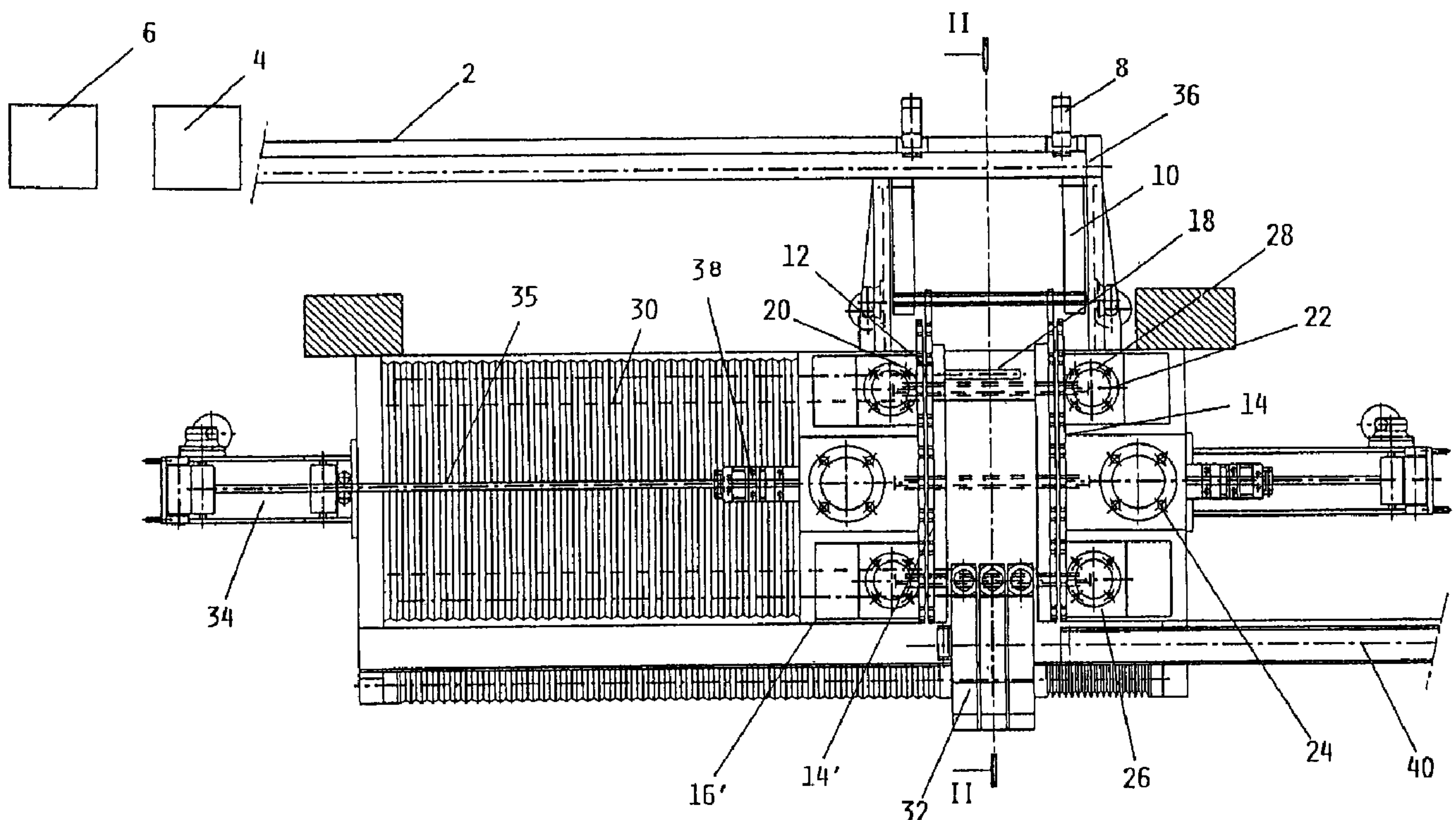




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(72) Inventeur/Inventor:
DALLAN, SERGIO, IT
(73) Propriétaire/Owner:
DALLAN S.R.L., IT
(74) Agent: ROBIC

