No. 843,380. PATENTED FEB. 5, 1907.

A. WINTON & H. B. ANDERSON.

FAN FOR AUTOMOBILE COOLING SYSTEMS.

APPLICATION FILED APR. 2, 1906.

2 SHEETS—SHEET 1

FIG. 1.

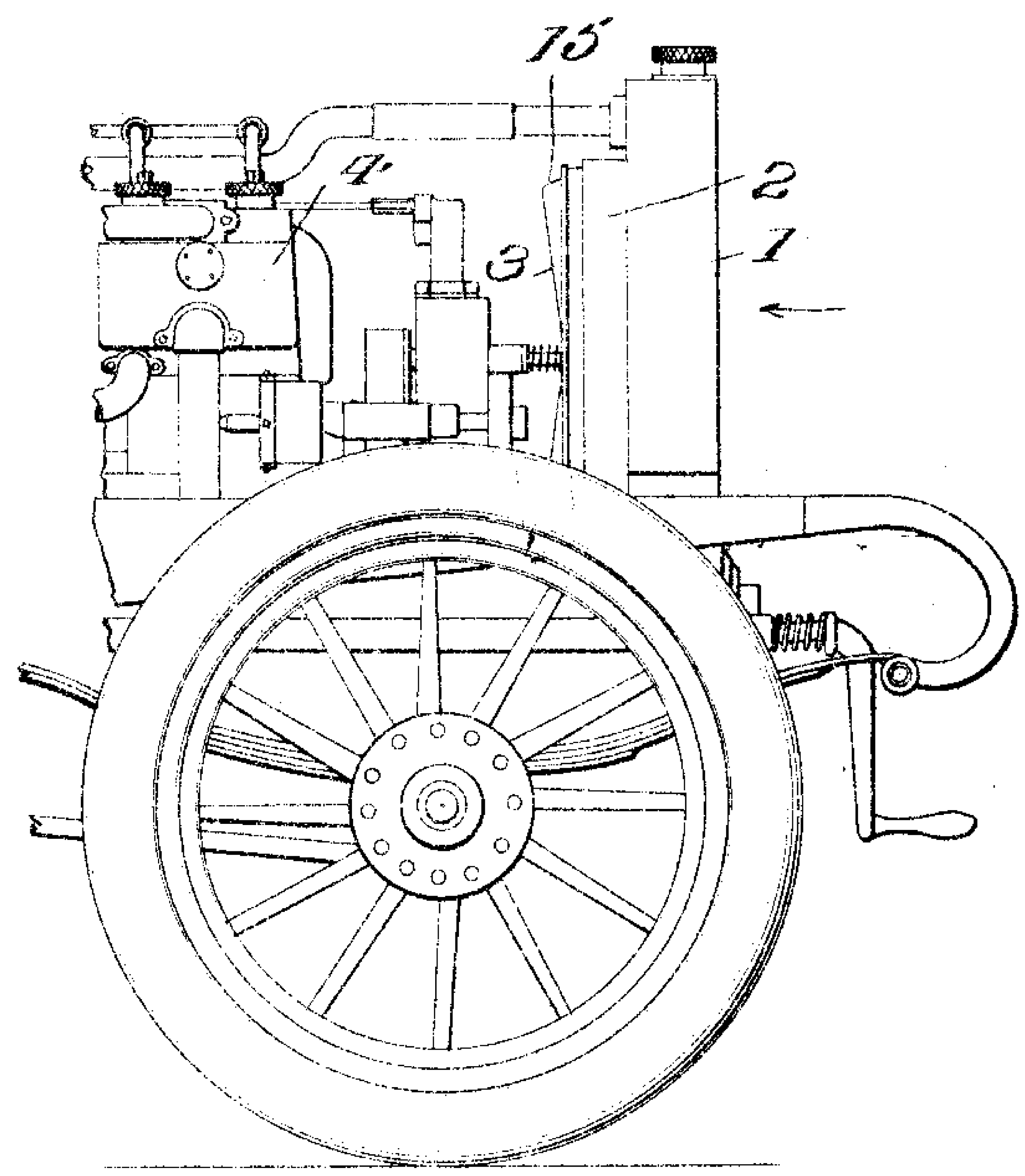
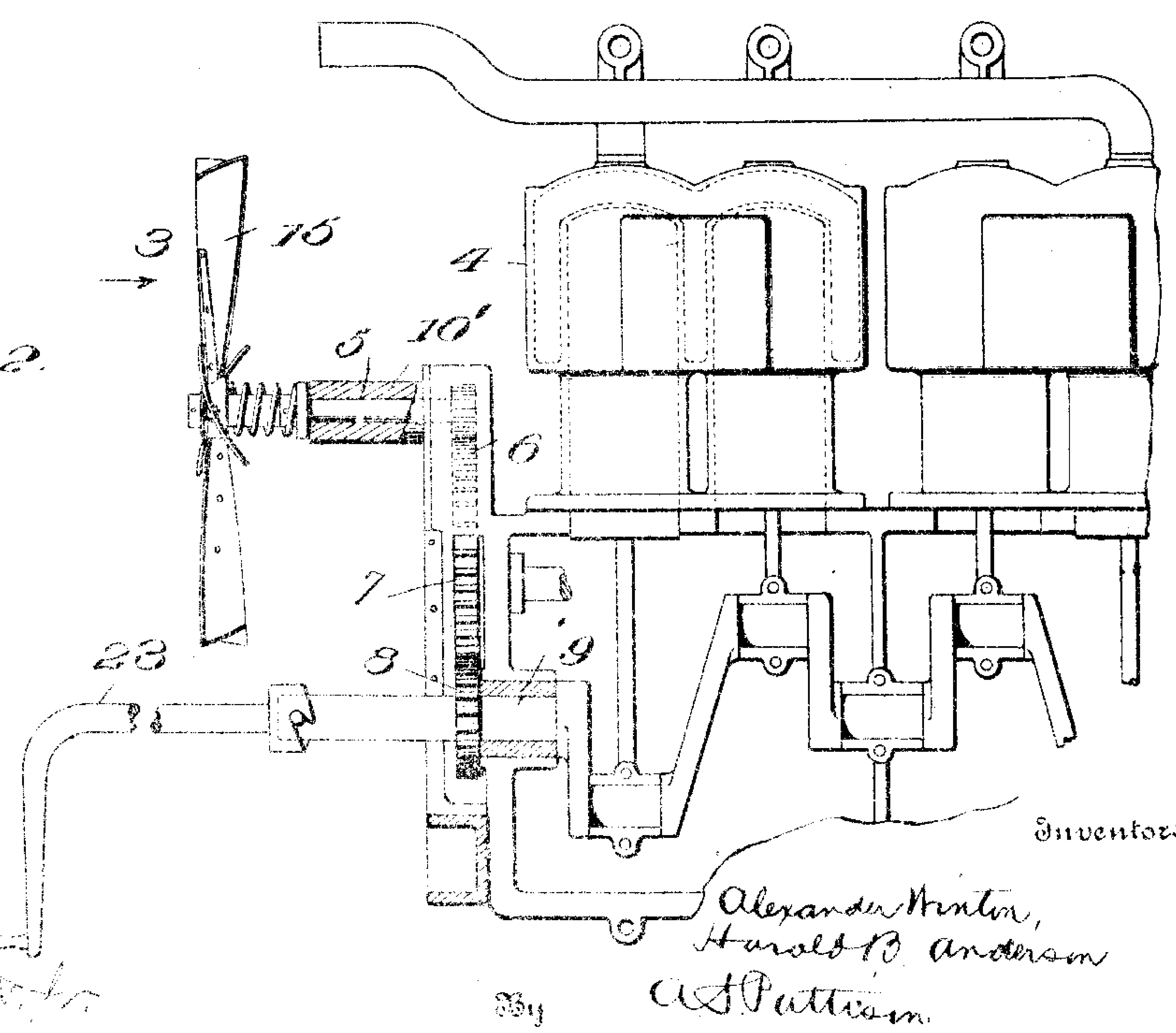


FIG. 2.



