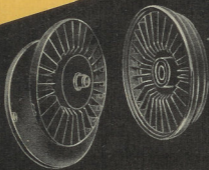


NOW IN ITS

SECOND

Year!



CHRYSLER

FLUID DRIVE

FLUID FIRST BY CHRYSLER DRIVE

DEVELOPED AND PROVEN BY
CHRYSLER CORPORATION
ENGINEERS

● For many years, the goal toward which automotive engineers have been striving has been the development of a gasoline-propelled motor car which could, under all ordinary conditions, be driven without constant use of the clutch or gear shift lever but which would operate with all the flexibility of steam or electricity.

Several years ago, a European automobile manufacturer began experiments with a fluid flywheel, and this manufacturer's cars have been equipped with this method of transmitting power for many years.

The basic principle, then, is by no means new or untried. The first application of a fluid coupling to passenger cars in the United States was made late in 1938, when Chrysler

For two model-years and in six series of Chrysler cars, Fluid Drive has been available as standard or optional equipment.

1939



CHRYSLER CUSTOM IMPERIAL



CHRYSLER IMPERIAL

1940



CHRYSLER CROWN IMPERIAL



CHRYSLER NEW YORKER



CHRYSLER SARATOGA



CHRYSLER TRAVELER

introduced Fluid Drive as standard equipment on the 1939 Chrysler Custom Imperial.

This public introduction came only after Chrysler Corporation engineers had spent six years developing and testing various types of fluid coupling, putting each through gruelling tests in the laboratory, and on the road—on all kinds of roads and in all kinds of weather.



When the ultimate design was finally chosen, a new series of tests was given to a number of Chrysler cars equipped with Fluid Drive. Day in and day out these cars tackled every conceivable road condition—from desert sand to torturous winding mountain roads; in hub-deep mud; on icy

pavements, smooth, slippery and treacherous; in deep snow where cars with conventional drive would fear to tread.

Not only did Chrysler Fluid Drive come through with flying colors but even the engineers who designed the new coupling were amazed at its versatility. Neither sand nor mud nor snow nor ice could stall these cars. Under conditions which would render completely in-



operative a car with conventional drive, Chrysler cars equipped with Fluid Drive pulled away as smoothly as the Twentieth Century Limited leaving Grand Central.

But our engineers were not seeking a device which would be of value only under adverse conditions. Indeed, this advantage was secondary in importance. Smooth, easy operation at all times—in the stop-and-go traffic of metropolitan areas and in country cruising; the previously unknown pleasure of driving for hours without once touching clutch pedal or gear shift lever but with the comforting knowledge that both clutch and gear shift were ever-present when the need

for a quick change of gear ratio presented itself: this was the primary purpose of Chrysler Fluid Drive and the success attained by Chrysler Corporation engineers is attested to by the hundreds of thousands of miles of effortless and trouble-free driving which Chrysler Fluid Drive has given to owners since 1938.



THE *PRINCIPLE* OF CHRYSLER FLUID DRIVE

● To explain Chrysler Fluid Drive in non-technical terms is extremely simple if we substitute two ordinary electric fans for the component parts of the fluid coupling.

In the accompanying illustrations, we see two fans facing each other (Figure 1). Fan "A" is connected to the current supply, while fan "B" is receiving no electrical energy whatever. Fan "A" represents the driving member of the Fluid Drive unit; that is, that portion of the coupling which is directly connected to the crankshaft. Fan "B" is the driven member through which power is transmitted by means of the conventional friction clutch and transmission to the rear axle of the car.

In Figure 2, fan "A" is rotating under power, but the blades of fan "B" remain stationary, being held by a light pressure of the hand. This is analogous to the action of Chrysler Fluid Drive when the engine is idling, but the car is held immovable because of the application of the brakes.