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(54) Title: ASSEMBLY MACHINE FOR THE AUTOMATIC PRODUCTION OF STRUCTURAL ELEMENTS FOR FALSE CEILINGS



(57) Abrégé/Abstract:

A machine for the automatic production of structural elements for false ceilings, characterised by comprising a stepping feeder (12) for the profile bars (38) cut to size, two series of lateral stations (22, 24, 26) interfering with the ends of the profile bars fed transversely by said stepping feeder, and a plurality of dies provided in the different stations to subject the ends of the profile bars to the required operation, the position of a least one of the series of stations being adjustable relative to the other.



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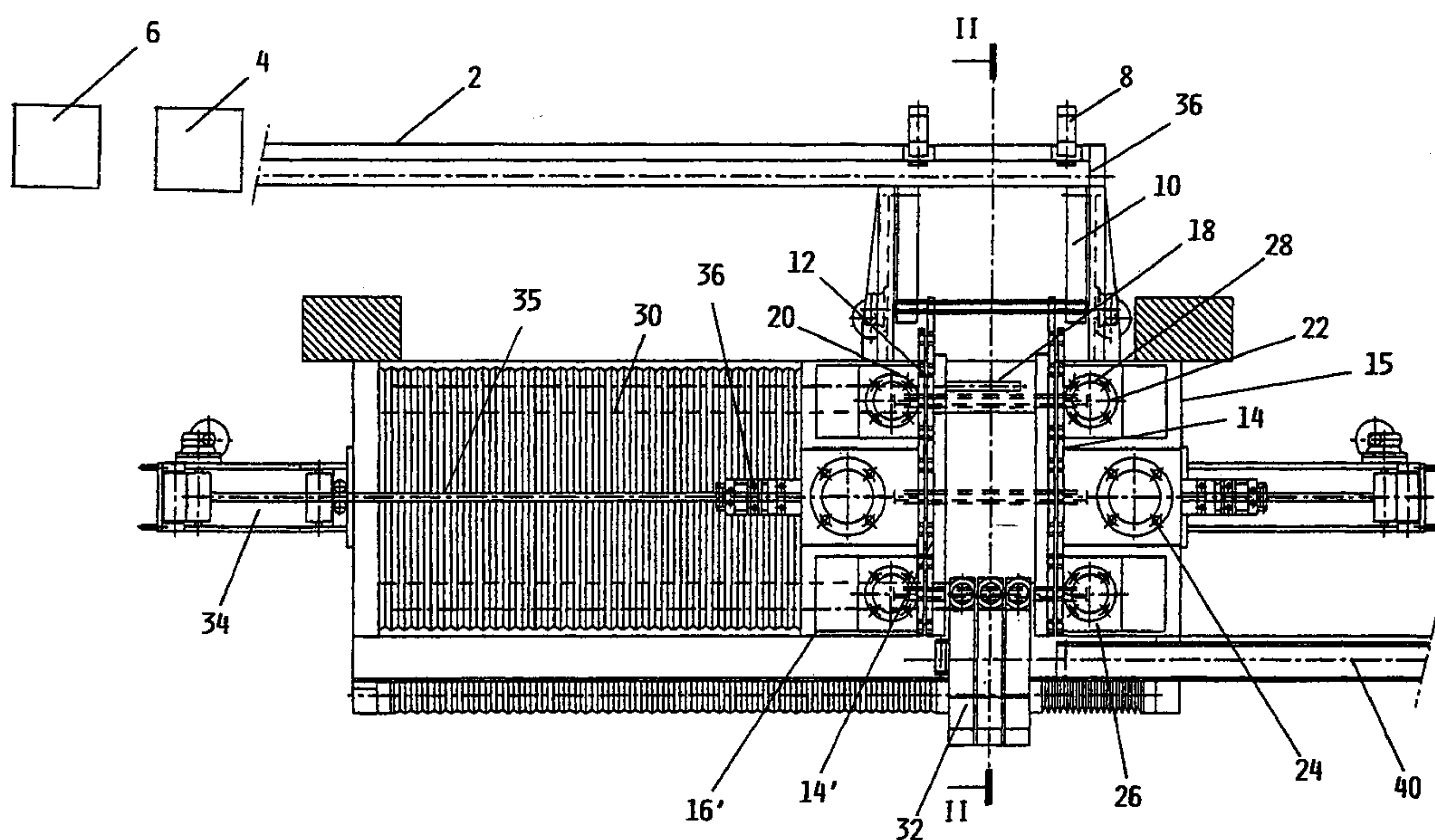
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- (71) Applicant (for all designated States except US): **DALLAN S.R.L.** [IT/IT]; Via Per Salvatronda, 50, I-31033 Castelfranco Veneto (IT).
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(75) Inventor/Applicant (for US only): **DALLAN, Sergio** [IT/IT]; Via Per Salvatronda, 50, I-31033 Castelfranco Veneto (IT).
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(54) Title: **ASSEMBLY MACHINE FOR THE AUTOMATIC PRODUCTION OF STRUCTURAL ELEMENTS FOR FALSE CEILINGS**