Witnesses
C. P. Wright Jr.
A. H. Ehrsberg

Inventors
Alexander Winton,
Harold B. Anderson

By A. S. Pattison

Attorney

No. 843,380. PATENTED FEB. 5, 1907

A. WINTON & H. B. ANDERSON.

FAN FOR AUTOMOBILE COOLING SYSTEMS.

APPLICATION FILED APR. 2, 1906.

2 SHEETS—SHEET 2.

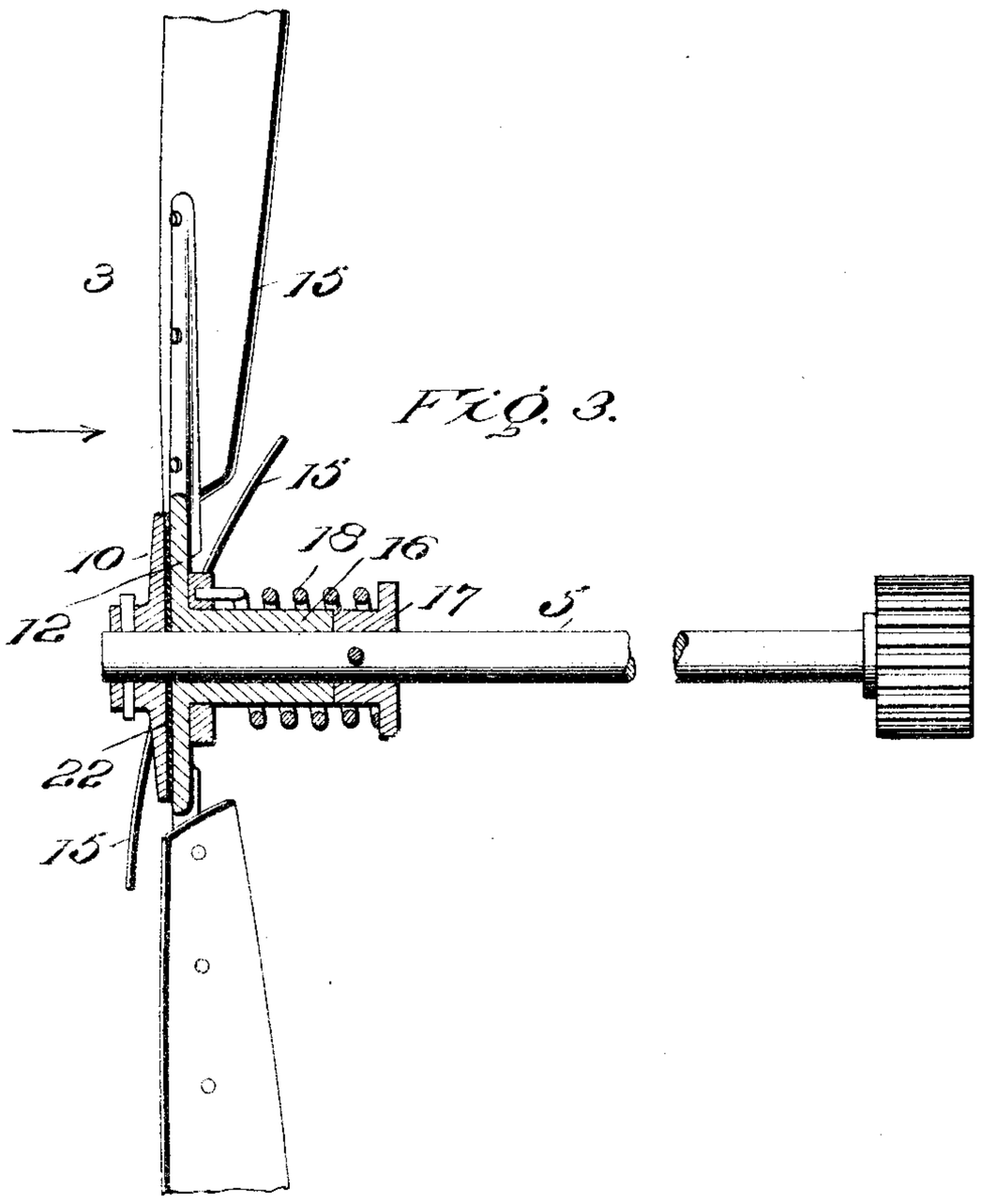


FIG. 3.

