

[54] **BEDPLATE WITH DRIVE MECHANISM FOR INSTALLING PROCESS UNITS OF AUTOMATIC PROCESSING LINE**

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[76] Inventors: **Alexandr Alexandrovich Bulatov**, ulitsa Zabaikalskaya, 4, kv. 17; **Albert Ivanovich Chesnokov**, ulitsa Gavrskaya, 11, kv. 182, both of Leningrad, U.S.S.R.

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Primary Examiner—Charles J. Myhre
Assistant Examiner—Thomas C. Perry

[21] Appl. No.: **324,801**

Related U.S. Application Data

[63] Continuation of Ser. No. 128,862, March 29, 1971, abandoned.

[52] U.S. Cl. **74/665 F, 74/665 L, 29/33 P**

[51] Int. Cl. **F16h 37/06**

[58] Field of Search **74/665 F, 665 G, 665 GA, 74/665 GB, 665 GC, 665 GD, 665 GE, 665 L, 665 M, 665 N; 29/33, 563, 564**

[57] **ABSTRACT**

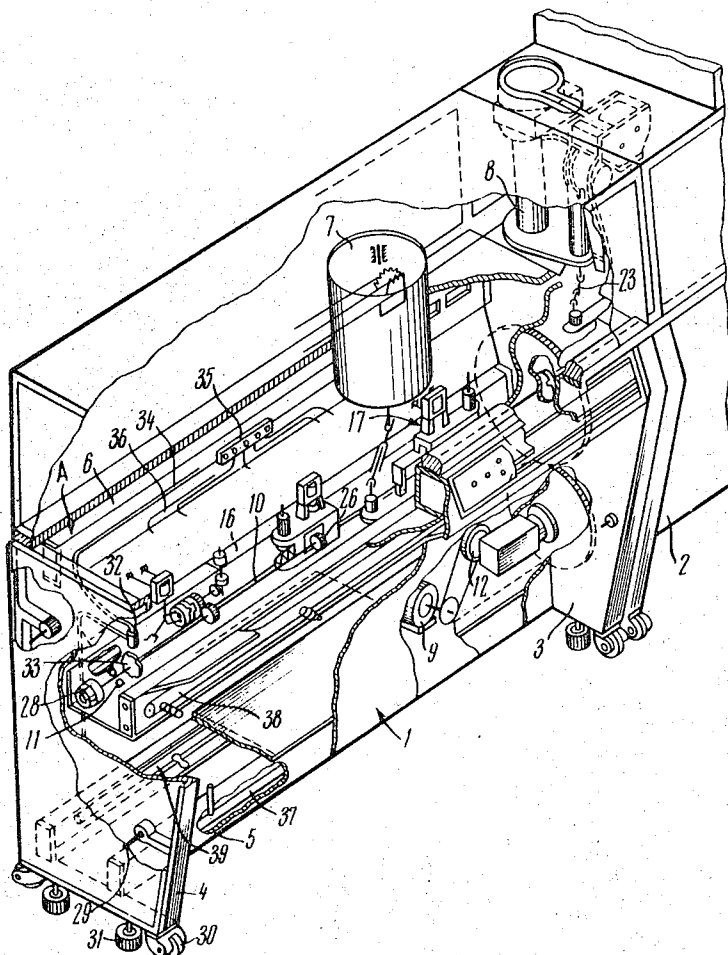
A bedplate with a drive mechanism for installation of process units of automatic processing lines in which the supporting surface for the installation of the process units is arranged along the longitudinal axis of the bedplate while the driving shaft is located under the supporting surface, also along the longitudinal axis of the bedplate. A cross member is located on one side of said driving shaft, said cross member having inter surfaces which mount coupling units and through which the process units are driven by the driving shaft, with said coupling units being adapted for displacement along the axis of the driving shaft and for being turned through 180° with relation to their respective output end of the shaft connected to the process units.

