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2,747,558

AIR-COOLED ENGINE AND AIR INTAKE THEREFOR

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2 Sheets-Sheet 1

Fig. 1

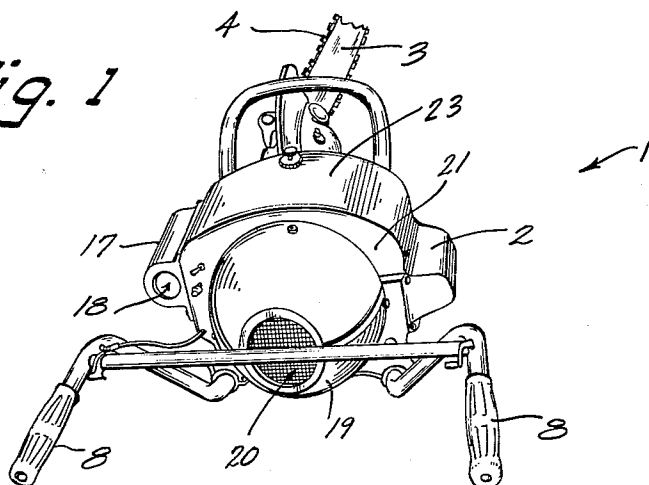
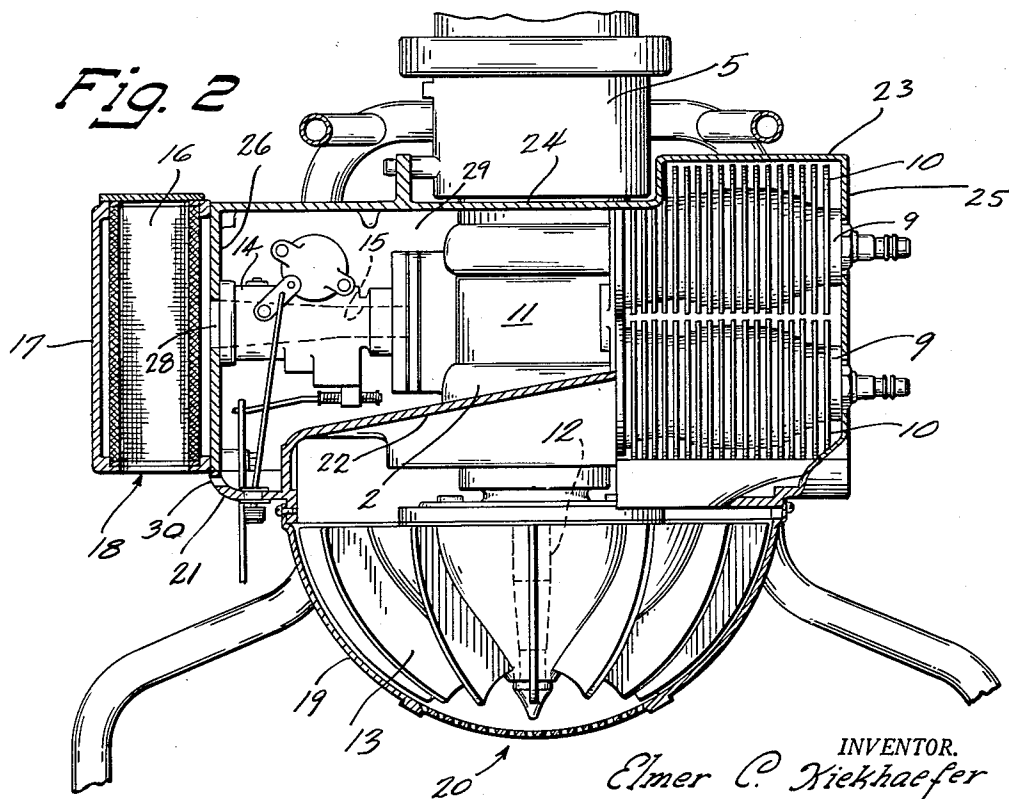