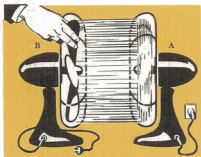


Figure 2

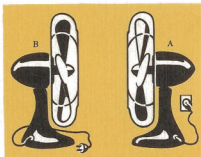


Figure 1

Both fans are rotating in Figure 3. The air blast from fan "A" rushes against the blades of fan "B", causing them to rotate. Thus, the second fan is receiving energy from the first fan through the medium of air which becomes an energy carrier. And if we have means of increasing and decreasing the speed of the first fan, the speed

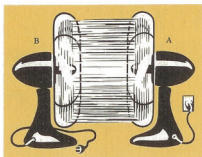


Figure 3

of the second fan likewise will increase and decrease. Bear in mind particularly that there is no mechanical connection of any kind between our two fans —yet, via air, the rotary motion of one is immediately transmitted to the other.

Here we have essentially the principle of Chrysler Fluid Drive. Fluid Drive has precisely the same elements as our fans, except that we substitute fluid for air and radial vanes for the blades of the fan.

● Illustrated in Figure 4 is a demonstrating unit which graphically illustrates Fluid Drive in action. It should be borne in mind that in actual practice the Fluid Drive members (Figure 6) are permanently housed in a casing which is attached to, and revolves with, the crankshaft. For purposes of demonstration, however, we have re-

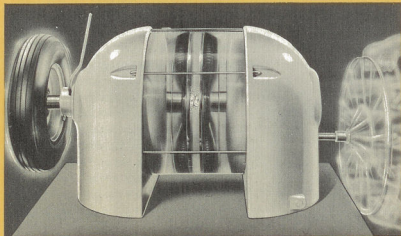


Figure 4

moved the housing and installed the driver and driven member in a large cylindrical casing partially filled with liquid.

Notice, in Figure 4, the action of the bubbles, whirling between the vanes of the driven member. Thus we reproduce, to a limited extent, the action of the fluid in the actual Fluid Drive unit. The vanes attached to the casing, and rotating with it, throw the oil around and outward like a vertical whirlpool until it crosses the quarter inch gap between the driver and runner, impinges on the vanes of the runner and causes it to turn. Thus we visualize the oil whirling

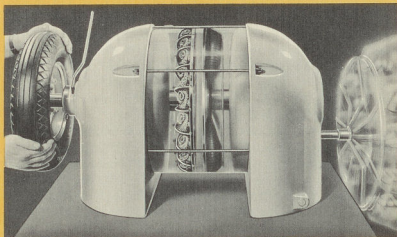


Figure 5

around and around in this closed circuit, snaking in and out between the vanes of the driver and runner—picking up a load of energy from the driver—carrying it across to the runner—and returning again and again to the driver for more energy. In operation, the path of the oil is similar to that of a coil spring bent into a hoop.

Figure 5 illustrates the shaft of fluid which provides the only connection between the engine and the rear wheels. At regular engine speed, this so-called shaft fills the entire housing, exerting the tremendous power which drives a Chrysler car equipped with Fluid Drive with a smoothness and flexibility comparable to steam or electricity.

CHRYSLER FLUID DRIVE

IN OPERATION...

● It is not in any sense an overstatement to say that Chrysler Fluid Drive is the most far-reaching improvement in motor car operation since chains and sprockets were discarded in favor of bevel gears.

In a car with conventional fly-wheel, it is quite impossible to start the engine with gears in mesh and the clutch engaged. Yet, this is exactly what you do in a car equipped with Chrysler Fluid Drive, and without the slightest possibility of injury to any mechanical part.

Your engine will not stall; it will continue to operate. Moreover, you will not feel the faintest jerk or jar as the car moves from a standstill. This is true even if you suddenly push the accelerator pedal right down to the floor board. The car seems to gather momentum as smoothly as a toboggan on a gradual slope.

Its smoothness in transmitting power is one notable advantage of the Fluid Drive but not its only one. Even more important is the fact that this revolutionary improvement greatly reduces the use of the gearshift lever and clutch in all ordinary driving conditions. In fact, it is quite possible to drive for hours, through varying traffic conditions, without once touching gearshift lever or clutch pedal, after the original shift to high gear.

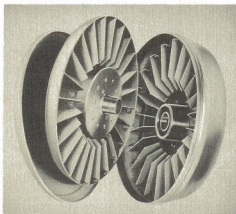


Figure 6

Why, then, use a clutch?

