

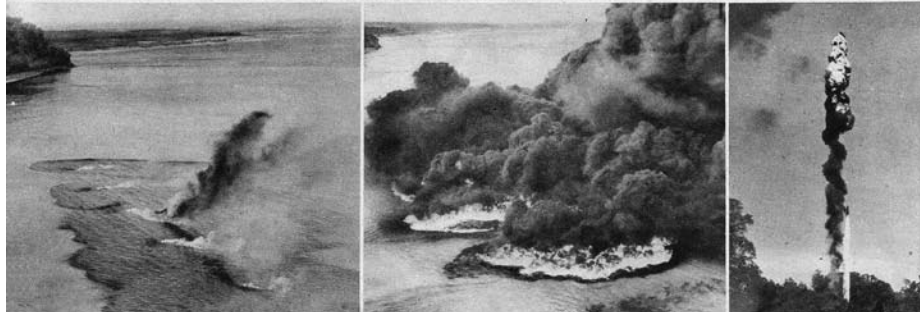
HMS Conundrum — one of the 1600-ton floating drums on which the petrol pipe-lines were carried across the Channel. Each drum carried 70 miles of line.



Two hundred miles of three-inch hollow steel cable stretch into the distance at a pipe-line storage depot.



Above: oil projected into the sea from pipe-lines to form a continuous line ready for ignition. Below (left): the oil is ignited; (centre) the sea is on fire; (right) finger of flame used on ships against low-flying aircraft.



# 4 INVASION

## Petrol by Pluto

**P**LUTO — the Pipe Line Under The Ocean — is one of Britain's greatest military engineering feats which kept our Armies supplied with the petrol on which they depended for their drive into the heart of Hitler's Reich.

Force PLUTO went into operation shortly after D-Day when the sea-lanes to Cherbourg had been swept clear of mines, and pipe-lines were laid on the sea bed from Ventnor in the Isle of Wight to the Cherbourg Peninsula.

A steady flow of petrol through a system of three-inch cables, pumped from cleverly camouflaged stations in Ventnor Bay became a torrent of supply when Boulogne was captured, and a second system of pipe-lines was paid out from Dungeness to that great French port by the use of 1,600-ton floating drums towed across the Channel by 10,000-ton vessels, barges and motorboats.

Soon 1,000,000 gallons of petrol was being pumped almost every day into the tanks of our fighting vehicles and supply transports, by RASC men working on the other side of the Channel at coastal pumping stations which received their supplies from Britain's internal pipe-line.

As the Allies advanced the system was extended and soon pipe-lines were laid from Boulogne to Antwerp, to Eindhoven, Emmerich and finally to Frankfurt-on-Main.

## Burning the Sea

**H**AD the Germans attempted to invade Britain they would have been met by a Wall of Flame on land and sea.

Britain's first line of defence against invasion in those dark days of 1940 was a sea-flame barrage. The pressing of a button at a moment's notice would have turned the sea into an all-consuming inferno.

Petrol pipes, some of them hidden in the tubular scaffolding on the beaches, were laid from concealed storage tanks and carried oil under the sea ready to be discharged and set on fire when it rose to the surface. The aim was two-fold — to force the enemy assault craft into lanes where they could have been dealt with by shore defences, or to explode the oil at the last moment and destroy them by flame.

A score of secret flame-weapons formed part of our defences on land.

Ten-gallon drums filled with jellified petrol which would explode a ton of blazing fuel at the push of a button; a hedgehog fougasse which would jump over a wall or high ground and explode on an enemy tank; hundreds of land-flame barrages shooting out 150ft tongues of withering fire; these were some

# SECRETS OUT

of the many secret anti-invasion inventions which were ready for action had the signal been given. Knowledge gained in preparing this Wall of Flame led to improvements in tank flame-throwers and the use of a vertical flame-thrower on ships to destroy low-flying aircraft in the narrow Channel waters.

Not one Nazi set foot on the shores of Britain. Their reception would have been a warm one — about 1,500 degrees Fahrenheit.

## Pick-a-back Tank

**B**RITISH tanks carried their own bridges. One of these was the "Scissors" Bridge — folded and mounted on a Valentine tank. It was lifted into position by means of an hydraulic arm.

The "Ark" Bridge has two ramps which can be dropped down to the front and rear. Altogether there were four types of bridge-carrying tank used in Europe. They are being used to-day in Burma.

Bridging equipment is so arranged that it takes only a few seconds to place in position, during which time no man need leave his tank or expose himself to enemy fire. The bridges laid enable a heavy tank to cross ditches up to 30 ft wide and to scale promenade walls more than 10 ft high.

In Normandy they were used to bridge craters, streams and flooded ditches which were under fire.

So well built are these slip-across devices that they can carry some of the heaviest armoured vehicles. The "Scissors" Bridge can take a weight of 38 tons.

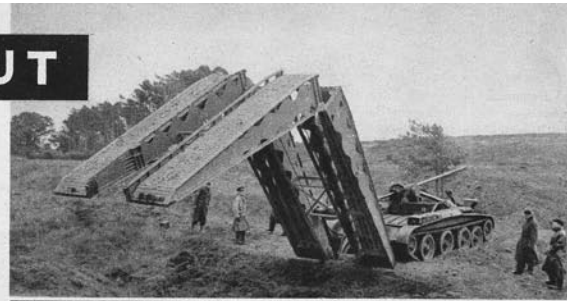
## Drying the Fog

**G**ROUND fogs — the "pea-soupers" which air-men dread — were beaten by British scientists long before Berlin experienced its first thousand-bomber raid.

Four Halifax bombers on their way back from operations over the Ruhr were the first aircraft to prove the worth of FIDO. Visibility was almost nil. Yet they landed safely — ten minutes after FIDO had been lit. Visibility was increased up to four miles.

The apparatus used consisted of long feeder pipes through which was pumped thousands of gallons of petrol. When ignited the flames rose to three feet through a series of small holes in the pipes which marked the approaches and runway. The fog in this area was completely lifted.

Fifteen operational airfields were equipped with the fog dispersal apparatus, and it is estimated that 2,500 planes and more than 10,000 airmen were saved. Finally the letters of FIDO no longer stood for "Fog Investigation dispersal operations". They stood for "Fog, intensive dispersal of".



Here a test is being made with a "Scissors" type bridge mounted on a tank chassis. The hydraulic arm is closing the bridge to return it to the carrying position.



Tank-carried bridges were used extensively in Italy. Here a self-propelled gun crosses an obstacle by means of an "Ark" type bridge.



The "Ark" bridge tank formed a ramp up which armoured vehicles were able to advance to scale such obstacles as sea walls.

(Right): An RAF Lancaster takes off between walls of flame. Outside the fringe of fire there is impenetrable fog through which no plane could attempt to take off or land in safety. FIDO produced a four-mile visibility within a region covered in dense fog belts. Fifteen operational airfields were equipped with this apparatus.