(57) Abstract: A machine for the automatic production of structural elements for false ceilings, characterised by comprising a stepping feeder (12) for the profile bars (38) cut to size, two series of lateral stations (22, 24, 26) interfering with the ends of the profile bars fed transversely by said stepping feeder, and a plurality of dies provided in the different stations to subject the ends of the profile bars to the required operation, the position of a least one of the series of stations being adjustable relative to the other.

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ASSEMBLY MACHINE FOR THE AUTOMATIC PRODUCTION OF STRUCTURAL ELEMENTS FOR FALSE CEILINGS

This invention relates to an assembly machine for the automatic production of structural elements for false ceilings.

5 Structural elements for false ceilings are known, consisting of profile bars of inverted T-shape provided at their ends with hooks formed either directly from the central web of the T profile bar or from inserts which are formed separately for application to each profile during its production.

10 Said profile bars are connected together to form a lattice structure which by means of steel ties or cables is generally suspended at its top from the ceiling, their horizontal flanges lowerly supporting panels, staves and anything else required to form the false ceiling.

15 Such structural elements are currently formed using single-die presses, ie presses comprising a die of dimensions corresponding to the length of the profile bar to be formed, which is housed within the press and on which the various operations are carried out, possibly in a single step but more generally in several steps, and always within the actual die in which the bar is positioned. Said die is provided with a plurality of punches which are operated in sequence to effect on the bar such operations as perforating,
20 drawing, crimping, etc.

These known single-die presses have however certain drawbacks, namely:

- poor flexibility in that for each size (length) of profile bar the press requires a particular die which has to be changed each time the profile bar is to be
25 modified or following any change in dimensions or type of operation,

- they require a large number of different dies depending on the type of hook, the length of the profile bars and the type of operation to be carried out,
- they immobilize capital,
- they occupy considerable storage space.

An object of the invention is to eliminate there drawbacks by providing an assembly machine in which profile bars of different dimensions and different hook types can be worked.

10 According to the present invention, there is provided a machine for the automatic production of inverted T-shaped structural elements for false ceilings, comprising a stepping feeder for T-shaped profile bars cut to size, two series of lateral stations interfering with the ends of said profile bars fed transversely by said stepping feeder, and a plurality of dies provided in said lateral stations to subject the ends of said profile bars to a required operation, the position of at least one of said two series of lateral stations being adjustable relative to the other, characterised in that at least one station of said stations is a station for applying an insert to the ends of said T-shaped profile bars, said inserts being formed by a press acting on a strip unwound from a reel, said press being provided upstream of said station for applying the insert to the ends of said T-
20 shaped profile bars.

A preferred embodiment of the invention is described in detail hereinafter with reference to the accompanying drawings, on which:

Figure 1 is a plan view of the assembly machine of the invention, and

Figure 2 is a cross-section there through on the line II-II of figure 1.