[56] **References Cited**

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2 Claims, 4 Drawing Figures



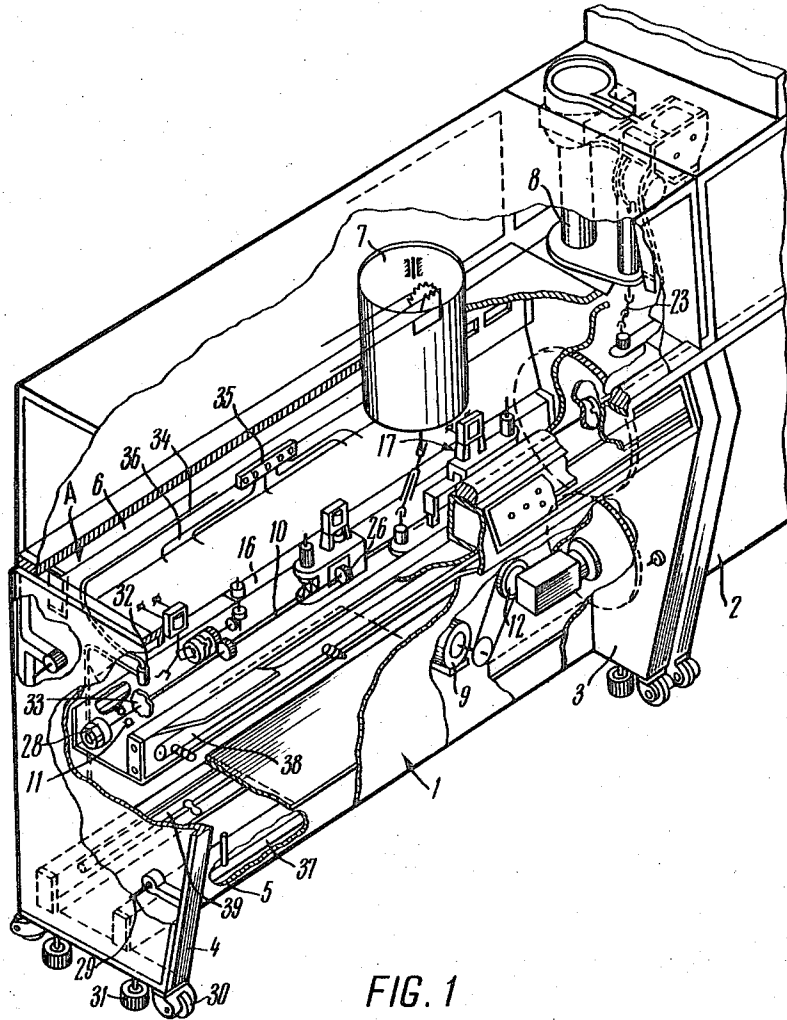


FIG. 1

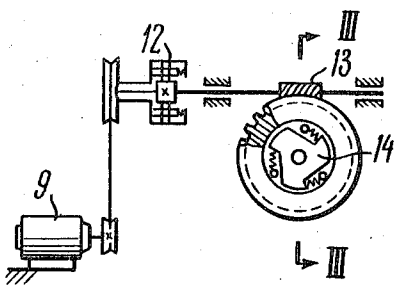


FIG. 2

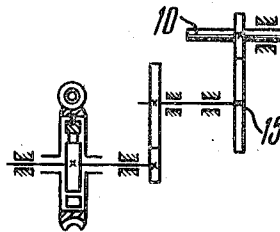


FIG. 3

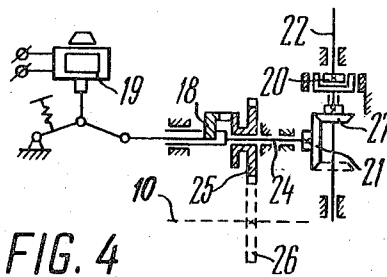


FIG. 4

BEDPLATE WITH DRIVE MECHANISM FOR INSTALLING PROCESS UNITS OF AUTOMATIC PROCESSING LINE

This is a continuation of application Ser. No. 5
128,862, filed Mar. 29, 1971, now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates to automatic process-
ing lines an more specifically, to bedplates with a drive 10
mechanism, intended for installing the process units of
automatic processing lines. This invention can be used
most successfully in high-efficiency automatic process-
ing lines with a short cycle required for processing the
product, for example, radio components.

