(19) LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

(11) N° de publication : **LU507663**

(12) **BREVET D'INVENTION** **B1**

(21) N° de dépôt: LU507663

(51) Int. Cl.:
E01D 21/00

(22) Date de dépôt: 04/07/2024

(30) Priorité:
20/12/2023 CN 202311763504.4

(43) Date de mise à disposition du public: 06/01/2025

(47) Date de délivrance: 06/01/2025

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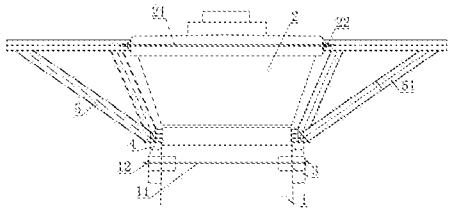
(54) **A MOBILE AND CYCLIC BEAM-DROPPING BRACKET FOR A CONTINUOUS BEAM 0# BLOCK.**

(57) A mobile and cyclic beam-dropping bracket for a continuous beam 0# block The present invention belongs to the technical field of continuous beams, particularly relating 5 to a mobile and cyclic beam-dropping bracket for a continuous beam 0# block. The technical solution is: a mobile and cyclic beam-dropping bracket for a continuous beam 0# block, including a corbel pre-embedded in the pier body of the bridge pier, with a wedge drop beam device connected to the corbel; it also includes a shaped steel frame, the lower end of the shaped steel frame is connected to the wedge drop beam device, and the upper end of the 10 shaped steel frame is connected to the pier cap. The present invention provides a mobile and cyclic beam-dropping bracket for a continuous beam 0# block that is convenient to assemble and disassemble.



A MOBILE AND CYCLIC BEAM-DROPPING BRACKET FOR A CONTINUOUS BEAM 0# BLOCK

Technical Field

This invention belongs to the technical field of continuous beams, particularly relating to a mobile and cyclic beam-dropping bracket for a continuous beam 0# block.

Background Art

With the development of the economy and the increasing demands for urban landscapes, the use of various continuous beams in bridge engineering to span different routes has become increasingly common. The construction of the continuous beam 0# block, as the first step in the construction of the bridge superstructure, involves heavy construction weight, high working height, and high safety risks. It is a key procedure in the construction of continuous beams, and ensuring the safety of its construction work is of utmost importance. At present, the construction of the continuous beam 0# block mainly adopts ground support brackets and pier top brackets. Due to their prefabrication in the factory, easy installation, and good adaptability to the site environment and pier height, pier top brackets are increasingly used in the construction of continuous beam 0# blocks, enhancing the efficiency of bracket installation and removal, and improving material turnover efficiency, which is of great significance for saving construction costs of continuous beams.

In existing technology, patent publication number CN214401417U discloses a rotatable bracket for a continuous beam 0# block, where the various rods are connected by hinges, and the rods are separated by the removal of the hinges. Patent publication number CN117090139A discloses a bracket device that uses pier body embedded parts and bolt connections to the pier body, and uses a sand box to implement the bracket dismantling and formwork removal.

In the aforementioned bracket devices, the production and installation of hinged rods, the positioning of embedded parts, and other processes have high technical requirements and present some difficulties in actual on-site operations.

Summary of the Invention

To solve the aforementioned problems existing in current technology, the purpose of this invention is to provide a mobile and cyclic beam-dropping bracket for a continuous beam 0# block that is easy to assemble and disassemble.

The technical solution adopted by this invention is:

A mobile and cyclic beam-dropping bracket for a continuous beam 0# block, including a corbel embedded in the pier column of the bridge pier, with a wedge drop beam device connected to the corbel; it also includes a shaped steel frame, the lower end of the shaped steel frame is connected to the wedge drop beam device, and the upper end of the shaped steel frame is connected to the pier cap.

The wedge drop beam device of this invention relies on the wedging action of the inclined surfaces to press the shaped steel frame tightly, ensuring the stability of the shaped steel frame after installation. The inclined surfaces of the wedge drop beam device are not connected, and during disassembly, separating the inclined surfaces of the wedge drop beam device allows for the rapid disassembly of the shaped steel frame. This invention facilitates the lowering of the wedge drop beam device, the removal of the formwork and shaped steel frame, and achieves rapid disassembly and turnover of the bracket.

As a preferred embodiment of this invention, the wedge drop beam device includes an adjusting threaded rod and four wedge steel ingots, arranged in a return pattern. The upper wedge steel ingots are connected to the shaped steel frame, the lower wedge steel ingots are connected to the corbel, and the adjusting threaded rod passes through the left and right wedge steel ingots, with adjusting nuts threaded on both ends of the adjusting threaded rod.

