THE NEXT WAR AT SEA

# POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

MARCH
25 CENTS

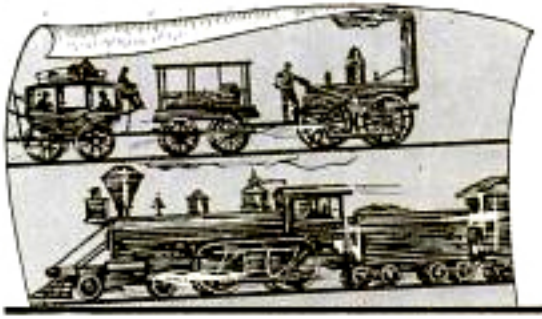
SEE PAGE 350

MAGIC in "MAN-MADE STONE"

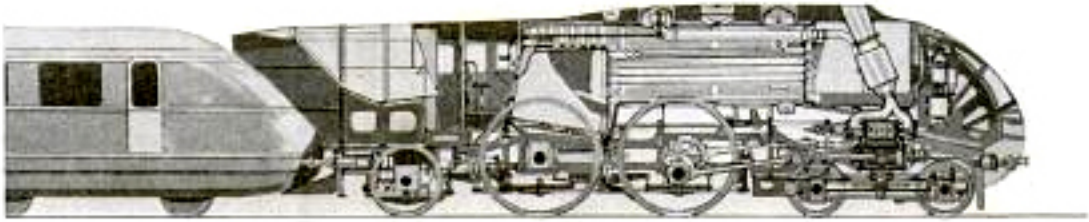
# Pioneering Achievements in the Age of Speed

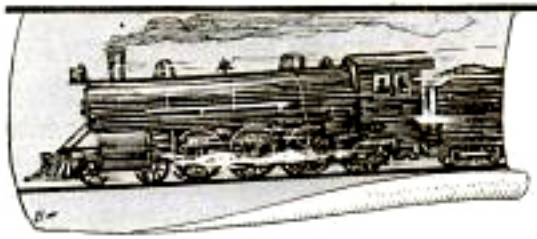
*Early Results of Man's Desire for Speed: Top, Scene of Orville Wright's First Flight at Kitty Hawk, N. C., in 1903; Second, First Great Northern Train Entering the Frontier Town of Devil's Lake, N. D., as That Railway Extended Its Line toward the West Coast; This Picture Was Made on June 17, 1883; Third, New Yorkers Boarding Horse Car, as They Did in Dim Past, as Feature of Philadelphia Sesquicentennial Exposition; Bottom, Clarence Chamberlin, the Pilot, with His Sister in Back Seat of Family Car in 1902; It Was First Auto in Their Home Town of Denison, Iowa*

# Streamlines to Increase Speed of Locomotives



Streamlined covers for locomotives are being employed in Germany to increase train speed. The covers or hoods are designed with flowing lines to reduce wind resistance,thus permitting faster operation without increasing the power. Speeds of 100 to 125 miles per hour are expected. One design places the engineer's cab at the front, resulting in improved vision.

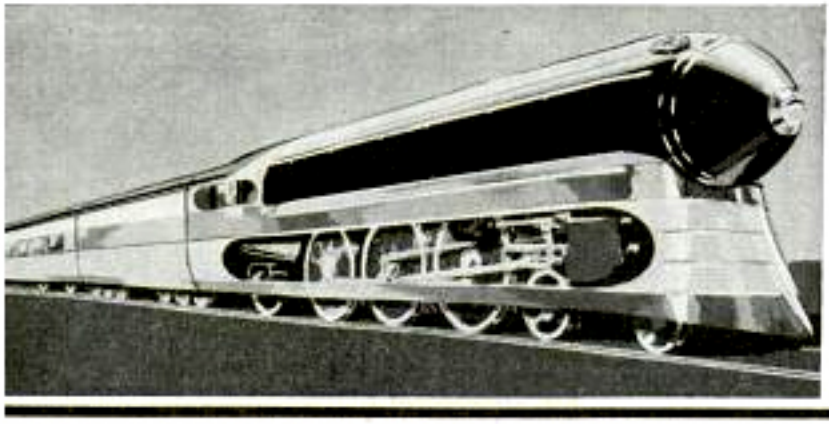




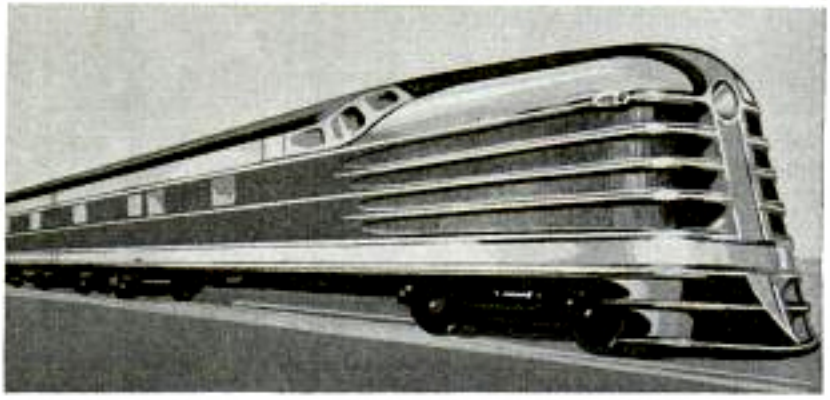
*Top and Bottom, Three Steps in Evolution of the Steam Locomotive; Center, Two Streamlined Locomotives, Upper View Showing Driver's Cab Located at Front; Lower View Shows Method of Articulation*