PRIOR ART

Widely known in the art are bedplates with drive
mechanisms comprising an electric drive motor and a
driving shaft coupled to said motor, with both mounted 20
on the base of the bedplate, and said driving shaft actu-
ating the process units installed on the mounting pads
of the bedplate.

While designing and manufacturing the known auto-
matic processing lines, the bedplates with the drive 25
mechanisms are designed and manufactured to suit the
specialized group of process units. For ensuring the in-
stallation of the process units and for the most efficient
arrangement of the group of process units, the mount-
ing pads of the bedplate are installed at different levels
and planes. The drive motor and the driving shaft are
also installed so as to ensure the best arrangement of
the process unit drive and convenience in its servicing.
During installation of the entire automatic processing
line on the known bedplates intended for the special-
ized group of process units, it becomes necessary to
make special conveying connections between the pro-
cess units of the jointed bedplates due to the different
levels of product conveyance.

These conveying connections make it difficult to ob-
tain a single operating cycle of the process units of the
entire automatic processing line thus complicating con-
siderably the system of synchronization, and calling for
the use of accumulators which, in turn, leads to difficul-
ties in the manufacture and operation of the line. In the
automatic processing lines whose process units are in-
stalled on the known bedplates the long period of time
required for the passage of the product through the
conveying connections and accumulators affects ad-
versely the efficiency of the entire line.

OBJECTS AND SUMMARY OF THE INVENTION

The present invention is directed to providing a bed-
plate with a drive mechanism which will be fit for use
with any kind of automatic processing line, thereby en-
suring the conveyance of the products in one direction
and on one and the same level throughout the line.

With this object in view, the invention is a bedplate
with a drive mechanism wherein, according to the in-
vention, the supporting surface for the installation of
the process units is arranged horizontally along the lon-
gitudinal axis of the bedplate throughout its length
while under the supporting surface, along the longitudi-
nal axis of the bedplate, throughout its length, is in-
stalled a driving shaft with a cross member installed on
at least one side of said shaft. The cross member has
datum surfaces on which coupling units are installed

and through which the process units are set in motion
by the driving shaft, with said coupling units being
adapted for displacement along the axis of the driving
shaft and for being turned through 180° with relation
to their respective output ends of the shaft connected
with the process units.

It is practicable that the coupling unit be made in the
form of a single-jaw coupling and an irreversible cou-
pling linked rigidly with each other by a bevel gear
drive, with one shaft of the coupling unit with the jaw
coupling carrying a gear wheel which meshes with the
gear wheel installed on the driving shaft and with provi-
sion for moving along said shaft.

It is also practicable that the ends of the driving shaft
be provided with couplings which can be extended be-
yond the outline of the bedplate for connection with
the shaft of the other jointed, the driving shaft being
coupled to the drive motor by a slipping clutch and an
overrunning clutch.

Such a design of the bedplate with the drive mechan-
ism allows the process units to be installed on the bed-
plate in any desired sequence and on one and the same
level along the bedplate axis. The process units can be
connected with the drive in any point of the bedplate
by displacing the coupling unit as required. The direc-
tions of rotation can also be changed by turning the
coupling unit through 180°.

Operation of the process units installed on the bed-
plate in synchronism with the other process units is en-
sured by the unit comprising a single-jaw coupling and
an irreversible coupling which stop the process units at
a precisely required moment and start them again at a
predetermined stage of the cycle.

In addition, the ends of the driving shaft are provided
with couplings which can be extended beyond the out-
line of the bedplate. In this case, the driving shaft is
coupled to the electric drive motor by a slipping clutch
and an overrunning clutch. Such an arrangement com-
bines the drive mechanisms of the different bedplates
into a single kinematic chain, thus providing for syn-
chronous operation of all the process units in the auto-
matic processing line. This arrangement dispenses with
the need for the conveying connections and accumula-
tors between the jointed bedplates.