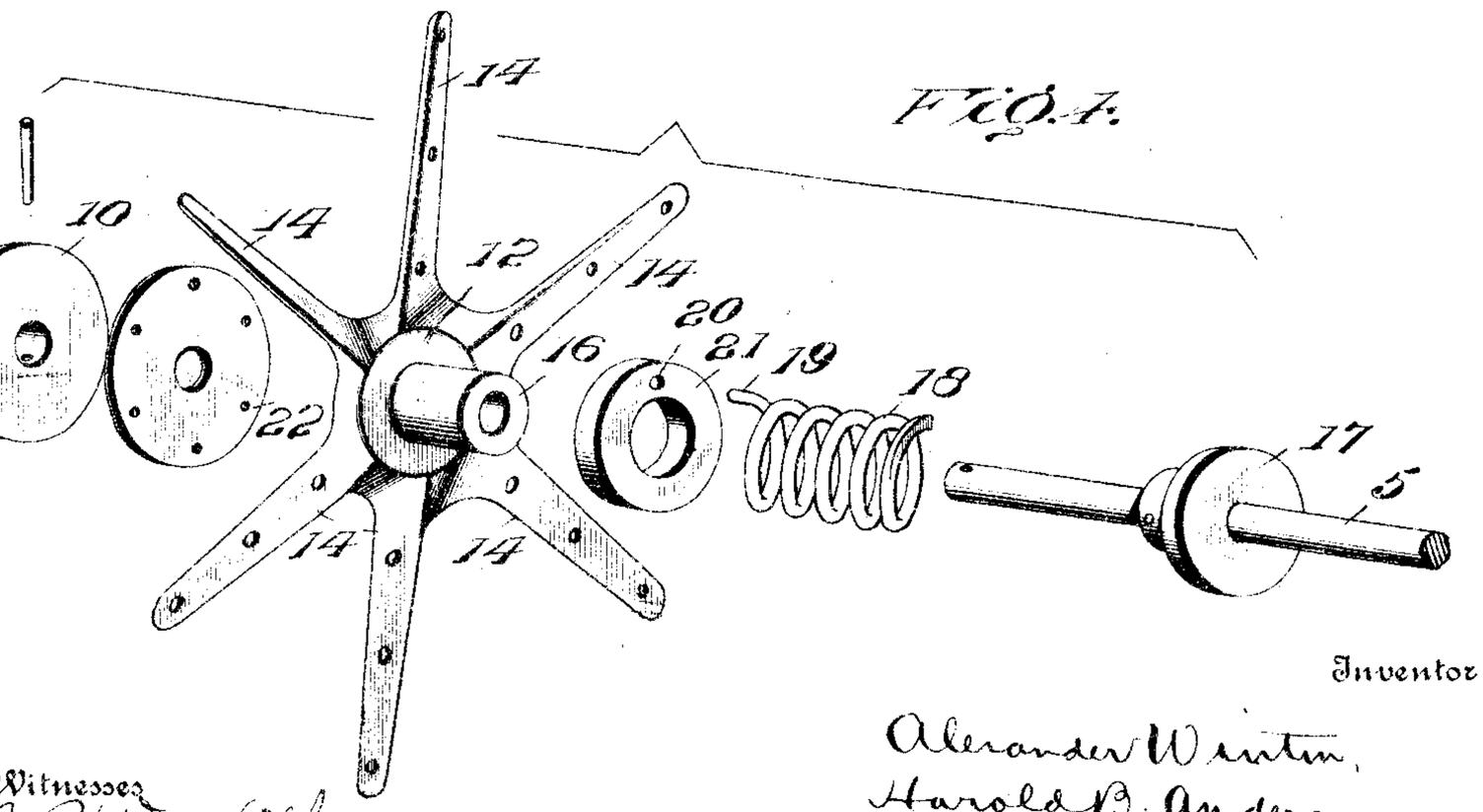


FIG. 4.

Witnesses
C. P. Wright Jr.
A. H. Ehrlinger.

Inventors
Alexander Winton,
Harold B. Anderson,
By A. J. Pattison,
Attorney

UNITED STATES PATENT OFFICE.

ALEXANDER WINTON AND HAROLD B. ANDERSON, OF CLEVELAND, OHIO, ASSIGNORS TO THE WINTON MOTOR CARRIAGE COMPANY, OF CLEVELAND, OHIO.

FAN FOR AUTOMOBILE COOLING SYSTEMS.

No. 843,380. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed April 2, 1906. Serial No. 309,508.

To all whom it may concern:

Be it known that we, ALEXANDER WINTON and HAROLD B. ANDERSON, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fans for Automobile Cooling Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to improvements in fans for automobile cooling systems; and its object is to prevent stripping the gears which positively connect the fan with the explosive-engine.

It is well understood by those skilled in the art that fans are generally used in the cooling systems of automobiles, using both air and water cooled explosive-engines. It is also known that the explosive-engine starts suddenly, and for that reason the fan is not usually gear-driven, because the inertia when suddenly starting the fan is found to put a serious strain on the gears and to cause a stripping of the teeth thereof. Hence, therefore, the usual and practically universal way of connecting the fan with the engine has been by rope or cable which has more or less slack. This has been found, however, to be difficult to keep at the proper tension to allow for some slip, and at the same time insure the positive driving of the fan when the engine is running fast, as the rope or cable in use becomes too slack to meet all the requirements of practical use.