Because it gives selectivity of speeds (gear ratio) and complete control to the driver at all times. Even when driving in congested traffic, no shifting of gears is required, but if there arises the necessity for quick pick-up, the driver need not depend on engine acceleration alone to attain higher speed.

NOTHING TO LEARN OR UNLEARN

If you can drive an automobile, you need no instructions when you first seat yourself behind the wheel of a Chrysler car equipped with Fluid Drive. There is no nerve-wracking period of readjusting your driving habits. No special instructions are necessary. You drive as you always have driven, but with a new sense of ease and smoothness.

You CHOOSE YOUR STARTING-GEAR RATIO

Do you want fast get-away? Then start in low, as you have always done. You will find, however, that you may shift directly from low to high without the slightest trace of jerk. Or, if you prefer, start in second. Your engine won't stall; there will be absolutely no strain on mechanical parts.

Perhaps you'd rather start in high. Did you ever try it in a car with the conventional flywheel? With Fluid Drive, your car will pull away with a smooth, even acceleration hitherto unknown in a gasoline-propelled vehicle. You do not declutch when coming to a stop, but merely rest your foot on the brake pedal. It is necessary to declutch only when shifting gears.



FORGET YOUR CLUTCH PEDAL . . .

Under average driving conditions, your first shift to high gear is your last for the duration of the trip. You can stop and start, drive slowly or at normal road speed, without once shifting gears, or declutching.



Only when you desire a surge of power for exceptionally quick get-away, or to meet emergency conditions, is it necessary to shift. And therein lies one of the most important features of Fluid Drive: When you need a lower gear ratio, it is yours instantly. It is not necessary to wait until your speed has reduced sufficiently to permit a complicated mechanism to function.

WHEN *Additional* POWER IS NEEDED

● There arise at times, circumstances which require a quick change of gear ratio and on such occasions, no mechanical device can effect a gear shift as quickly as manual control. With Chrysler Fluid Drive, it is not necessary to wait until a pre-determined reduced speed is attained, in order to shift to a lower gear ratio.

Perhaps you are following a slow-moving car or truck on a long, straight grade. When the road ahead of you is safely clear, a quick shift to second gear, *at the instant you want it*, gives you ample reserve power to pull around, and ahead of, the car which is blocking you.



Because Chrysler Fluid Drive is able to operate in high gear at low speeds, maximum traction is obtainable where most needed—on icy pavements, for example. In a car with conventional flywheel, it is impossible to start in high gear without abusing the clutch. Second or low gear must therefore be used and the sudden application of power, resulting from the use of a lower gear, causes the wheels to spin.

This also applies to mud or sand or deep snow, in which case the wheels dig deeper into the soft surface making it impossible in many instances to pull out under the car's own power.



Fluid Drive overcomes these obstacles because of the even application of power to the load. In most instances, high gear can be used, but at times conditions may be encountered where the load is greater than the engine can handle in high gear, despite the extreme flexibility of Fluid Drive.

In such cases, second gear, or even low, may be used; in either case, the pull will be smooth and even and will impose no strain upon the engine.

No mechanically-operated gearshift arrangement can have the flexibility of Chrysler Fluid Drive.

SMOOTH, EASY STARTING

Whether you start in high gear or in a lower gear, shifting later to high, the Chrysler car equipped with Fluid Drive will start and gather momentum without the slightest trace of jerk so common with the conventional type of flywheel.

There is no sudden surge. Smooth acceleration at all speeds is an inherent quality of Chrysler Fluid Drive.



ENGINE CANNOT BE STALLED

Because there is no mechanical connection between the engine and the rear wheels, it is impossible to stall the engine of a Chrysler equipped with Fluid Drive. Whether on hills, in sand or mud, on icy pavements or "crawling" at extremely low speed in high gear, or at a dead stop in gear with engine running, there is no possibility of stalling.