By means of the present invention it becomes possi-
ble to produce various parts on universal bedplates
with drive mechanisms by designing and manufacturing
automatic processing lines to any desired layout. The
employment of the present bedplates with the drive
mechanism cuts down the designing time by 20-30 per-
cent and reduces the total time required for manufact-
uring and starting the automatic line by 30-40 per-
cent.

The present invention will be better understood from
the following detailed description thereof given by way
of example with reference to the accompanying draw-
ings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a section of the automatic processing line
with the bedplate according to the invention;

FIG. 2 is a diagrammatic view showing the coupling
of the electric drive motor with the driving shaft of the
bedplate according to the invention;

FIG. 3 is a section taken along line III—III in FIG. 2,
the view looking in the direction of the arrows; and

FIG. 4 is a diagrammatic view showing a unit comprising a single-jaw coupling and an irreversible coupling of the bedplate according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

The section of the automatic line (FIG. 1) is designed for the production of radio components, particularly resistors. This section includes process units installed on bedplates 1 and 2 with the drive mechanisms.

The bedplate 1 comprises end face walls 3 and 4 interconnected by longitudinal lower tie rods 5 and upper tie rods 6. The upper tie rods 6 are defined by channel bars whose upper horizontal flanges are machined and serve as supporting surfaces for the installation of process units 7 and 8 which are made in the form of a drum-type drying furnace and a loading device. Other process units are not shown in the drawing in order to emphasize the elements directly related to the subject matter of the present invention.

Mounted on the bed plate is an electric drive motor 9 rotating a driving shaft 10. The driving shaft 10 is arranged along the longitudinal axis of the bedplate throughout its length, being mounted in supporting bearings 11 installed in the end face walls 3 and 4. The kinematic linkage of the driving shaft 10 (FIGS. 1, 3) with the electric drive motor 9 is through a friction clutch 12 (FIGS. 1, 2), a worm gear drive 13 (FIG. 2), an overrunning clutch 14 and a gear drive 15 (FIG. 3). The gear drive 15 consists of replaceable spur gears which set the required speed ratio of the gear drive to suit the operating cycle of the automatic processing line.

Located on both sides along the driving shaft 10 (FIG. 1) are cross members 16 defined by channel bars secured at one end in the end face walls 3 and 4. The vertical walls of the channel bars 16 are machined and serve as datum surfaces for the installation of coupling units 17. Each coupling unit 17 includes a single-jaw coupling 18 (FIG. 4) with an electromagnet 19 which controls engagement and disengagement of the coupling 18, and an irreversible coupling 20. The couplings 18 and 20 are interconnected rigidly by a bevel gear drive 21. Output shaft 22 of the coupling unit 17 can be connected with the process units by means of suitable transmission mechanisms, for example a cardan shaft 23 (FIG. 1). Mounted on a shaft 24 (FIG. 4) of the coupling unit 17 is a gear wheel 25 meshing with a gear wheel 26 installed on the driving shaft 10. The gear wheel 26 is mounted on the shaft 10 by means of splines and a lock screw (not shown) so that said gear wheel can be moved along the driving shaft and fixed in any desired position. The coupling units 17 can be installed on cross members 16 in any point along the axis of the driving shaft 10 and on any side of said shaft. To ensure the required direction of rotation of the process units, the coupling units 17 can be installed on either side of the shaft 10 and be turned to one of the positions at 180° with relation to the output shaft 22. In addition, the required direction of rotation can be obtained by shifting the gear wheel 27 of the bevel gear drive 21. The ends of the driving shaft 10 are provided with couplings 28 (FIG. 1) which can be extended beyond the outline of the bedplate and fixed in this position after connecting them to the driving shafts of the jointed bedplates. The end face walls of the bedplates are provided with tie rods 29, supporting rollers 30 and adjustable supports 31. The bedplate has a force-feed

lubricating system comprising a pump 32 actuated by a cam 33 secured on the driving shaft 10. From the pump 32, the oil is delivered through a pipeline 34 to a distributor 35 from which it can be fed to any lubrication point through pipelines 36. Also, mounted on the bedplate, along its longitudinal axis are water pipes 37, air pipes 38 and pipes 39 for feeding oil to the hydraulic pneumatic systems.