By this invention the fan-shaft is positively connected with the engine-shaft by toothed gears, and the fan is so mounted on its shaft that when the engine starts the sudden jerk caused upon the fan is relieved by a friction device interposed between the fan and its shaft and yet which is not subject to slack from wear to prevent the positive driving of the fan when the engine is running fast, as in the use of a rope or cable. The construction is also such that the action of the air on the blades of the fan will tend to increase its friction with the fan-shaft, so that the faster the fan is run the greater the friction, and this tends to prevent slipping when running fast, while at the same time permitting a slip when the fan is suddenly started when at rest.

In the accompanying drawings, Figure 1 is a side elevation of the front end of an automobile, showing the invention as applied in practice and its relation to the water-cooling radiator of a water-cooled explosive-engine. Fig. 2 is a view showing an explosive-engine and the positive gearing connecting the fan-shaft with the engine-shaft. Fig. 3 is a detached view of the fan-shaft with the fan thereon and the friction devices shown in section. Fig. 4 is a detached perspective view of the several parts of the fan, showing them separated, but in their relative relation.

Referring now to the drawings, 1 indicates any desirable form of radiator through which the water for cooling the engine circulates, in a manner well understood by those acquainted with the art, and against the outer surface of which the current of air from the fan 3 impinges for cooling the radiator, and therefore cooling the water passing through it. The construction of a radiator for this purpose and the circulation of the water through it are so well understood that further illustration and description is not necessary. Preferably, though not necessarily, a hood 2 is located just in rear of the radiator and practically incloses the fan, as illustrated in Fig. 1. Such arrangement is found to increase the efficiency of the fan. Air is drawn through the radiator by the fan from the front and in the direction indicated by arrows in Figs. 1, 2, and 3.