During installation, tightening the adjusting nuts pushes the left and right wedge steel ingots inward. Under the squeezing action, the left and right wedge steel ingots move diagonally upward relative to the lower wedge steel ingots, and the upper wedge steel ingots move diagonally upward relative to the left and right wedge steel ingots, thus moving the upper wedge steel ingots upward in a straight line. After the upper wedge steel ingots have moved into place, it is convenient to accurately connect the upper end of the shaped steel frame to the bridge segment cap. During disassembly, the adjusting nuts are turned in the opposite direction, moving the left and right wedge steel ingots apart until the upper wedge steel ingots

separate from the left and right wedge steel ingots, at which point it is convenient to disassemble the shaped steel frame.

As a preferred embodiment of this invention, the inner sides of the wedge steel ingots are chamfered. A space is left on the inner side of the four wedge steel ingots to facilitate their inward movement.

As a preferred embodiment of this invention, the inner planes of the left and right wedge steel ingots are parallel to each other. When the left and right wedge steel ingots move towards each other, their inner planes fit together, improving the stability of the wedge drop beam device.

As a preferred embodiment of this invention, for solid piers, corbels are set on both sides of the pier column.

As a preferred embodiment of this invention, it also includes tie rods, which are connected to the corbels on both sides of the pier column, with tie nuts threaded on the ends of the tie rods. After tightening the tie nuts, the tie rods pull and fix the corbels on both sides.

As a preferred embodiment of this invention, for hollow piers, the ends of the corbels protrude from both sides of the pier column. The full length of the corbel passes through the whole pier column, allowing the corbel to also serve as a platform for setting up the formwork support bracket for the upper solid section.

As a preferred embodiment of this invention, the pier cap is pre-embedded with fastening threaded rods, the shaped steel frame is fixed with end caps, and the fastening threaded rods pass through the end caps and are locked by fastening nuts. Tightening the fastening nuts fixes the end cap of the shaped steel frame to the pier cap.

As a preferred embodiment of this invention, both sides of the end cap are connected with a fastening threaded rod.

As a preferred embodiment of this invention, the shaped steel frame includes a tripod, the upper end of the tripod is connected to the pier cap, the lower end of the tripod is connected to the wedge drop beam device, and several cross bars connect the tripods on the same side.

The beneficial effects of this invention are:

The wedge drop beam device of this invention relies on the wedging action of the inclined surfaces to press the shaped steel frame tightly, ensuring the stability of the shaped steel frame after installation. The inclined surfaces of the wedge drop beam device are not connected, and during disassembly, separating the inclined surfaces of the wedge drop beam device allows for the rapid disassembly of the shaped steel frame. This invention facilitates the lowering of the wedge drop beam device, the removal of the formwork and shaped steel frame, and achieves rapid disassembly and turnover of the bracket.

Brief Description of the Drawings

Figure 1 is a front view of the present invention;

Figure 2 is a left side view of the present invention;

Figure 3 is a schematic diagram of the structure of the wedge drop beam device.

List of reference numerals: 1 - pier body; 2 - cap; 3 - corbel; 4 - wedge drop beam device; 5 - shaped steel frame; 11 - tie rod; 12 - tie nut; 21 - fastening threaded rod; 22 - fastening nut; 41 - adjusting threaded rod; 42 - wedge steel ingot; 43 - adjusting nut; 51 - end cap; 52 - tripod; 53 - cross bar.

Detailed Description of Embodiments

To make the objectives, technical solutions, and advantages of the embodiments of this invention clearer, the following will combine the drawings of the embodiments of this invention to provide a clear and complete description. It is evident that the described embodiments are part of the embodiments of the invention, not all of them. The components of the embodiments of the invention described and shown in the drawings herein can be arranged and designed in various different configurations.

Therefore, the detailed description of the embodiments of the invention provided in the drawings is not intended to limit the scope of the claimed invention, but merely represents selected embodiments of the invention. Based on the embodiments in this invention, all other embodiments obtained by those of ordinary skill in the art without creative efforts fall within the scope of protection of this invention. It is to be noted that, where possible, the embodiments of this invention and features of those embodiments can be combined with each other.

As shown in Figures 1 to 3, the embodiment of the mobile and cyclic beam-dropping bracket for a continuous beam 0# block includes a corbel 3 embedded in the pier body 1 of the bridge pier, with a wedge drop beam device 4 connected to the corbel 3; it also includes a shaped steel frame 5, the lower end of the shaped steel frame 5 is connected to the wedge drop beam device 4, and the upper end of the shaped steel frame 5 is connected to the pier cap 2.