ON DOWN GRADES, ENGINE CAN BE USED AS BRAKE

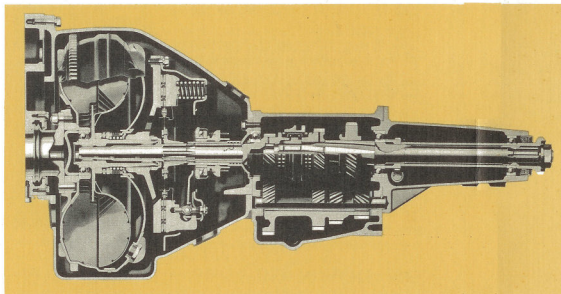
When descending a grade, the engine of a Chrysler Fluid Drive car may be used as a brake in exactly the same manner as on the car you are now driving. In this instance, the function of the two members is reversed and the driven member becomes the driving member, being operated by the action of the rear wheels.



CAR CAN BE LOCKED IN *any* GEAR

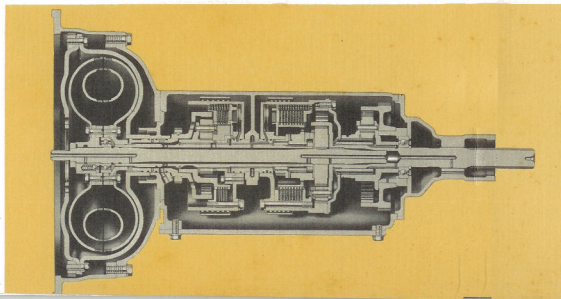
Another advantage of Chrysler Fluid Drive with its standard transmission is the fact that the car can be locked in any gear. This feature is obviously much to be desired, particularly negotiating steep downgrades, where locking in gear adds to the braking facilities of the car.

How does CHRYSLER FLUID DRIVE compare with other types of hydraulic drive?



CHRYSLER FLUID DRIVE

A sectional view of Chrysler Fluid Drive and standard transmission reveals its simple design and a minimum of moving parts.



HYDRA-MATIC DRIVE

Complicated mechanisms with multiple sets of planetary gears increase the possibility of noise and friction with its resultant wear.

Questions and Answers

PROVING
THE SUPERIORITY
OF
CHRYSLER'S
FLUID DRIVE

The introduction of a form of hydraulic drive on a competitive automobile has prompted a number of questions in the minds of prospective car buyers. In the section following, we have set down those questions most frequently asked and have endeavored to answer them in non-technical, easily understood language.

DEVELOPMENT

Where was the principle of Fluid Drive first applied to automobiles?

→ A European motor car manufacturer was the first to use a fluid flywheel.

Who first developed a fluid (or hydraulic) drive in this country and applied it to standard passenger cars?

→ From 1932 to 1937 Chrysler engineers were engaged in developing a Fluid Drive unit which would be simple in construction, easy to operate and, as proved by countless tests, long-wearing and free from trouble. These tests were conducted not only in the laboratory but on the road under every conceivable weather condition, and on all types of roads—sand, mud, ice, snow, etc.

When and on what automobile was Fluid Drive first made available on an American passenger car?

➔ Fluid Drive was standard equipment on the 1939 Chrysler Custom Imperial and optional on Imperial models. In 1940, Fluid Drive is standard on the Beautiful Chrysler Crown Imperial and is optional equipment on the Beautiful Chrysler Saratoga, New Yorker and Traveler models. Thus the Chrysler Fluid Drive has proved its worth in the hands of hundreds of owners over the past two years.

When was hydramatic drive first introduced?

➔ Hydramatic drive was introduced on the 1940 models of a competitive car.

MECHANISM

Does Chrysler Fluid Drive eliminate the standard clutch?

➔ No, because such elimination would be highly undesirable. As explained on page 6, the use of a standard clutch, which is a proved and efficient mechanism, gives the driver absolute control at all times.

Does the hydramatic drive and automatic transmission used by a competitive car use a clutch?

➔ Yes. It uses not one, but *four* clutches: two band clutches, gripping planetary drums, as in the old Model T Ford, and two multi-disc clutches of very intricate design (see illustration on page 10).

Will the drag of brake bands on planetary drums result in wear and require refinishing of drums?

→ Yes. Wherever friction exists, wear will result, and there is no reason to believe that these brake bands will react contrary to this natural law.

Will such planetary gearing eventually develop the inherent "whine" of this type of gear?