Fig. 2



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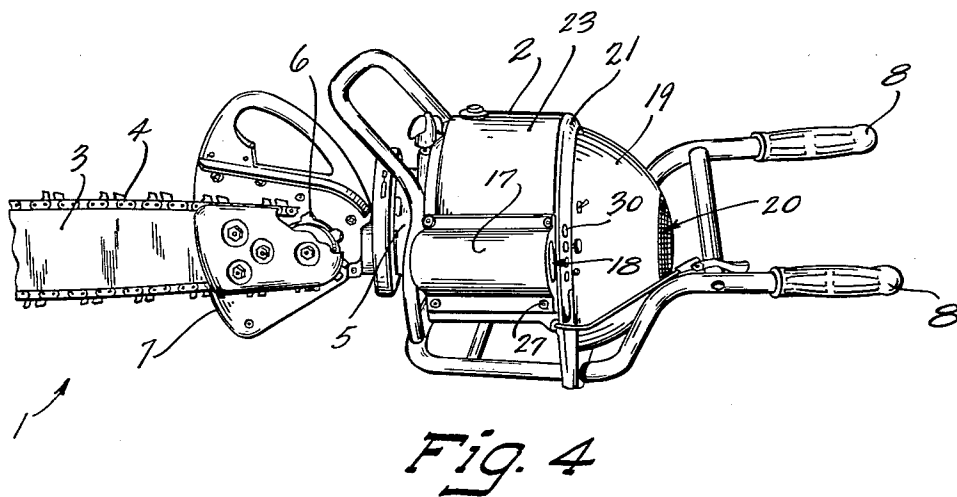
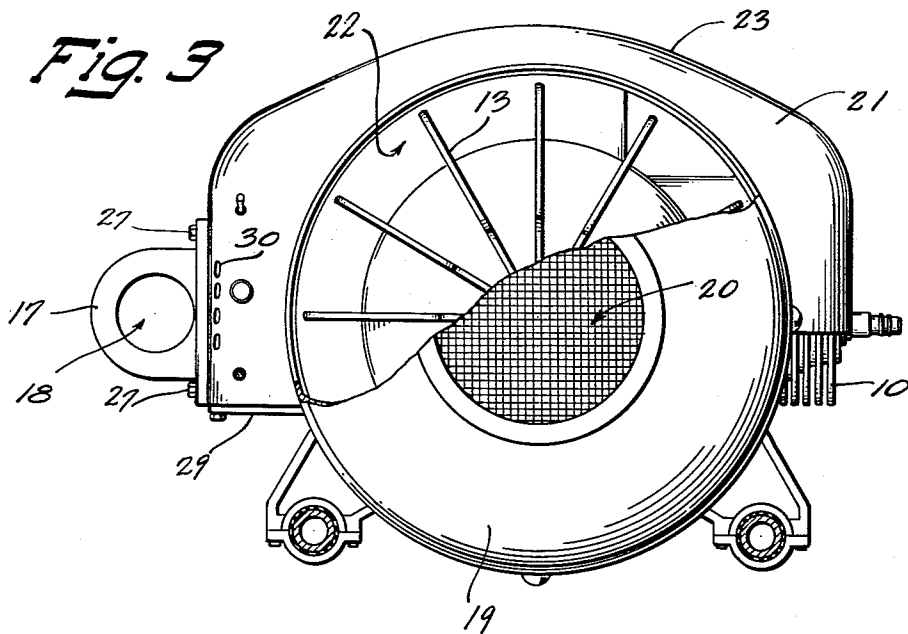
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Application October 18, 1952, Serial No. 315,547

3 Claims. (Cl. 123—41.62)

This invention relates to air-cooled engines for chain saws and the like and particularly to means for preventing induction of sawdust and wood chips into the combustion air intake system of the engine.

The invention provides for the use of a limited amount of cooling air directed past the carburetor intake opening and generally downwardly thereof to prevent sawdust and wood chips from being drawn upwardly into the intake opening. The impeller of the air cooling system is utilized to separate out by centrifugal action the sawdust and wood chips from the small amount of air which is diverted to keep the filter clean.

An object of the invention is to allow use of the engine for longer periods without cleaning of the air intake filter.

Another object is to prevent sawdust from reaching the air filter and passing therethrough into the engine.