The explosive-engine is indicated by 4, and its crank-shaft 9 is positively connected with the fan-shaft 5 through the medium of a train of gearing 6, 7, and 8. Suitable bearings are provided for the fan-shaft, as here shown, the inner end thereof being journaled in a housing 10′.

Suitably secured to the outer end of the fan-shaft 5 is a suitable friction thrust-disk or collar 10, and placed loosely on said shaft in rear of the disk is the fan 3. This fan consists of a hub portion 12, from which radiate the arms 14, and to these arms the fan-blades 15 are firmly attached. Preferably the hub has a rearwardly-extending portion 16, which provides an elongated bearing upon the shaft 5 for the fan.

It will be noticed that the fan-hub and its extension are located between the disk 10

and a collar 17, which are firmly attached to the shaft by transverse pins or otherwise. Surrounding the extension 16 is an expanding spiral spring 18, which has its inner end abutting against the collar 17 and its forward end 19 preferably engaging an opening 20 in a sleeve or ring 21. The sleeve 21 in turn rests against the portion 12 of the fan. A fiber friction-disk 22 is preferably located between the outer face of the hub 12 and the friction thrust-disk 10, though this latter is not absolutely essential. It seems, however, to take part of the wear and to increase the frictional contact of the front end of the hub in respect to the coacting friction-disk 10.

In operation the engine is started as usual in any suitable manner. Usually a starting-crank, such as 23, is provided for that purpose, though other means of starting may be utilized. As stated, an explosive-engine starts suddenly, and the fan being frictionally held on its shaft by the means here shown and described the sudden shock to the gearing is relieved. Also explosive-engines when running are frequently suddenly speeded to a very high speed. In such event the shock to the fan-gearing is relieved for the moment by the friction arrangement; but the frictional drive will gradually take hold until the fan is running at the proper speed.

Attention is directed to the fact that the driving frictional surfaces are so arranged that the air-pressure upon the blades of the fan will cause a frictional thrust in addition to that caused by the expanding-spring 18. This tends to cause the frictional contact to be increased when required for high speed, but is of such extent as to permit the fan to slip when the engine is started or suddenly speeded.

The construction here shown and described is found to embody a principle of operation that is found exceedingly efficient and to permit the use of the desirable gear-driven fan without its recognized disadvantages, heretofore pointed out.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination with an explosive-engine, of a fan-shaft, gears positively connecting the engine with the fan-shaft, a fan loose on the fan-shaft, a friction-disk fast on the fan-shaft and coacting with the fan-hub for driving the fan, an expanding-spring having one end coacting with the opposite side of the hub from the said friction-disk, and the opposite end of the spring held by a shoulder on the fan-shaft, the parts coöperating as described.

2. The combination with an explosive-engine, of a fan-shaft, gears positively connecting the engine with the fan-shaft, the fan having an elongated hub loose on the shaft, a friction-disk fast on the shaft and coöperating with one side of the hub for driving the fan, and an expanding-spring coöperating with the opposite side of the hub for the purpose described.

3. The combination of a fan-shaft, means for driving it at different speeds, a fan loose on the shaft, friction devices between the fan and its shaft for driving it, the friction devices so located that the air resistance upon the blades of the fan causes the friction to increase or decrease according to the speed of the fan.

4. The combination of a fan-shaft, means for driving the shaft at different speeds, a fan loose upon the shaft, friction driving devices between the shaft and the fan, means forcing the friction devices together, the friction devices being so arranged that the air resistance to the blades of the fan will add to the frictional engagement of the friction driving devices when the speed of the fan is increased.

In testimony whereof we affix our signatures in presence of two witnesses.

ALEXANDER WINTON.
HAROLD B. ANDERSON.

Witnesses:
H. L. OWESNEY,
I. F. BAUGHMAN.