

(16)

-1-

BEAM FOR SUPPORTING FORMWORKS

1 The present invention relates to a beam for supporting
a formwork for use in constructing a concrete floor comprising
slabs and girders.

 The applicant of the present invention proposed
in his Japanese patent application No. 56-75341 a process
5 for constructing a concrete floor, comprising the steps
of arranging beams between a pair of girder formworks
at regular intervals, putting formworks for slab on the
beams, placing concrete in the girder formworks and the
slab formworks, and, after the required period for curing
10 concrete has elapsed, removing the girder formworks without
removing the slab formworks and the beams for use at
the upper floor.

 In concrete buildings, the span between the girders
often varies according to various conditions of building.
15 Therefore, if beams do not permit the adjustment of length,
a lot of beams having different lengths have to be prepared.
Although such inconvenience can be solved by providing
beams having an adjustable length, such adjustable beams
have a disadvantage that the portion where the adjustment
20 is made is under the load of concrete, unfavorably affecting
the dimensional accuracy of concrete slab formed.

1 In accordance with the present invention, there
is provided a beam for supporting formworks for use in
constructing concrete floor, comprising a main body having
a vertical plate fixedly mounted thereon at each end
thereof, and an adjuster member removably mounted on said
5 plate of said main body at each end thereof, said adjuster
member having a hook secured to outer edge thereof, one
of said plate and said adjuster members being formed with
a longitudinal groove and the other being formed with
a ridge adapted to fit in said groove, so that said
10 adjuster member is slidable in a longitudinal direction
with said ridge in said groove to adjust the entire length
of the beam.

 In accordance with the present invention, the length
of the beam can be easily adjusted by sliding the
15 adjuster member guided by the groove in the plate
secured to the beam body. Also, since the load on the
length adjusting portion is borne by the ridge-groove
engaging portion, the load bearing strength is greatly
increased. This ensures good dimensional accuracy
20 in making a concrete floor.

 Other features and advantages of the present invention

1 will become apparent from the following description taken with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of the beams according to the present invention in use;

5 Fig. 2 is a vertical sectional view thereof in an assembled state;

Fig. 3 is an enlarged sectional view thereof; and

Figs. 4 to 10 are schematic views illustrating how a concrete floor is constructed by use of the beams according to the present invention.

Referring now to Figs. 1 to 3, a beam 1 in accordance with the present invention includes a main body 2 and adjusters 3 secured to both ends of the main body. The main body 2 comprises an upper member 4 made of an angle bar, a lower member 5 made of an iron rod, a truss 6 made of an iron rod bent in zigzags for joining the upper member 4 and the lower member 5, and a plate 7 mounted on the upper and lower members at each end thereof. The lower member 5 is slightly shorter than the upper member 4, so that the endwise edges of the plates 7 are oblique toward the center of the main body 2.

Each adjuster 3 comprises an oblong plate 8 mounted on the side faces of the plate 7 and the upper member 4, and a hook 9 secured to the end of the oblong plate 8. The endwise edges of the oblong plates 8 are also

1 oblique toward the center of the beam body 2. Each hook
9 comprises an upper plate 9a adapted to rest on the
top of a side formwork 11 for forming a girder, a claw
9b formed by downwardly bending one end of the upper
5 plate 9a toward the inside of the side formwork 11, and
a web 9c downwardly and obliquely extending from the
other end of the upper plate 9a. The edge of each oblong
plate 8 is welded to the web 9c.

The plate 7 is formed with a groove 12 which runs
10 in the longitudinal direction of the beam body 2. The
groove, 12 is formed by bending the middle of the plate
7 so as to form a trapezoidal section.

Each oblong plate 8 is provided with a ridge 13
which also runs in the longitudinal direction of the
15 beam body 2 and is adapted to fit in the groove 12 when
the plate 8 is mounted on the side face of the plate
7. In the embodiment shown in Figs. 1 to 3, a ridge
13 is provided on each face of the oblong plate 8. (Fig. 3)

Since the upper ridge 13 of the plate 8 fits in
20 the groove 12 when the plate 8 is mounted on the side
face of the plate 7, the adjuster 3 can move in the longi-
tudinal direction of the beam body 2 along the groove
12 so that the full length of the beam 1, that is, the
distance between the claws 9b is variable.