These and other objects and advantages of the invention will be more fully set forth in the following description of a preferred embodiment of the invention as illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a perspective view of the chain saw unit from the position of the operator showing the cooling air intake and carburetor air intake which open in the direction which the sawdust and wood chips will be directed;

Fig. 2 is a top plan view of the engine of the chain saw unit with parts broken away and sectioned to show the construction and arrangement thereof whereby the cooling air is directed towards the carburetor intake opening;

Fig. 3 is an end elevation of the chain saw unit with parts broken away showing the cooling air system; and

Fig. 4 is a side elevation of the engine with parts broken away to show the circulation of air provided by the impeller driven by the engine.

The chain saw 1 shown in the drawings includes the engine 2 and the guide rail 3 which carries the saw chain 4. The transmission case 5 at the forward end of engine 2 carries the sprocket 6 which is driven by engine 2. One end of guide rail 3 is secured to the transmission case 5 in line with sprocket 6 and adjacent to the abutment 7 formed by transmission case 5 which extends adjacent to guide rail 3 and downwardly thereof to engage the work to be cut by the chain. The chain 4 is carried for movement around the edge of guide rail 3 and is trained over sprocket 6 to be driven by the engine so that the lower portion of chain 4 moves towards abutment 7 and holds abutment 7 and the chain saw unit against the work for the steady support of the unit.

The handles 8 are secured beneath the engine and extend rearwardly of the unit for grasping by the operator and manipulation of the unit from a position remote from the moving chain 4.

In the operation of the chain saw unit, the guide rail may be adjusted to various positions for cutting at different angles. In any case, however, the cutting side of

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the chain 4 carries and directs the wood chips and sawdust in the direction of the engine.

The engine 2 includes the cylinders 9 which are provided with series of fins 10 for air cooling of the cylinders. Cylinders 9 are disposed horizontally on one side of the crankcase 11 of the engine. The crank shaft 12 projects at the rear end of the engine to carry the impeller 13. The carburetor 14 is carried by crankcase 11 oppositely of cylinders 9 and is provided with a horizontally disposed mixing passage 15 which opens into the crankcase for the delivery of a fuel mixture thereto. The cylindrical, open-ended filter 16 is carried within the housing 17 with one end of filter 16 supported adjacent to the inlet opening 18 of housing 17 to receive the air which passes radially outwardly through the filter into housing 17. Housing 17 is open at one side to communicate with passage 15 for delivery of air to the carburetor. Opening 18 of housing 17 faces oppositely of the guide rail and chain 4 so that the sawdust and wood chips are not received directly therein.

The casing 19 enclosing impeller 13 is provided with the screened inlet opening 20 which is disposed at the rear of the chain saw and also faces oppositely of the guide rail and chain 4. The scroll plate 21 supports casing 19 and receives the air therefrom which is drawn into the casing by rotation of impeller 13 with operation of engine 2. The scroll plate 21 includes the channel 22 which extends circularly about the axis of rotation of impeller 13 and is developed axially with respect thereto. The hood 23 extends over the engine to cover the same and is closed at the forward end of the engine by the wall 24. The rear end of hood 23 is secured to the periphery of scroll plate 21. One side 25 of hood 23 extends downwardly over the ends of cylinder 9 and the opposite side 26 of hood 23 extends downwardly over the end of carburetor 14. Housing 17 carrying filter 16 is secured to side 26 of hood 23 by the bolts 27 and over the opening 28 which registers with passage 15 of the carburetor. The lower closure member 29 is joined to crankcase 11, plate 21, side 26 and forward wall 24 of hood 23 to close the hood so that the air in the hood and directed to cylinders 9 passes only downwardly between the fins 10 to cool the cylinders except for the small amount of air, which according to the invention, is utilized to prevent sawdust and wood chips from entering opening 18.

According to the invention, channel 22 terminates above the engine to release the air from casing 19 into hood 23 in the direction of and over cylinders 9 and a series of ports 30 provided in wall 29 of scroll plate 21 are oppositely disposed to direct a relatively small amount of air across opening 18 of filter housing 17 and generally downwardly thereof.