The wedge drop beam device 4 of this invention relies on the wedging action of the inclined surfaces to press the shaped steel frame 5 tightly, ensuring the stability of the shaped steel frame 5 after installation. The inclined surfaces of the wedge drop beam device 4 are not connected, and during disassembly, separating the inclined surfaces of the wedge drop beam device allows for the rapid disassembly of the shaped steel frame 5. This invention facilitates the lowering of the wedge drop beam device 4, the removal of the formwork and shaped steel frame 5, and achieves rapid disassembly and turnover of the bracket.

Specifically, the wedge drop beam device 4 includes an adjusting threaded rod 41 and four wedge steel ingots 42, arranged in a return pattern. The upper wedge steel ingots 42 are connected to the shaped steel frame 5, the lower wedge steel ingots 42 are connected to the corbel 3, and the left and right wedge steel ingots 42 have pre-drilled holes, with the adjusting rod passing through the holes of the left and right wedge steel ingots 42, and both ends of the adjusting threaded rod 41 are threaded with adjusting nuts 43. For round-end piers, a seam steel plate is used to fill the gap between the wedge drop beam device 4 and the pier body 1.

During installation, tightening the adjusting nuts 43 pushes the left and right wedge steel ingots 42 inward. Under the squeezing action, the left and right wedge steel ingots 42 move diagonally upward relative to the lower wedge steel ingots 42, and the upper wedge steel ingots 42 move diagonally upward relative to the left and right wedge steel ingots 42, thus moving the upper wedge steel ingots 42 upward in a straight line. After the upper wedge steel ingots 42 have moved into place, it is convenient to accurately connect the upper end of the shaped steel frame 5 to the bridge segment cap 2. During disassembly, the adjusting nuts 43 are turned in the opposite direction, moving the left and right wedge steel ingots 42 apart until the upper wedge steel ingots 42 separate from the left and right wedge steel ingots 42, at which point it is convenient to disassemble the shaped steel frame 5.

It is to be noted that the inner sides of the wedge steel ingots 42 are chamfered. A space is left on the inner side of the four wedge steel ingots 42 to facilitate their inward movement. The inner planes of the left and right wedge steel ingots 42 are parallel to each other. When the left and right wedge steel ingots 42 move towards each other, their inner planes fit together, improving the stability of the wedge drop beam device 4.

The pier body 1 is pre-embedded with shaped steel corbels 3, and the corbels 3 are used in different forms according to construction requirements.

For solid piers, corbels 3 are set on both sides of the pier body 1. A tie rod 11 connects the corbels 3 on both sides of the pier body 1, and the ends of the tie rod 11 are threaded with tie nuts 12. After tightening the tie nuts 12, the tie rod 11 pulls and fixes the corbels 3 on both sides.

For hollow piers, the ends of the corbels 3 protrude from both sides of the pier body 1. The full length of the corbel 3 passes through the whole pier body 1, allowing the corbel 3 to also serve as a platform for setting up the formwork support bracket for the upper solid section.

The shaped steel frame 5 includes a tripod 52, the upper end of the tripod 52 is fixed with an end cap 51, the end cap 51 is connected to the pier cap 2, the lower end of the tripod 52 is connected to the wedge drop beam device 4, and several cross bars 53 connect the tripods 52 on the same side.

The pier cap 2 is pre-embedded with fastening threaded rods 21, the fastening threaded rods 21 pass through the end cap 51 and are locked by fastening nuts 22. Tightening the fastening nuts 22 fixes the end cap 51 of the shaped steel frame 5 to the pier cap 2. Both sides of the end cap 51 are connected with a fastening threaded rod 21.

This invention is not limited to the aforementioned embodiments; any person can derive other various forms of products under the enlightenment of this invention, but regardless of any changes in shape or structure, all technical solutions that fall within the scope defined by the claims of this invention are within the protection scope of this invention.

CLAIMS

1. A mobile and cyclic beam-dropping bracket for a continuous beam 0# block, characterized in that: it includes a corbel (3) pre-embedded in the pier body (1) of the bridge pier, with a wedge drop beam device (4) connected to the corbel (3); it also includes a shaped steel frame (5), the lower end of the shaped steel frame (5) is connected to the wedge drop beam device (4), and the upper end of the shaped steel frame (5) is connected to the pier cap (2).

2. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 1, characterized in that: the wedge drop beam device (4) includes an adjusting threaded rod (41) and four wedge steel ingots (42), arranged in a return pattern. The upper wedge steel ingots (42) are connected to the shaped steel frame (5), the lower wedge steel ingots (42) are connected to the corbel (3), and the adjusting rod passes through the left and right wedge steel ingots (42), with adjusting nuts (43) threaded on both ends of the adjusting threaded rod (41).

3. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 1, characterized in that: the inner sides of the wedge steel ingots (42) are chamfered.

4. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 3, characterized in that: the inner planes of the left and right wedge steel ingots (42) are parallel to each other.

5. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 1, characterized in that: for solid piers, corbels (3) are set on both sides of the pier body (1).

6. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 5, characterized in that: it also includes tie rods (11), which are connected to the corbels

(3) on both sides of the pier body (1), with tie nuts (12) threaded on the ends of the tie rods (11).

7. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 1, characterized in that: for hollow piers, the ends of the corbels (3) protrude from both sides of the pier body (1).

8. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 1, characterized in that: the pier cap (2) is pre-embedded with fastening threaded rods (21), the shaped steel frame (5) is fixed with end caps (51), and the fastening threaded rods (21) pass through the end caps (51) and are locked by fastening nuts (22).

9. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to claim 8, characterized in that: both sides of the end cap (51) are connected with a fastening threaded rod (21).

10. The mobile and cyclic beam-dropping bracket for a continuous beam 0# block according to any one of claims 1 to 9, characterized in that: the shaped steel frame (5) includes a tripod (52), the upper end of the tripod (52) is connected to the pier cap (2), the lower end of the tripod (52) is connected to the wedge drop beam device (4), and several cross bars (53) connect the tripods (52) on the same side.

REVENDICATIONS

1. Un étrier mobile et cyclique pour un bloc de poutre continue 0#, caractérisé en ce qu'il comprend un corbeau (3) pré-intégré dans le corps de colonne de pile (1) du pilier de pont, avec un dispositif de descente de poutre à coin (4) connecté au corbeau (3) ; il comprend également un cadre en acier profilé (5), l'extrémité inférieure du cadre en acier profilé (5) est connectée au dispositif de descente de poutre à coin (4), et l'extrémité supérieure du cadre en acier profilé (5) est connectée au chapeau de pile (2).

2. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 1, caractérisé en ce que : le dispositif de descente de poutre à coin (4) comprend une tige filetée de réglage (41) et quatre lingots d'acier en coin (42), disposés selon un motif de retour. Les lingots d'acier en coin supérieurs (42) sont connectés au cadre en acier profilé (5), les lingots d'acier en coin inférieurs (42) sont connectés au corbeau (3), et la tige de réglage passe à travers les lingots d'acier en coin gauche et droit (42), avec des écrous de réglage (43) vissés sur les deux extrémités de la tige filetée de réglage (41).

3. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 1, caractérisé en ce que : les côtés internes des lingots d'acier en coin (42) sont chanfreinés.

4. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 3, caractérisé en ce que : les plans internes des lingots d'acier en coin gauche et droit (42) sont parallèles entre eux.

5. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 1, caractérisé en ce que : pour les piliers pleins, des corbeaux (3) sont placés des deux côtés du corps de colonne de pile (1).

6. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 5, caractérisé en ce que : il comprend également des tiges de liaison (11), qui sont connectées aux corbeaux (3) des deux côtés du corps de colonne de pile (1), avec des écrous de liaison (12) vissés sur les extrémités des tiges de liaison (11).

7. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 1, caractérisé en ce que : pour les piliers creux, les extrémités des corbeaux (3) dépassent des deux côtés du corps de colonne de pile (1).

8. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 1, caractérisé en ce que : le chapeau de pile (2) est pré-intégré avec des tiges filetées de fixation (21), le cadre en acier profilé (5) est fixé avec des bouchons d'extrémité (51), et les tiges filetées de fixation (21) passent à travers les bouchons d'extrémité (51) et sont bloquées par des écrous de fixation (22).

9. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon la revendication 8, caractérisé en ce que : les deux côtés du bouchon d'extrémité (51) sont connectés avec une tige filetée de fixation (21).

10. L'étrier mobile et cyclique pour un bloc de poutre continue 0# selon l'une quelconque des revendications 1 à 9, caractérisé en ce que : le cadre en acier profilé (5) comprend un trépied (52), l'extrémité supérieure du trépied (52) est connectée au chapeau de pile (2), l'extrémité inférieure du trépied (52) est connectée au dispositif de descente de poutre à coin (4), et plusieurs barres transversales (53) relient les trépieds (52) du même côté.