→ Modern development of machine tools has made possible the production of planetary gears which are far more quiet than those used in early planetary systems. One set of modern planetary gears will develop little or no "whine" under ordinary conditions. However, when three sets of planetary gears are used (as in some automatic transmissions) the number of moving parts is greatly increased, thus increasing the possibility of noise and whine developing over a period of time.

Does the use of planetary bands and multi-disc clutches eliminate clutch wear and clutch "chatter"?

→ It is axiomatic that any mechanism which must grip or slip will wear and develop "chatter."

What type of oil is used on the hydramatic drive?

→ The same oil that is used in the transmission operates the fluid coupling.

Is this advantageous?

→ No. Oil engineers recommend specific oils for specific purposes.

Is the Chrysler Fluid Drive a true hydraulic drive?

→ Yes, because under all conditions and all speeds the energy produced by the engine is transmitted through a fluid medium.

Is the hydramatic drive a true hydraulic drive?

➔ No. In first and second gears, the hydramatic drive is a true hydraulic drive in a certain sense; however, the gear reduction is obtained through two sets of planetary gearings which are controlled by means of band and disc clutches operated by oil pumps. In third and fourth gears, only 40% of the power is transmitted through the hydramatic fluid coupling. The remaining 60% is delivered directly from the engine into the transmission by mechanical means, thereby neutralizing much of the benefits of the hydraulic drive. With this preponderance of mechanical drive it is impossible to obtain the smooth, even flow of power which is delivered by 100% hydraulic drive, such as Chrysler uses.

Does Chrysler Fluid Drive use a special oil?

➔ Yes. An oil which will withstand extremes of temperature has been specially developed for this purpose.

Where else on the Chrysler car is this special oil used?

➔ Nowhere. It is developed exclusively for Fluid Drive.

Does the hydramatic drive require change of oil?

➔ Yes. Because this oil is also used in the transmission it becomes "worn-out" and dirty. Hence the manufacturer recommends an oil change at every 5,000 miles.

How often is it necessary to change the oil in the Chrysler Fluid Drive?

➔ After hundreds of thousands of miles of operation of Fluid Drives in Chrysler Engineering test cars it has never been found necessary to change the oil. A periodic inspection of the oil level is all that is necessary, to check on

the very slight seepage which might exist, and ordinarily the unit will require considerably less than half a pint after a year of hard service.

Does the Fluid Drive generate heat and cause the unit to become very hot?

→ Under all ordinary driving conditions the oil in the Fluid Drive becomes no hotter than the oil in the crankcase of the engine. Circulation of air over the unit for cooling is accomplished by air impeller blades which are attached to the front and back faces of the Fluid Drive unit. The cooling air carries away the heat and prevents the unit from overheating.

With no mechanical connection between the engine and the rear wheels, can you start the car by pushing?

→ Yes. The Fluid Drive is just as efficient in either direction of drive; i.e., with the power supplied by the engine, or with the power coming from the rear wheels.

Doesn't the oil sludge and form varnish when the unit gets warm?

→ No. It takes the combined effects of heat and oxygen to cause a breakdown of an oil, and since the Fluid Drive unit is completely sealed, no air and oxygen can get to the oil. The slight amount of air in the unit when originally filled does not contain sufficient oxygen to cause deterioration of the oil.

Will the Fluid Drive work when the temperature goes way below zero?

→ The Fluid Drive unit will function satisfactorily at all anticipated extremes of temperature.

How much oil does the Fluid Drive hold?

→ Two gallons.

CONTROL

Can a car equipped with the hydramatic drive be started in high gear?

➔ No. In order to reach high gear it is necessary to go through four sets of gearing.

Can a Chrysler Fluid Drive-equipped car be started in high gear?

➔ Yes. If the driver so desires.

How should a Fluid Drive car be started?

➔ A distinct advantage of the Chrysler car equipped with Fluid Drive is that it is under absolute control of the driver at all times. Where quick get-away is desired, the car may be put into low gear to start and then, by a flick of the shift lever, shifted directly to high. Similarly, the start may be made in second gear or, if desired, in high gear. As a matter of fact, it is possible under normal conditions to drive without once touching the gearshift lever or declutching.

When is it necessary to shift gears with a Fluid Drive car?