25 The upper member 4 and the plate 7 are formed with

1 an elongated hole 14. Each oblong plate 8 is formed with bolt holes 15 arranged at regular intervals in two rows running in the longitudinal direction. The bolt holes 15 in the upper and lower rows are adapted to 5 communicate with the elongated hole 14 in the upper member 4 and the one in the plate 7, respectively. The elongated holes 14 in the plate 7 are staggered in a longitudinal direction. In a like manner, the bolt holes 15 in the upper row are also staggered with respect to the bolt 10 holes 15 in the lower row in the oblong plate 8. The distance between the bolt holes in the upper row and those in the lower row is large to increase the resistance to the turning moment acting on the connecting portion between the adjuster 3 and the beam body 2.

15 At the connecting portion, engagement of the ridge 13 in the groove 12 prevents the adjuster 3 and the beam body 2 from turning with respect to each other, as well as increasing the resistance to the turning moment. A support 22 secured to the plate 8 provides an additional 20 support means for supporting the adjuster.

A formwork 17 may be secured by nailing it to a sheathing board 18 nailed to the upper member 4. (Fig. 3) Although not shown in any figures, the beam body 2 should have a camber so that when loaded, the upper 25 member 4 will be straight.

1 In use, an adjuster 3 is mounted at each end of
the beam body 2 with the ridge 13 on the oblong plate
8 in the groove 12 in the plate 7 and is secured to the
beam body 2 by tightening bolts 16 passing through the
5 elongated holes 14 and the bolt holes 15.

The adjustment of the distance between the claws
9b of the adjusters 3 is performed by rough adjustment
made by selecting among the bolt holes 15 and fine adjustment
made within the length of the elongated holes 14. The
10 mounting position of the adjuster is adjusted according
to the distance between the girders.

Next, it will be described with reference to Figs.
4-10 how the concrete floor is made.

Firstly, as shown in Fig. 4, a pair of side formworks
15 11 are erected on bottom formworks 20 supported by supports
19. The opposed pair of side formworks 11 are coupled
together by means of a separator 21 to form a girder
formwork 10. On the floor, the beams 1 are assembled
and adjusted to the required length.

20 The beam 1 is then pulled up and set between a pair
of the girder formworks 10 with the hook members 9 engaging
the top of the side formworks 11. (Fig. 5) A plurality
of beams 1 are arranged at regular intervals.

A formwork 17 for slab is laid on the array of beams
25 1. (Fig. 6) Reinforcing iron rods (not shown) are set

1 in the girder formworks 10 and on the slab formwork 17 and concrete is placed therein to form a concrete floor consisting of a slab A and girders B, as shown in Fig. 7.

5 The side formworks 11 are removed. (Fig. 8) They can be smoothly removed because the beam 1 is inwardly tapering at its both ends. The side formworks 11 removed are carried to the upper stair for use. Because the beam 1 has its claws 9b embedded in concrete of the girder 10 B, it still supports the floor A until curing is complete.

After the required period for curing has elapsed, the beam 1 is removed from the concrete slab by loosening the bolts 16 and nuts and pulling down the beam. (Fig. 9) When the beam body 2 is hammered, the adjusters 3 tend 15 to move inwardly, so that the claws 9b easily get off the girders. Now, the beam assembly can be carried to the next floor without taking its parts apart.

Finally, the bottom formworks 20 for the girders are removed. Now, a concrete floor as shown in Fig. 20 10 is complete. The beams 1 and the bottom formworks 20 removed can be used at upper stairs.

CLAIMS



- 1 1. A beam for supporting formworks for use in constructing a concrete floor, comprising a main body having a vertical plate fixedly mounted thereon at each end thereof, and an adjuster member removably mounted on said plate of said main body
5 at each end thereof, said adjuster member having a hook secured to outer edge thereof, one of said plate and said adjuster member being formed with a longitudinal groove and the other being formed with a ridge adapted to fit in said groove, so that said adjuster member is
10 slidable in a longitudinal direction with said ridge in said groove to adjust the entire length of the beam.
2. The beam as claimed in claim 1, wherein said beam body comprises an upper member, a lower member and a truss joining said upper member with said lower member.
- 15 3. The beam as claimed in claim 1, wherein said plate is formed with elongated holes running in a longitudinal direction and said adjuster member is formed with bolt holes arranged at regular intervals in a longitudinal direction, said adjuster member being bolted to said
20 main body through said plate with bolts passing through said bolt holes and said elongated holes.



-9-

1. 4. A beam for supporting formworks, substantially as herein described with reference to the accompanying drawings.
 5. A method of forming a concrete structure wherein there is used one or more beams according to any preceding claim.
 6. A method according to claim 5, substantially as herein described with reference to Figs. 4 to 10 of the accompanying drawings.
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