Another provides for a cover which will fit in with covers on the coaches so that the entire train becomes a streamlined unit.

# Locomotive Like Bullet Styled for Tomorrow



*Left, practical design for streamline steam locomotive allowing ready access to wheels for inspection and maintenance and preserving "personality" of iron horse*

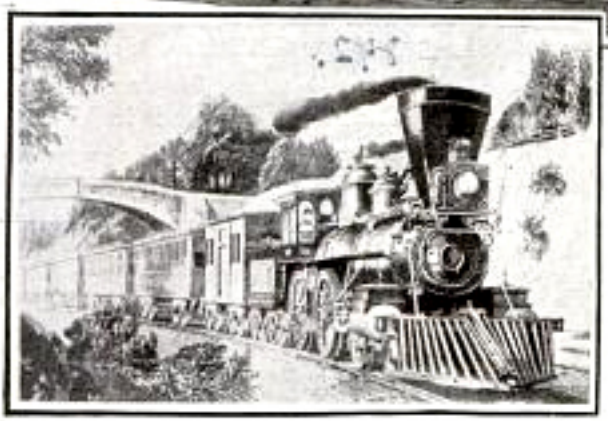


*Right, sketch of a streamline Diesel locomotive demonstrating how engines can be mounted in front of engineer's cab without obstructing his view ahead*

What is the next step in the evolution of the streamline train? A suggestion of tomorrow's styles is presented by Otto Kuhler, industrial engineer, in sketches of a steam locomotive with bullet-shaped boiler and open-side shrouding, and a Diesel-electric car with its power plant mounted ahead of the engineer's cab. Mr. Kuhler believes many streamline engines today are freaks, badly conceived in outline, and he prefers to retain the "personality" of the old iron horse in its new dress. Trains must be re-styled rather for public appeal than for aerodynamic reasons, he says, but the ultimate in streamlining is impractical for locomotives because of the need for easy access for inspection and maintenance during short stops. Thus he leaves the "skirt" open at the side. Germany's "Flying Hamburger" locomotive is, Mr. Kuhler thinks, the "most perfect shape" but its underslung bullet nose would not meet conditions in this country, where the traditional "cowcatcher" is retained on the latest streamstyled types to shove stalled obstacles off the track. Technical evolution of steam locomotives has all but streamlined them, for the high balloon stack of the 1860 engine would have thwarted any effort to streamline by shrouding, while the modern steam engine with its low overhead projections is readily adapted to thorough streamstyling. Five requirements for good streamline designing are 1, easy identification for public appeal and for vision at crossings; 2, visibility radius of almost 270 degrees for the engineer; 3, sturdy construction; 4, good aerodynamics, and 5, pleasing appearance. In 1935, fifteen new steam engines were built, more or less streamstyled, three new Diesel, and twelve lightweight Diesel-electric articulated trains.

# Streamline Cowcatchers 'Ease' Cars Off Track

## *Rounded Design Intended to Push Autos Off Right of Way*



*The line of locomotives above shows how the cowcatcher has gradually disappeared behind a solid wall of steel as streamlining has advanced. Left, an early cowcatcher*

High-speed, streamline locomotives still retain the cowcatcher, a distinctly American contribution to railroad design, although its purpose is no longer to catch cows. The "iron fence" at the front of the modern locomotive is intended primarily to cope with automobiles. As a result, the cowcatcher, like the rest of the iron horse, has been streamlined, partly for appearance, but also because it has been found that this streamline design pushes obstructions off the right of way with less damage than the old-fashioned set of bars. Modern cowcatchers present a smooth, rounded steel surface, almost like a snow-plow. When an obstacle is struck it is pushed aside, rather than tossed into the air. Coupling blocks, which often jammed into an auto and held it until the car was ground under the wheels, are being inclosed and, when not in use, covered by sliding doors. Some locomotives hide real old-fashioned cowcatchers back of solid steel plates but the guard remains in one form or another. The cowcatcher is about 100 years old and was intended not to "catch" cattle, but to push them from the tracks. Early light locomotives suffered almost as much damage when they struck a heifer as the animal itself did. Early cowcatchers were mounted on two wheels and extended far in front of the engine. Strangely enough, as locomotives became heavier and faster, the original design did not change greatly until the era of streamlining arrived.