In the operation of the chain-saw unit, the rotation of impeller 13 which directs a quantity of air towards cylinders 9 to cool the same effects and maintains a moderate pressure within hood 23. The air under pressure within hood 23 is released through ports 30 over the end of housing 17 provided with opening 18 so that sawdust and wood chips which are directed by chain 4 rearwardly of the unit and towards the engine are not drawn into filter 16 for engine operation. Any amount of sawdust and wood chips drawn by the impeller into casing 19 through opening 20 is directed by channel 22 of scroll plate 21 into hood 23 towards cylinders 9 and passes with the cooling air downwardly between fins 10 of the cylinders to the ground. Ports 30 are disposed with respect to channel 22 in scroll plate 21 and the direction of air delivered by impeller into hood 23 so that such sawdust and wood chips tend to be separated out of the air which otherwise might pass within hood 23 and be discharged through ports 30. The channel 22 forms a baffle within hood 23 which directs the air away from

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ports 30 so that the wood and dust is separated out and from the air which is being passed through ports 30.

Impeller 13 which is utilized to provide the cooling air for the engine and a small amount of air under pressure to keep foreign particles from reaching the opening to carburetor 14 as described draws the air into casing 19 wherein the air is subject to a high rotational velocity which causes the larger foreign particles carried by the air to move centrifugally outwardly to the inside wall of the casing. The particles travel along the inside wall of casing 19 and into channel 22 until released into hood 23 in the direction of cylinders 9 with the cooling air as described.

The air circulating system as shown in the drawings is similar to that described and claimed in the present inventor's copending application Serial No. 271,506 and filed February 14, 1952, now Patent No. 2,699,764, issued January 18, 1955, for Air Cooled Internal Combustion Engine.

Various embodiments of the invention may be employed within the scope of the accompanying claims.

I claim:

1. In an engine for chain saws and the like, an impeller driven by an engine for cooling the same, a casing for said impeller and having a discharge opening, a hood enclosing said engine and communicating with said opening to receive the air driven by the impeller and to direct the air over the engine for maximum effective cooling thereof, a carburetor for said engine having an intake opening adjacent to said hood, and vent means in said hood comprising a number of ports for the diversion of a part of the cooling air therein and disposed to direct such air past said intake opening to preclude the entry therein of foreign particles, the discharge opening of said impeller housing being directed away from said vent ports whereby foreign particles drawn into the housing by the impeller are directed within said hood away from said vent ports.

2. In an engine, a carburetor having an intake passage opening, a plurality of closely-spaced fins attached to a part of the engine for cooling the latter, an impeller driven by the engine and having a generally circular outer casing secured to the engine with an air intake opening, said casing enclosing said impeller including a hood extending over the engine to receive the air from the casing under limited pressure and disposed to direct the air over the engine and between said fins to cool the latter, said hood extending adjacent to the opening of said car-

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buretor intake passage and having discharge vents comprising a number of ports disposed to release a limited amount of air under pressure in the hood exteriorly of and across said intake opening to preclude foreign particles carried by the outside air from said carburetor passage, and baffle means in said hood disposed to direct the air received therein from said casing away from said ports and toward said fins whereby the foreign particles carried by the air entering said intake opening are discharged between said fins and the air passing within the hood to said ports is generally free of foreign particles.

3. In an engine having a number of horizontally disposed cylinders, a series of closely-spaced vertical fins attached to said cylinders for cooling the latter, a carburetor secured to the engine and having an intake opening remote from said cylinders, an impeller driven by the engine and having a casing secured to the engine with an air intake opening, said casing enclosing said impeller including a hood extending over the engine including said carburetor and cylinders to receive the air from the casing under limited pressure and disposed to direct the air over the engine cylinders and downwardly between said fins to cool the latter, said hood extending adjacent to the opening of said carburetor intake passage and having discharge vents comprising a number of ports disposed to release a limited amount of air in the hood exteriorly of and across said intake opening to preclude foreign particles carried by the outside air from said carburetor passage, and baffle means formed in said hood to direct the air received therein from said casing toward said cylinders and away from said ports, the cooling air delivered to said hood under pressure and the foreign particles carried thereby being directed toward said fins and away from said ports.

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