As can be seen from the figures, the assembly machine of the invention comprises a conveyor belt 2 provided downstream of a floating cutter 4 positioned at the exit of a forming machine 6.

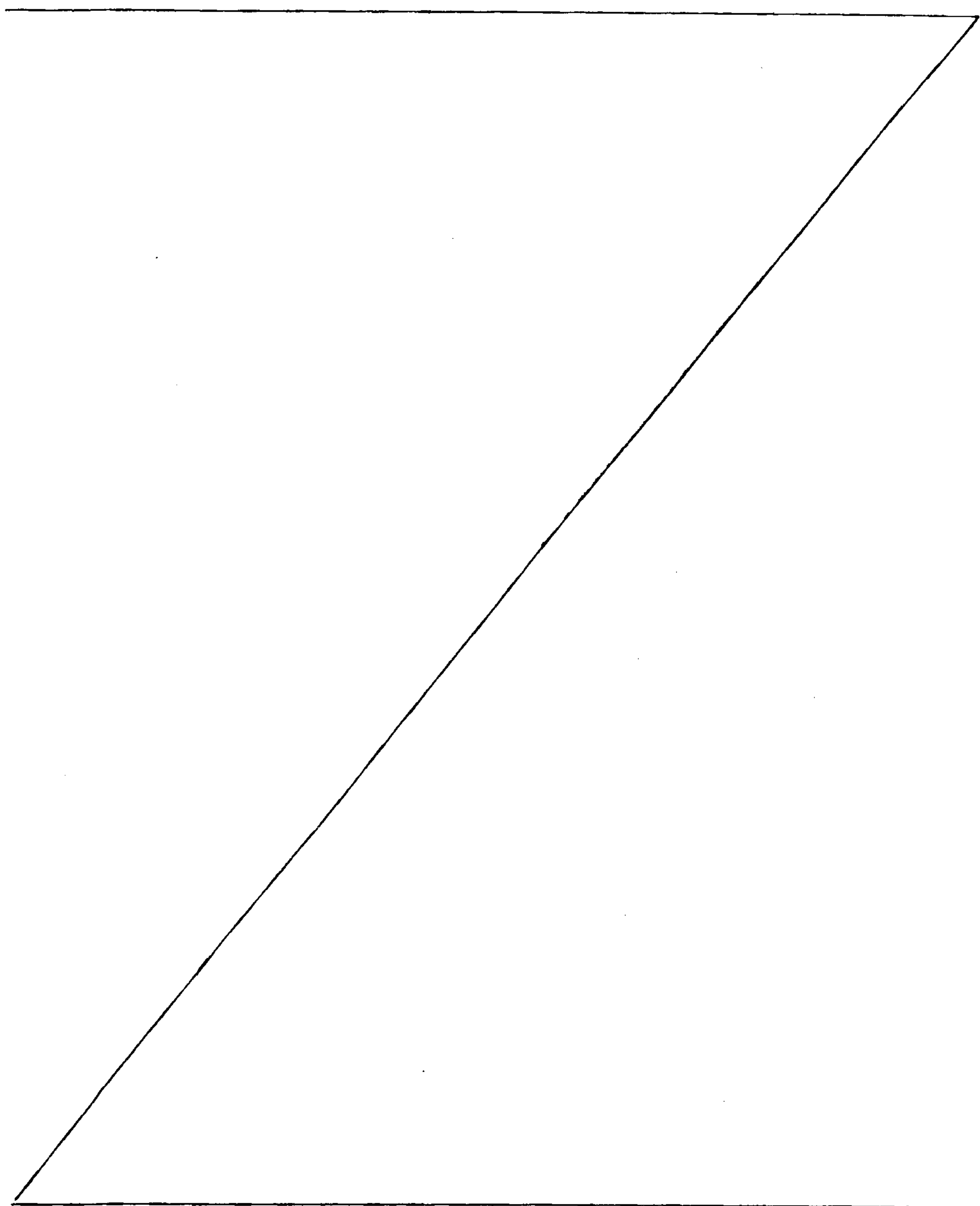
At the downstream end of said conveyor belt there are provided two pushers 8 which move axially perpendicular to the axis of the belt 2.