The above-described bedplate with a drive mechanism can be readied at a short notice for the installation of the process units of the automatic processing line. Such a bedplate can carry the entire automatic line if its length and the number of process units allow this. While designing such an automatic line, it is necessary to select the transmission mechanisms for each process unit depending on the required speed of the working tool, and to determine the most rational arrangement of the process units on the datum surfaces of the bedplate. Then it is necessary to determine the arrangement of the coupling units 17 along the length of the driving shaft 10 to suit the location of the process units and the required direction of rotation. Having linked kinematically the driving shaft 10 with the process units, it is necessary to connect the lubricant feed pipes 36, water pipes 37, air pipes 38 and the pipes 39 feeding oil to the hydraulic systems. Thus, the bedplate realized in accordance with the present invention makes it unnecessary to design the bedplate proper with its drive mechanism and enables it to be made on the centralized basis, regardless of the designing and manufacturing stage of the process units. The drive mechanism of the above-described bedplate ensures synchronous operation of all the process units of the automatic processing line and allows, if necessary, accurate stopping of any process unit which is made possible by the use of the irreversible coupling 20. The single-jaw coupling 18 ensures starting of any process unit in accordance with the preset operating cycle of the entire automatic line. The coupling unit 17 also ensures simultaneous starting of a group of process units in accordance with the preset operating cycle. Thus, the present bedplate with the drive mechanism is universal and is highly convenient with regard to adjustments and servicing in operation.

In case of a very long automatic line, the process units can be mounted on a number of bedplates. The bedplates are jointed together by rigid tie rods 29. This jointing is simplified by the supporting rollers 30 and adjustable supports 31. After fastening of the bedplates, the couplings 28 are extended for joining the driving shafts 10. All the drive mechanisms of the jointed bedplates are interconnected rigidly and rotate at the same speed, thus ensuring synchronous operation of all the process units in the automatic line. The torque transmitted by the drive motors 9 is equalized by the friction clutches 17. The pipelines of the jointed bedplates can be coupled by the pipe fittings, forming a single centralized piping system.

Thus, the bedplate with the drive mechanism according to the invention ensures conditions for a maximum standardization and typification of the automatic lines which makes it possible to evolve base designs of machines for definite purposes and ensures their repeated employment.

What we claim is:

1. A bed plate provided with a drive mechanism for installation of processed units of an automatic process-

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ing line, comprising a supporting surface serving for installation of the processed units, said supporting surface being arranged along the longitudinal axis of the bed plate, a motor, a main shaft arranged along said bed plate under said supporting surface, said main shaft always rotating in one direction, means for transmitting torque from said motor to said main shaft, means for transmitting torque in two directions from said main shaft to the process units, said last named torque transmitting means including coupling units adapted for displacement along said main shaft, for being turned through 180° and for their fastening to the datum surfaces of a longitudinal beam at any side of said main shaft and consisting of an irreversible coupling and a single-jaw coupling kinematically linked by bevel gear wheels said single-jaw coupling having a shaft and a train of gears connecting the shaft of the single-jaw coupling to that main shaft.

2. A bed plate provided with a drive mechanism for installation of processed units and for laying out automatic processing lines from several such bed plates, comprising a main shaft rotating in one direction,

means for transmitting torque in two directions from said main shaft to the process units, said torque transmitting means including coupling units adapted for their displacement along said main shaft, for being turned through 180° and for their fastening to the datum surfaces of a longitudinal beam at any side of said main shaft, a supporting surface serving for installation of the process unit, said main shaft arranged along the bed plate under the supporting surface provided on both ends with couplings defining a single common shaft of an automatic processing line when joined to the main shafts of other similar bed plates, and means including a motor, a friction clutch installed between the motor and a reduction gear and compensating for different, but close speeds of the motors of several bed plates, and an overrunning clutch installed between the reduction gear and the main shaft serving to prevent the transmission of torque from the main shaft to the reduction gear, and said motor, friction clutch and overrunning clutch being kinematically linked to one another.

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