Emil Gathmann, by a very ingenious method of casting ingots with the smaller end down and then stripping them without excessive inconvenience, as well as by distributing the metal in his ingot moulds, also produces a more rapid cooling of the lower parts of the ingot than of the top, and thereby concentrates the cavity in the upper portion.

The Goldschmidt process involves heating the metal in the top of the ingot by the well-known thermit reaction, or else by creating a stirring reaction in the ingot by means of a can of thermit through which, it is claimed, blow-holes, pipes, and segregation are all reduced.

Each of these cavity-reducing processes has been tried on a commercial scale long enough to prove its advantage under a given set of conditions. It is probable, however, that, in the production of very large quantities of steel, cropping off as much of the ingot as is necessary to remove the shrinkage cavity is cheaper than introducing a complication into the process of manufacture, and that careful inspection is an adequate safeguard for avoiding the dangerous defect in finished steel known as an unwelded pipe in the great majority of cases.

FOURTH AMERICAN ROAD CONGRESS.

Final arrangements for the Fourth American Road Congress, to meet in Atlanta, Georgia, during the week of November 9-14, are nearing completion. All indications point to a record-breaking attendance and exceptionally strong program, while the demand for exhibit space on the part of manufacturers will far exceed the supply of space available.

The Construction and Maintenance Section program as now made up is as follows:

Drainage Structures.—By W. F. Atkinson, state highway engineer of Louisiana. Discussion opened by S. D. Foster, chief engineer, State Highway Department of Pennsylvania.

System in Road Management.—By C. J. Bennett, Highway Commissioner of Connecticut. Discussion opened by Paul D. Sargent, state highway engineer of Maine.

Maintenance Methods and Relation to Traffic.—By George W. Cooley, state engineer of Minnesota. Discussion opened by H. R. Carter, state highway engineer of Arkansas.

Convict Labor.—By George P. Coleman, state highway commissioner of Virginia. Discussion opened by J. E. Maloney, state engineer of Colorado.

Rights of Way.—By Austin B. Fletcher, highway engineer of California. Discussion opened by W. S. Gearhart, state engineer of Kansas.

Surfaces for Light Volume Mixed Traffic.—By S. Percy Hooker, state superintendent of highways of New Hampshire. Discussion opened by Frank F. Rogers, state highway commissioner of Michigan.

Efficiency in Highway Organization, Centralization of Purchases.—By E. A. Stevens, state highway commissioner of New Jersey. Discussion opened by John S. Gillespie, Road Commissioner of Allegheny County, Pennsylvania.

State Control of Road Work as a Policy.—By A. N. Johnson, former state highway engineer of Illinois. Discussion opened by T. H. MacDonald, state highway engineer of Iowa.

Engineering Supervision of Road Construction.—By W. S. Keller, state highway engineer of Alabama. Discussion opened by R. C. Terrell, state highway commissioner of Kentucky.

Economics.—By J. E. Pennybacker, chief, Division of Economics, U.S. Office of Public Roads.

Educational Field for Highway Departments.—By Dr. Jos. Hyde Pratt, state geologist of North Carolina. Discussion opened by Col. Sidney Suggs, state highway commissioner of Oklahoma.

Heavy Traffic Roads.—By Henry G. Shirley, chief engineer, State Roads Commission of Maryland. Discussion opened by W. A. Hansell, superintendent of public roads, Fulton County, Georgia.

Grades and Excavation.—By A. D. Williams, chief road engineer of West Virginia. Discussion opened by Wm. R. Roy, state highway commissioner of Washington.

Problems of Street Construction and Maintenance.—By Charles E. Bolling, city engineer, Richmond, Virginia. Discussion opened by F. L. Ford, city engineer, New Haven, Conn.

Road Binders and Palliatives.—By chief engineer, Rhode Island State Roads Commission. Discussion opened by Chas. W. Campbell, city engineer, St. Joseph, Mo.

Possible Lines of Improvement in Contract Highway Work.—By John J. Ryan, secretary, New York State Road Builders' Association. Discussion opened by L. D. Smoot, city engineer, Jacksonville, Florida.

The elaborate exhibit of the U.S. Office of Public Roads, which is being prepared for the Panama-Pacific Exposition, will be shown intact at the Road Congress and will include not only exact models of every known type of road, and the historical development of road building from the earliest times, but will also comprise special models showing road location, the beautifying of the roadside, and mountain road construction as exemplified in the splendid Swiss roads. The New York State exhibit will include at least one example of model work, which it is claimed will prove one of the most impressive exhibits at the Congress. A number of other states will have interesting exhibits in the form of models, maps and materials.

Information about the program and the Congress in general may be obtained from I. S. Pennybacker, Executive Secretary, and concerning exhibits from Charles P. Light, Business Manager, Colorado Building, Washington, D.C. The general officers of the Congress are as follows: Austin B. Fletcher, State Highway Engineer of California, president; Edward M. Bigelow, State Highway Commissioner of Pennsylvania, vice-president; W. E. Atkinson, State Highway Engineer of Louisiana, 2nd vice-president; A. N. Johnson, Former State Highway Engineer of Illinois, 3rd vice-president; C. A. Magrath, Chairman, Ontario, Canada, Highway Commission, 4th vice-president; Lee McClung, treasurer, former treasurer of the United States; John N. Carlisle, State Commissioner of Highways of New York, Chairman, Committee on Program; the Executive Committee comprises in addition to President Fletcher, George C. Diehl, Chairman, Good Roads Board, American Automobile Association; Logan Waller Page, President, American Highway Association and Director, U.S. Office of Public Roads; Richard H. Edmonds, editor of the Manufacturers' Record, and A. G. Batchelder, Chairman, Executive Committee, American Automobile Association.