30 Again at the downstream end of said belt there are provided two conveyor straps 10 which are inclined slightly downwards and feed a stepping

2a

device indicated overall by 12.

The stepping device comprises a pair of parallel chains 14, 14' mounted respectively on two shoulders 16, 16', one 16' of which is movable relative to the other shoulder 16 via a guide system 18 and manually operable recirculating ball sliders 20.



Three pairs of dies 22, 24, 26 are mounted on the shoulders 16, 16' and are each operated by a corresponding hydraulic cylinder 28.

With the shoulder 16' there is associated a bellows screen 30 able to cover the distance between the operating face of the dies and the left hand
5 ends of the die bench following the movement of the shoulder 16'.

At the pair of dies 26, the machine of the invention also comprises movable transverse stations 32 positionable on the central part of the profile bar to be worked, and in particular on its vertical web.

A reel 34 about which steel strip 35 passes is provided to the side of
10 the intermediate pair of dies.

The machine of the invention operates in the following manner: after adjusting the distance between the shoulders 16, 16' to adapt them to the length of the profile bars 38 to be worked, these profile bars, leaving the forming machine 6 already of T shape and cut by the floating cutter 4, are
15 made to advance along the conveyor 2 until they encounter a limit switch 36, at which the pushers 8 transfer them onto the conveyor 10 such that they lie substantially on their side, ie with their web, vertical when installed, now lying horizontal because of the fact that the subsequent operations are performed mainly on this web.

20 The conveyor 10 transfers the profile bars stepwise to the device 12, which with its pair of chains 14, 14' grips each profile bar positioned transversely between the chains, raises it and advances it transversely between through a certain distance, to then lower it. The pitch of the stepping movement, ie the distance between two successive positions of each profile
25 bar, is equal to the distance between the dies corresponding to the two

- 4 -

working stations, and the rate of advancement of the stepping device is equal to the rate at which the pairs of dies of the two stations are operated.

At the pair of dies 24, inserts formed by a press 38 acting on the strip 35 unwound from the reel 34 are applied to the ends of the profile bar.

5 Alternatively, the inserts are joined together to form a tape from which they are separated, to be applied to the ends of the bar portions.

In other cases in which it is not intended to apply such inserts, the pair of dies 24 punches the ends of the profile bars to form corresponding hooks.

10 When the profile bars arrive at the pairs of dies 26, the transverse stations 32 operate to form in the central region of the bar either holes for suspending it from the overlying ceiling, or apertures to be hooked by hooks provided on the other bars.

