fan above referred to. This clutch is provided to permit the fan to rotate with relation to the driving mechanism when the engine or driving means is brought to a sudden reduced speed or an abrupt stop, thus preventing breakage of the parts and particularly preventing the fan blades from being snapped off or otherwise disassociated from the other parts of the fan. One portion of this clutch is designated by the numeral 41 and is keyed to the shaft, and also has one face thereof provided with any suitable friction material 42, such as leather, fibre or any one of the various materials usually provided for this purpose. This element 42 engages the adjacent face of the housing 43 which may be of the shape illustrated so as to provide a means for attaching the fan blades and also to produce a housing for the other friction element 44, which engages the innermost or opposite face of the housing, and causes this housing and the fan to be rotated with the fan shaft. To insure the unitary rotation of the parts under ordinary conditions, a tension means which includes the expansion spring 45 and the nut 46 is employed. This spring may be protected against dirt and dust by means of the cupped element 47 which encloses the spring, and is arranged within the housing 43. The extreme outer end of the fan shaft is threaded to receive the nut 46, the manipulation of which permits the tension of the clutch to be varied, so as to cause it to properly drive the fan and yet permit it to rotate with respect to the shaft should the engine be brought to an abrupt stop or suddenly decreased in speed.

A lubricating pipe 48 enters the uppermost portion of the casing and is preferably arranged so that the lubricant will be fed to the gears and other portions confined in the casing, and may be connected to a force feed lubricating system or not as found desirable.

From the foregoing description it is evident that a simple structure is provided whereby the fan is positively driven which permits the fan to be adjusted along the slot without varying the fan speed.

It is further evident that all that is necessary in order to change the location of the fan is to release the lock nut. This permits the fan to be adjusted within the slot 27, and by virtue of the fact that the pinions 18—23 may be moved with relation to the gear 15, the adjustment of the fan may be accomplished with comparative ease, and without varying the fan speed.

It is also evident that should the engine or any other portion be brought to a sudden stop or a sudden decrease of speed that the fan may rotate relatively to the fan shaft, which relieves the blades of any excess tortional strain which thereby insures against breakage of the fan blades or other portion entering into the fan structure proper or its associated parts.

Having thus described the invention, what I claim and desire to cover by Letters Patent is:

1. In a device of the class described, the combination of a fan, driving means there-

for, and means whereby said fan may be adjusted relatively to the driving means without disconnecting the driving means and the fan.

2. In a device of the class described, the combination of a fan and positive driving means therefor, said fan being adjustable relatively to the driving means without disconnecting the driving means and the fan.

3. In a device of the class described, the combination of a fan and means for driving said fan, said fan being vertically adjustable relatively to the driving means without disconnecting the driving means and the fan.

4. In a device of the class described, the combination of a fan, driving means therefor, said driving means including a plurality of gears which are in mesh with each other and means whereby said fan may be adjusted relatively to the driving means without disconnecting said gears.

5. In a device of the class described, the combination of a fan and means for driving said fan, said means including a plurality of driving elements, an element of said means being arranged between the fan and another element of the driving means and being movable relatively to the fan to permit said fan to be adjusted while said first mentioned element of the driving means is in cooperative relation with the last mentioned element of the driving element.

6. In a device of the class described, the combination of a fan and means for driving said fan, means extending between the driving means and said fan having means cooperating with the driving means and fan, said second mentioned means being movable relatively to the driving means and the fan to permit of the adjustment of the fan relatively to said driving means.

7. In a device of the class described, the combination of a fan, means for driving the fan and means whereby said fan may be adjusted relatively to the driving means while the fan and driving means are in cooperative relation, said means including means which may be extended and retracted, and a plurality of cooperating rotatable elements cooperating with each other to drive the fan.

8. In a device of the class described, the combination of a fan, means for driving the fan and means whereby said fan may be adjusted relatively to the driving means while the fan and driving means are in cooperative relation, said means including means which may be extended and retracted and having a rotatable element connected thereto which is cooperatively connected with the driving means and fan.

9. In a device of the class described, the combination of a fan, means for driving the fan and means whereby said fan may be adjusted relatively to the driving means, said last mentioned means including a link which may be extended and retracted and locked in either position.

10. In a device of the class described, the combination of a fan, means for driving the fan and means whereby said fan may be adjusted relatively to the driving means, said last mentioned means including means which may be extended and retracted, and which carries a rotatable element which may be moved relatively to the driving element to adjust said fan.

11. In a device of the class described, the combination of a fan, means for driving the fan and means whereby said fan may be adjusted relatively to the driving means, said last mentioned means including means which may be extended and retracted relatively to the driving means, and means for locking said last mentioned means in adjusted position.

