# THE KUILENBURG BRIDGE.

The Utrecht Boxtel line of State railways in the Netherpoints being known by the respective names of the Kuilen- parabolic truss.

burg, the Bommel. and the Crèvecœur viaducts. The great lengths of these bridges, the nature of the streams that they cross, and the local circumstances necessitated engineering skill of a high class. The conditions of the foundations were such as to require piling. The piles varied from twentythree to fifty-three feet in length, being driven in some cases by the ordinary pile - driving engine, and in oth-

lateral and diagonal bracing. The span of 492 feet has a The sled is propelled by a set of sweeps arranged in rowparabolic uppermember, the depth of truss in center being locks and operated like oars. The sweeps are slotted to lands crosses three large rivers, the Lek, the Waal, and the 35 6 feet, and at the ends 26 24 feet. The other spans have receive the pins of the rowlocks, and the ends of the sweeps Maas, within a distance of ten miles, the bridges at these rectangular trusses of the same depth as the ends of the are provided with serrated steel ends or claws which engage the surface of the ice as the sled is propelled. When the



device is used as a boat these serrated ends may be removed and paddle blades attached in their stead.

At the rear of the boat there is a wheel used for steering the sled on the ice, and it answers equally well for a rudder for the boat when it floats in the water. A brake is attached to the rear to retard the motion of the sled; it may also he used to assist in steering.

Thisgondola sled affords a means of

BRIDGE AT KUILENBURG, DEPARTMENT OF THE NETHERLANDS.

ers by a steam ram. After the piles were cut off to a level below water, the space between them was filled with lowed in the work. The bridge is built for double track, beton or concrete, projecting from three to five and a half there being only a single track placed on at present. Two feet beyond the footings of the masonry above, and varying footpaths are provided for the service of administration. from eleven to twenty-one feet in thickness. The tops of The total weight of material in the structure is as follows: the piles were completely floored over, and masonry built up, well bonded on to the floors to prevent sliding by longitudinal and cross walings of oak, and the faces of piers and ice-breakers were finished in Belgian ashlar. The footings of the piers were thoroughly protected by a close row of long piles to each, and heavy rip-rapping of rough stone.



#### STRANGE'S SAFETY HITCHING APPLIANCE.

The superstructure of the Kuilenburg bridge (shown in Michaëlis, engineer-in-chief. It consists of nine spans, en-492 feet clear opening, one of 262 feet 6 inches, and seven cient size to contain several persons.

of 187 feet each, making, with the widths of piers, a total length between the faces of abutments of 2,181 feet. The bridge consists of two open trusses, built of riveted plates and angles, the upper and lower fianges being formed in the shape of double Ts. side by side. the inclined ties of thin rectangular bars, except toward the centers of spans, where they require stiffening for compression under variable load, and the vertical struts of I-shape, some of the largest being strengthened by the introduction of two series of channel bars between the verticals. The trusses are placed so as to give a clear width of roadway of 27 feet, and height of 16 feet 5 inches, the structure being a through bridge. Cross girders 2 feet 111/4 inches deep connect the main trusses, and the whole is well stiffened by a thorough system of

de total weight of material la the structur	0 10 40 1	Cono m
Wrought iron	4,394	tons.
Bessemer steel	610 5	**
Cast iron	30	"
Lead	$3\frac{2}{10}$	"
There were also 8 000 cubic feet of cak	9 500 0	mbio f

cubic feet of timber used, and 350 tons of plates placed between them of fir to form the floor of the bridge. 'The total cost of the structure was upwards of \$1,187,100.

## SAFETY APPLIANCE FOR RELEASING HORSES.

We give an engraving of a new safety device to be applied to the manger or some part of the stall to which horses are usually hitched. It consists in a device for cutting the halter should the horse become entangled in it.

Fig. 1 is a perspective view showing the exterior of the appliance, and Fig. 2 is a vertical section showing the arrangement of the several parts.

A hollow casting, A, is secured to the manger, and contains a spring-acted follower, C, which supports the halter and prevents it from coming into contact with the sharp edges of the casting, A, when no extraordinary strain is put upon the halter. The end of the halter is attached to a ring capable of sliding up and down on the rod, B. Should the horse become entangled so as to press down upon the halter, the follower in the casting, A, will be pressed down, allowing the halter to come into contact with the sharp edges of the casting and be instantly severed. It will be seen that so long as the halter fulfills its regular office it will not be cut, as the spring follower then holds it away from the cutting edges.

This invention was recently patented by Mr. Benjamin F. Strange, of Corvallis, Montana Ter.

#### SLED AND BOAT COMBINED.

The annexed engraving represents a novel gondola sled lately patented by Mr. James H. Dennis, of Newark, N. J. It is in reality a combined sleigh and boat, well adapted to the engraving) was built by the well known Dutch firm of both sleighing and boating purposes. Its construction will boat is similar in form to that of an ordinary row boat. It tirely of wrought iron construction, there being one span of is provided with transverse seats, and may be made of suffi-



All holes for riveting were drilled, no punching being al- enjoyable winter exercise which may be participated in by a party of persons, and no very great exertion is required to get up an astonishing speed on smooth hard ice. The double character of the sled renders it perfectly safe even on thin ice, as it answers the purpose of a boat as well as of a sled.

Further information may be obtained by addressing Mr. James H. Dennis, care of O. B. Wilson, 22 Cedar street, New York city.



The engraving represents an inkstand provided with a



## PERPETUAL CALENDAR INKSTAND.

calendar that requires changing but once a month to render Harcort & Co., under the superintendence of Mr. N. T. be readily understood from the engraving. The body or it perpetual. It makes a handsome article of desk furniture, and as a calendar it is always in the right place. To change the adjustment is but the work of a moment; it is done by unscrewing a nut at the bottom of the stand, and

turning the ink fount around until the days of the week are directly over the spaces containing the figures representing the proper days of the month. Forexample, if Tuesday is the last day of September, then Wednesday being the first day of October, the ink fount is turned until Wednesday is over the column beginning with figure 1. This useful article may be made either wholly of glass or partly of glass and partly of metal or wholly of metal. For further information, address Mr. S. M. Howard. administrator, 1207 Main street, Wheeling, W. Va., and see advertisement in another column.

DENNIS' GONDOLA SLED.

THE result of the great English Derby race was cabled from London to New York in just twenty-five seconds. Tolerably quick work even for lightning.