

### The Automobile Simplified

BY FREDERICK C. GUERLICH, M. E.

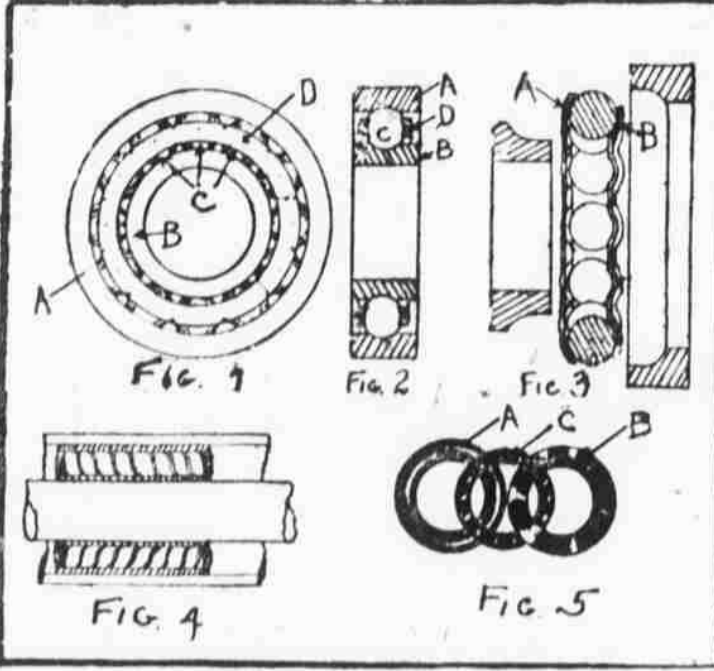
An intimate talk on the working units of the automobile discussed in such a way that the layman can easily understand them. If in reading these articles as they appear in The World each Sunday there is anything not clear to you ask Mr. Guerlich about it. An answer will be published on the completion of the articles on the section of the automobile under discussion.

MAKE THIS YOUR AUTOMOBILE CORRESPONDENCE SCHOOL. Address all inquiries to Auto Editor, Tulsa World, Tulsa, Okla.

#### Lesson No. 11—Ball and Roller Bearings.

The bearings used in the engine are almost universally of the ball or roller type. The ball or roller bearing, which is used in the engine, is the most important part of the engine. It is the only part of the engine which is in contact with the crankshaft and the connecting rod. It is the only part of the engine which is in contact with the crankshaft and the connecting rod. It is the only part of the engine which is in contact with the crankshaft and the connecting rod.

in the other, as the transmission gear shafts, or two ball rollers can spin or rotate on one another. As in the latter case, the pressure is in the form of a thrust, the bearing used is called a "thrust bearing" while those used for the crankshaft are called "journal bearings". Figures 1 and 2 show a ball bearing as is used in the transmission differential, which is shown in the upper part of Fig. 1. The lower part of Fig. 1 shows the ball and roller bearing, which is used in the crankshaft and the connecting rod. When these bearings are worn or broken, the only thing that can be done is to replace them. This is the only thing that can be done.



As was said before, parts can move on one another in three ways: namely, linearly or in a line, as for example, the pistons; they can revolve

about a fixed point, as in the case of the crankshaft and the connecting rod; or they can revolve on one another, as in the case of the ball and roller bearings. The bearings are the only parts of the engine which are in contact with the crankshaft and the connecting rod. They are the only parts of the engine which are in contact with the crankshaft and the connecting rod.

When, however, when putting the wheel back after greasing the bearings, sometimes make the mistake of getting the balls and their retainers reversed, getting the portion A where it should be the fact that A is larger than B, naturally leads to the belief that it should come to the larger outer raceways. When this is done the bearing will likely be ruined.

Figure 4 shows an excellent type of roller bearing—the Hylatt flexible. If the roller of a roller bearing were to take a position which is not absolutely parallel to its shaft, it would be subjected to a bending strain, for which reason a plain solid roller is not practical in a bearing. As the Hylatt bearing is designed, the roller can bend without flexing. The Hylatt bearings will be found in a very large percentage of the cars built.

Another excellent and much used roller bearing is the Timken, which has short tapered rollers. As it is designed, it will also act as a thrust bearing to some extent. Because of the taper, wear can be taken out by simply tightening the nuts which hold the bearing in place. When tightening bearings of the adjustable type, the wheels must be jacked up, and the bearing tightened as much as possible without making it impossible to spin the wheel by hand. The wheel must not "bind."

Figure 5 shows a ball-thrust bearing. Here A and B are the raceways and C the retaining with its balls. A large amount of the "hum" or "growl" which develops in the transmission and the differential is due to the worn bearings, as when the bearings become worn, not only will they permit the gears to become a little too far apart, but they will allow a certain amount of side play of the shaft.

The way to tell if a bearing of the type shown in Figs. 1 and 2 is worn, is to see how much the inner raceway B, can be moved sideways with respect to the outer raceways. You can't judge this well by trying to move the raceways toward one another.

To repair a worn ball bearing the raceways must be reground and larger balls inserted. Whether or not, therefore, it pays to have a bearing repaired is questionable. It will be weakened, and the repair is expensive.

Both the raceways and the balls are hardened and therefore brittle to some extent. This means that care must be exercised in installing them. They should never be driven into position by hard blows of a hammer. If they can not be pressed in, a gentle tapping on a soft tool or piece of metal will generally move them, though the movement will often be slow and the work require patience.

Many a bearing has been ruined because one of the raceways was cracked when the bearing was installed.

When ordering roller bearings, it is only necessary to give their number, which will be found in one of the raceways. If you find a number of numbers, and so do not feel certain of the right one, give the dimensions, but the number, also, as the number will help the dealer to give you the correct bearing, even though you may have failed to give all of the dimensions required.

Use a special enemy of ball bearings, and so if you put your car up for some time, be sure that all roller and ball bearings are well greased.

ITALIAN EXPOSITION IS PROJECTED IN NEW YORK

Italian-American business men in this country are planning to establish a permanent Italian exposition in New York city and eventually erect a beautiful and artistic pavilion to house their enterprise. In this building every important Italian product of agriculture and industry is to be shown, together with representative works of art. One of the main advantages expected to flow from this project is the bringing together of the consumer and producer, offering them every facility for co-operation.

Notice to High School Cadets. Report at once to Lee Leving, tailor and furrier, Tulsa Hotel building, 115 East Third street, for measurement for military uniforms.

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#### SLOVENIAN PRIESTS SIGN PATRIOTIC RESOLUTIONS

The Slovenian Priests League of America, which met last month in convention at Joliet, Ill., drew up a set of resolutions expressing their faith and allegiance, which are now published in translation. Among the articles to which they pledged themselves are the following:

"We express our deep respect, gratitude and loyalty to the Government of the United States of America, and to its great president, Woodrow Wilson, in this terrible struggle for liberty, democracy, and self-determination of the nations of the world."

"We pledge to our government and to our president all our moral and material support and urge all the Slovenians of the United States to be ready and to bring any and all the sacrifices required from them by the government."

"We are convinced that a permanent universal peace is possible only on a basis of perfect free self-determination of all the nations and that especially the Yugoslav question can be justly solved only upon the foundation of these principles."

The document further emphasizes the appreciation felt by the Slovene people of America of the true democratic liberty enjoyed in the land of their adoption. As the basis for the government to be set up in Yugoslavia, the constitution of the United States is recommended by them as a model.

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