12. In a device of the class described, the combination of a fan, means for driving fan, said means whereby the fan may be adjusted, said means including links which are connected together to permit them to be extended and retracted to permit of the adjustment of said fan relatively to the driving means and means for locking said fan in adjusted position.

13. In a device of the class described, the combination of a fan, driving means therefor and means whereby said fan may be adjusted relatively to the driving means while in cooperative relation with the driving means and means for locking the fan in adjusted relation.

14. In a device of the class described, the combination of a fan, means for driving said fan and means whereby said fan may be adjusted relatively to the driving means, said means including an element which is moved with the fan and relatively to the driving means.

15. In a device of the class described, the combination of a fan, means for driving said fan, and means whereby said fan may be adjusted relatively to the driving means, said means including an element which is moved with the fan and relatively to the driving means, and means for locking the fan in adjusted position..

16. In a device of the class described, the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, one of said gears being movable upon the adjustment of the fan, a member extending from the fan to the movable gear to which the movable gear is connected, an end of said member providing a journal in which said fan is mounted and means for locking said member against movement.

17. In a device of the class described, the

combination of a fan, driving means for the fan, means whereby said fan may be adjusted relatively to the driving means and means whereby said fan may be rotated relatively to the driving means when the driving means is brought to an abrupt stop.

18. In a device of the class described, the combination of a fan, driving means for the fan positively connected with the fan, and means whereby said fan may be rotated relatively to the driving means when said driving means is abruptly brought to a stop.

19. In a device of the class described, the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, one of said gears being movable upon the adjustment of the fan, a member extending from the fan to the movable gear to which the movable gear is connected, an end of said member providing a journal in which said fan is mounted, means for locking said member against movement, and a clutch whereby said fan may rotate with respect to the driving means when the driving means is brought to an abrupt stop.

20. In a device of the class described, the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, a pair of members pivotally connected together, one of said members having one of said gears of the driving means and the fan connected thereto and another of the gears of the driving means being arranged adjacent the pivot of said members.

21. In a device of the class described, the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, a pair of members pivotally connected together, one of said members having one of said gears of the driving means and the fan connected thereto and another of the gears of the driving means being arranged adjacent the pivot of said members, said last mentioned gear being movable relatively to the other gears of the driving mechanism upon the adjustment of the fan.

22. In a device of the class described, the combination of a fan, driving means for said fan, means whereby said fan may be adjusted with relation to the driving means, said driving means including a drive shaft having a gear, a gear meshing with said first mentioned gear, another gear secured to said fan and a gear movable upon the adjustment of the fan, said gear being in mesh with the fan gear and the gear which meshes with the gear provided upon the drive shaft.

23. In a device of the class described, the combination of a fan, driving means for said fan, means whereby said fan may be adjusted with relation to the driving means, said driving means including a drive shaft, a gear connected to the fan, a gear operably connected to the drive shaft, and another gear meshing with said last mentioned gear and the gear connected to the fan, said gear being movable relatively to the first mentioned gear to permit the adjustment of the fan.

24. In a device of the class described the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, a pair of members pivotally connected together, one of said members having one of said gears of the driving means and the fan connected thereto and another of the gears of the driving means being arranged adjacent the pivot of said members, said last mentioned gear being movable relatively to the other gears of the driving mechanism upon the adjustment of the fan, and means whereby the fan may rotate with respect to the driving means when the latter is brought to a stop.

25. In a device of the class described, the combination of an adjustable fan, driving means for the fan, said driving means including a plurality of gears which are in mesh with each other, a pair of members pivotally connected together, one of said members having one of said gears of the driving means and the fan connected thereto and another of the gears of the driving means being arranged adjacent the pivot of said members, said last mentioned gear being movable relatively to the other gears of the driving mechanism upon the adjustment of the fan, said fan being provided with means whereby it may rotate with respect to the driving means when the latter is brought to a stop.

26. In a device of the class described, the combination of a fan and positive driving means therefor, said driving means including a plurality of gears which are in mesh with each other, said fan being adjustable relatively to the driving means and one of said gears being movable with the fan upon the adjustment of the fan.

27. In a device of the class described, the combination of a fan mounted upon a shaft and means for driving said fan, said fan being vertically adjustable relatively to the driving means without disconnecting the driving means and the fan, said means for driving the fan including an element which is rotatable around the shaft of the fan.

In witness whereof, I hereunto subscribe my name this 9th day of February A. D., 1921.

GEORGE V. DOMARUS, JR.