LONDON — Although he is widely viewed as Britain’s greatest living sculptor, received a knighthood 20 years ago and has been the subject of countless museum retrospectives, Anthony Caro has yet to have an exhibition in New York’s Chelsea, the epicenter of today’s contemporary art scene.

But this fall, he will finally have his Chelsea moment. He recently completed a series of monumental painted steel sculptures, weighing about two tons each, titled “Passage.” Five of them will go on view at Mitchell-Innes & Nash in Chelsea in October, and four will be shown at Annely Juda Fine Art in London in September.

A return to the abstract steel sculptures that made him famous more than 40 years ago, the latest work is as architectural as it is sculptural. Yet unlike the vast pieces by Richard Serra that are currently on view at the Museum of Modern Art, which physically envelop the viewer, Mr. Caro’s latest sculptures can be experienced only from a slight remove. There is no point of entry.

“When I saw this body of work I felt he had done something dramatic,” said Lucy Mitchell-Innes, Mr. Caro’s New York dealer. “Although he picked up on old themes from the ’60s of using grills and grids, this time they don’t just define space but restrict access to it.”

Those who know Mr. Caro’s work will instantly recognize the “Passage” series as his, yet the artist considers these sculptures a significant departure.

“He said he chose that title for the series because he conceived of the sculptures as visual passages, even though you cannot physically walk through them.
One of the biggest changes from his past work is that he used galvanized steel rather than rusted steel. “I thought I wanted to paint them, so I sent the steel out to be galvanized in order to get the surface right,” he said. “And when it came back, I liked the way it looked.” So he kept it as is.

While fragments of sculptural objects are strewn around his studio — remnants of steel and machine parts that he buys by the weight at scrap yards around Europe — the works from this new series were nowhere in sight. Some had been sent to storage, and others were on their way to the dealers. He did have transparencies of them carefully laid out on a lightbox.

In the Cubist tradition, Mr. Caro has long seized on found objects and used them as the basis for his sculptures. One of the new works, “Star Passage,” made of steel galvanized and painted blue, incorporates a big guillotine for slicing steel that he found in the South of France. For another, “Chalk Line,” he took a long stone drinking trough, laid it on wood and applied galvanized steel planes to it in sections to make it seem as though he had dissected the stone.

Resting atop it is a hollow steel pole. “It is almost as if you crossed a Donald Judd with a Roman sarcophagus,” Ms. Mitchell-Innes said.

Unlike most artists, Mr. Caro generally does not work from drawings or maquettes when making sculptures. “I prefer to do the real thing,” he said. “You can feel the weight and reality of moving around steel. Whereas if you do something on a smaller scale, when it gets bigger it looks different.”

Sometimes, however, such free-style thinking is impossible, as with his current project for a choir for a church in northern France.

Occupying several studio buildings of his London work space are a series of dollhouse-like structures that are scaled-down models of the medieval Church of St.-Jean-Baptiste in Bourbourg, including stained-glass windows and a pair of round towers.

“It’s a 12th-century building, and at the time of Dunkirk, a plane landed on the roof and caught fire to the church,” he said, referring to the German invasion of the region in 1940. “The roof was restored but not the choir. Eight years ago, they asked me to do the choir.”

Unlike his sculptures, in which issues of scale, materials and design are all up to him, this project involves fitting a predetermined architectural space. “I’m leaving nothing to chance,” Mr. Caro said as he peered into a wood model.

He has created two towers for the choir and what he called an immersion tank for christenings. There will also be nine niches with sculptures in them that tell the story of the Creation. “Not exactly the Creation from the Bible,” he said. “More about animals, fish and things we see around us.” Outside the church, he has designed a tower of Cor-Ten steel, which he also calls a visual passage.

Mr. Caro is accustomed to big projects. After attending Cambridge University and art school, he began working as Henry Moore’s assistant in 1951. A decade later he created his own large-scale abstract structures. They were considered revolutionary at the time because he had abandoned figurative sculpture and gone totally abstract. And rather than setting his sculptures on a pedestal, he placed them on the ground, relating them directly to human scale.
By the 1960s and ’70s, he had become as well known as a Damien Hirst or Jeff Koons is today. But with the wane of formalism in the United States, his popularity waned, and he is now far better known in Europe.

Some contemporary artists still look to him for inspiration. The Los Angeles sculptor Charles Ray has made works in homage to him, including a re-creation of one of his most famous works, “Early One Morning,” a bright red horizontal metal sculpture of disparate lines and planes.

Jessica Stockholder, a sculptor who directs graduate studies in sculpture at the Yale University School of Art, says she is an enthusiastic fan. “I’ve always admired him,” she said. “His work is about how things jump across space to meet each other, and my work is about that too. In the ’80s I made a tabletop sculpture piece called ‘Ode to Anthony Caro.’ ”

Just how a Chelsea audience will react to Mr. Caro’s latest work is anyone’s guess. “Who can say what’s going to be hot or cold from one year to the next?” Ms. Stockholder asked.

Meanwhile, Mr. Caro seems unconcerned. “When you get older,” he said, “you just have to go your own way.”