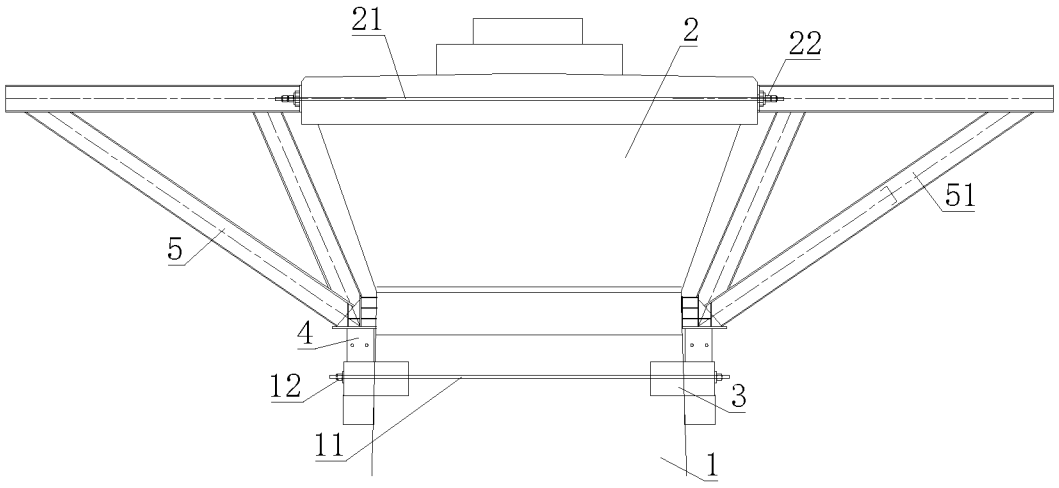


Fig 1

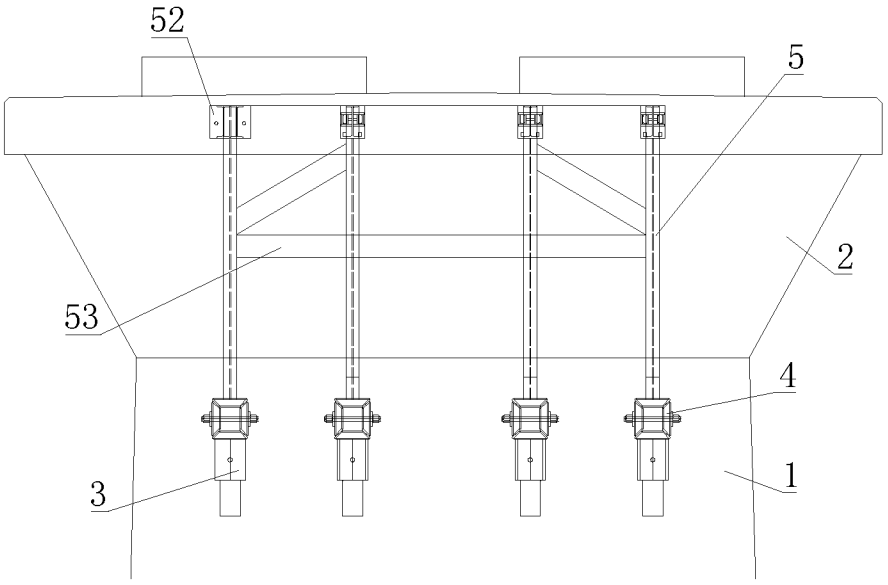


Fig 2

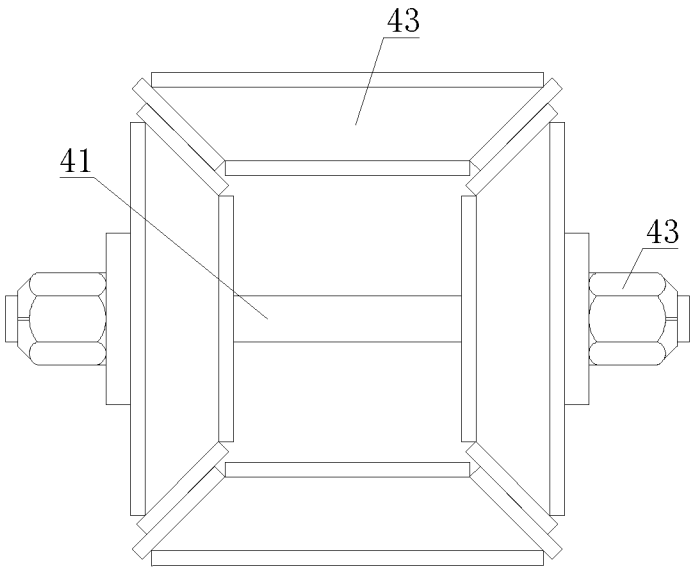


Fig 3