This invention relates to a hydrocarbon fuel derived from the refining of petroleum, and it pertains more particularly to a fuel prepared from acid sludge.

In the manufacture of refined oils, reduced crude oil is subjected to a treatment with sulfurous acid. The acid reacts with certain unsaturated hydrocarbons to form a sludge which is separated from the oil and hydrolyzed. The products of the hydrolysis separate into three layers: A lower layer of dilute acid, an upper layer of acid tar, and an intermediate layer which is known in the petroleum industry as "liver."

This sludge is an oxygenated carbonaceous material which is insoluble in dilute acid and in the acid tar and which is quite distinct from them in its physical and chemical properties. It is a by-product which is a nuisance and which must be disposed of. Attempts have been made to utilize it for fuel, but since it is a sticky, semi-solid mass when hot and a granular solid when cold, it must be suspended in a liquid medium before it can be pumped. Fuel oils having a gravity between 22° A. P. I. and 24° A. P. I. have been employed as a carrier for "liver," but when this mixture remains quiescent, as in storage, the liver settles out very quickly, stops up pipes, etc.

The object of this invention is to provide a means for permanently incorporating liver in an inexpensive available combustible oil carrier.

Another object is to provide a fuel containing liver which has a higher heating value than liver and which can be burned more easily.

A further object is to utilize acid tar residue for fluxing the liver so that fuel oil which was heretofore used for this purpose will be available for rerunning through the pitch stills.

Other objects of my invention will be apparent as the detailed description of my invention proceeds.

Since the treatment of hydrocarbon oils with sulfurous acid of different concentrations is well known in the art and forms no part of my present invention, it will not be described in detail. The sludge obtained from such treatment when hydrolyzed with steam and water yields, in addition to dilute acid, a layer of liver and a layer of acid tar. I draw off the acid tar and charge it into a pitch still, and continue the distillation (which may be by fire, by steam or by fire and steam) until the residue has a viscosity of about 200 furol to 350 furol at 122° F., and a gravity of about 15.5° to 16.5° A. P. I.

I then thoroughly mix the liver with the acid tar residue, using about one-half to one and one-half parts of acid tar residue to one part of the liver. The exact proportions will depend upon the consistency of the liver and upon the gravity and viscosity of the pitch still residuum.

The fuel prepared in the above manner will not settle out in storage, can be handled by ordinary pumps and burned in the usual types of fuel oil burners. In this manner the waste products of the acid treating plant, which are a nuisance and hard to dispose of, can be converted into a desirable fuel oil.

At the same time I have utilized the residuum from the pitch still and I have economized in the use of fuel oil.

While I have described a preferred embodiment of my invention, it will be understood that I do not limit myself to the specific details set forth except as defined by the following claims:

1. The method of making a fuel which comprises treating a hydrocarbon oil with sulfurous acid, removing the sludge therefrom, hydrolyzing said sludge to form acid, liver and tar, distilling said tar to remove the more volatile portions, and fluxing the residuum of said distillation with said liver.

2. A fuel comprising liver produced by hydrolysis of the sludge formed in the acid treatment of hydrocarbon oils, fluxed with the residuum from the distillation of acid tar.

3. A fuel oil comprising about one-half to one and one-half parts pitch still residue fluxed with one part of the liver produced in the refinement of hydrocarbon oils.

4. A composition of matter comprising pe-
troleum liver fluxed with a pitch still residue whose viscosity is about 200 to 350 furol at 122° F. and whose gravity is about 16° A. P. I.

5  5. A fuel oil comprising petroleum liver fluxed with tar.

6. The method of increasing the heating value of liver comprising admixing there-with a substantial quantity of pitch still residue.

Signed this 14th day of Feb., 1930, as Casper, county of Natrona, State of Wyoming.

JAMES H. SHEPARD.