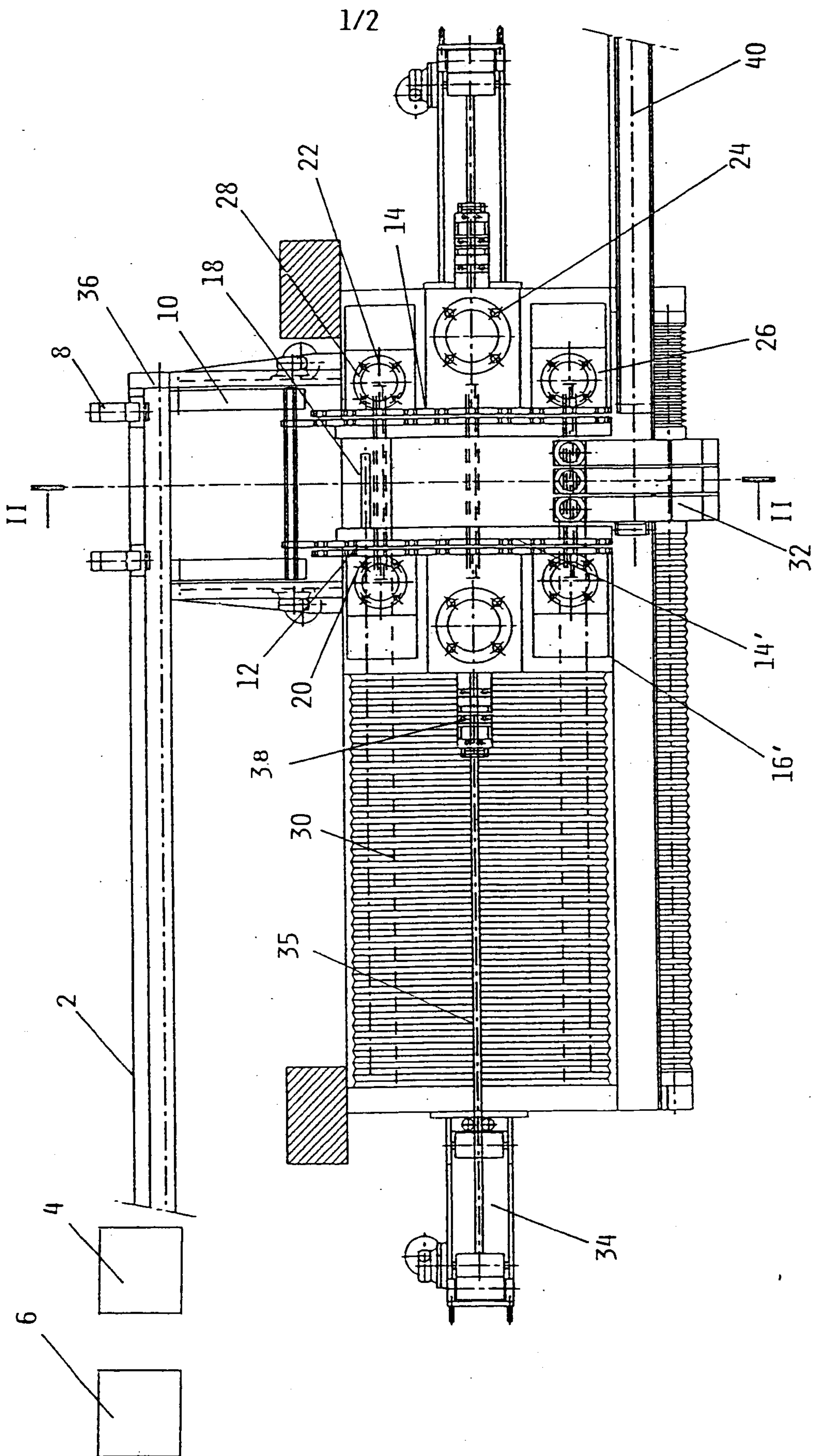
The positioning of these stations depends on the length of the bar to be worked and on the type of operation to be effected.

15 When these operations have been carried out the profile bars 38 are positioned on a conveyor belt 40 to be fed to discharge.

WHAT IS CLAIMED IS:

1. A machine for the automatic production of inverted T-shaped structural elements for false ceilings, comprising a stepping feeder for T-shaped profile bars cut to size, two series of lateral stations interfering with the ends of said profile bars fed transversely by said stepping feeder, and a plurality of dies provided in said lateral stations to subject the ends of said profile bars to a required operation, the position of at least one of said two series of lateral stations being adjustable relative to the other, characterised in that at least one
10 station of said stations is a station for applying an insert to the ends of said T-shaped profile bars, said inserts being formed by a press acting on a strip unwound from a reel, said press being provided upstream of said station for applying the insert to the ends of said T-shaped profile bars.
2. A machine as claimed in claim 1, characterised in that at least one of the two series of lateral stations is mounted on a shoulder which, by means of a guide system and manually operable recirculating ball slider, is adjustable relative to another shoulder which supports the other of said two series of lateral stations.
3. A machine as claimed in claim 1, characterised by comprising transverse
20 stations positioned at the most downstream pair of stations, said transverse stations being movable and positionable on the profile bar to be worked in order to effect operations on the central part of the vertical web of the profile bar.
4. A machine as claimed in claim 3, characterised in that said station for applying the insert is positionable in the length direction of the profile bar.
5. A machine as claimed in claim 1, characterised in that each die is operated by a hydraulic cylinder.

FIG. 1



2/2

FIG. 2