➔ Only when the driver desires an extra surge of power for existing road conditions, such as unusually steep hills, snow banks, or deep mud holes, or emergencies.

On a Fluid Drive car is it necessary to use the clutch pedal while driving?

➔ Not under normal conditions. Unless exceptionally steep hills or emergency conditions are encountered, the car may be left in high

gear throughout the duration of the trip. Chrysler cars equipped with Fluid Drive have been driven from Detroit to New York, a trip embracing greatly varied traffic conditions and terrain, without once touching the clutch pedal or gearshift lever.

Will a car with hydramatic drive and automatic transmission pull out of a snow bank with ease?

➔ Because of the automatic shifting of gears, far more careful manipulation is necessary. When pulling out of snow, or on icy pavements, it is advantageous to use higher gear ratios at lower engine speeds in order to gain traction and a smooth, even application of power. This is virtually impossible with the automatic transmission as the controls are set to shift gears at predetermined speeds. Consequently, in order to obtain high gear, a speed of 20 miles per hour is necessary (at part throttle). Under the above conditions, this speed would merely tend to spin the wheels, affording even less traction and control than with a conventional transmission and flywheel.

On a car equipped with hydramatic drive, can the driver choose his gear ratio?

➔ No. Because the changing of gear ratios is entirely automatic.

Is this an advantage?

➔ From the standpoint of safety and control, it is far more desirable that the driver be able to choose the gear ratio which will best do the job at hand. In the automatic transmission, car speed is not the only determining factor in the choice of gears. Throttle opening also governs this important operation. For example, at full throttle this transmission

shifts from second to third gear at 30 miles per hour; at half throttle, this same shift is accomplished at 13 miles per hour. Thus, the driver can never be certain in which gear his car is operating.

Does the Chrysler with Fluid Drive constantly change gear ratios while driving?

➔ As already pointed out, Chrysler Fluid Drive gives the driver absolute control and he may choose whichever gear ratio he desires, with the comforting knowledge that that gear will not change until he changes it.

Is it possible to drive a car with hydramatic drive at low speed in high gear?

➔ No; the automatic shifting of gears prevents this. At part throttle, high gear will not be attained until a speed of about 20 miles per hour is reached.

Can a Fluid Drive-equipped car be driven at low speed in high gear?

➔ Yes. If desired, high gear may be used at any speed from zero to maximum.



DOES FLUID DRIVE AFFECT HANDLING *or* DRIVING?

To summarize what has gone before, Chrysler Fluid Drive permits flexibility of control of the car by the driver at all times and under all conditions. The operation of the car is not left to a mechanical contrivance, but is under the personal control of the driver who is free to handle the car exactly as he chooses in order to secure the best results under existing circumstances.

Chrysler Fluid Drive offers unlimited possibilities in driver-control, principal of which are these:

The car may be driven in exactly the same manner as a three-speed, conventional clutch-operated car.

Where a quick get-away at a traffic light is desired, the car may be started in low gear and shifted directly to high.

If an extremely fast get-away is not desired, the driver may start in second gear—a start which is unbelievably smooth with Fluid Drive—and then

shift to high.

Where an exceptionally smooth start is of primary importance and extra-fast get-away is not essential, the car may be started in high gear and operated continuously thereafter in high, without ever depressing the clutch or shifting gears after the original shift from neutral to high.

No special instructions are necessary for the driver of a Chrysler car equipped with Fluid Drive. After a short time, the new owner discovers the method of operation which best suits his requirements. Chrysler Fluid Drive is a personally controlled mechanism and it is not necessary for the driver to adapt himself to its operation. As we have already said, there is nothing to learn or unlearn. You simply decide which method of operation you prefer; whichever method you choose will give you a new interpretation of restful driving and smoothness of ride.

ONLY A *Demonstration* CAN TELL THIS THRILLING STORY

If this booklet has stimulated your desire to ride in a Chrysler car equipped with Fluid Drive, by all means take the first opportunity of doing so. You will be amazed by the experience. Moreover, you will acquaint yourself with an epochal development. Chrysler Corporation engineers again make it possible for you to get the good things first in Chrysler.



NOW IN ITS
SECOND
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