

⑬



Europäisches Patentamt
European Patent Office
Office européen des brevets

⑰ Publication number:

0 067 127
A1

⑫

EUROPEAN PATENT APPLICATION

⑳ Application number: **82830101.0**

⑵ Int. Cl.³: **B 21 C 47/14**

㉑ Date of filing: **22.04.82**

③① Priority: **20.05.81 IT 8338881**

⑦① Applicant: **DANIELI & C. OFFICINE MECCANICHE S.p.A., Via Nazionale, 19, I-33042 Buttrio (UD) (IT)**

④③ Date of publication of application: **15.12.82**
Bulletin 82/50

⑦② Inventor: **Poloni, Alfredo, Via Redipuglia, 155, 34077 Ronchi dei Legionar (GO) (IT)**

⑧④ Designated Contracting States: **AT DE FR GB**

⑦④ Representative: **Petraz, Gilberto, G.L.P. S.a.s. di Gilberto Petraz P.le Cavedalis 6/2, I-33100 Udine (IT)**

⑤④ **Improvements to the heads of coil-forming machines and heads of coil-forming machines thus improved.**

⑤⑦ This invention concerns improvements to the heads (10) of coil-forming machines and the heads of coil-forming machines thus improved which comprise rotating guide means (53) and fixed structure means (11) that support said rotating guide means (53), whereby the rotating guide means (53) act substantially as the shaft of the motor means (40) which drives the coil-forming heads (10).

EP 0 067 127 A1

1. Description of the invention entitled:

"IMPROVEMENTS TO THE HEADS OF COIL-FORMING MACHINES AND HEADS
OF COIL-FORMING MACHINES THUS IMPROVED"

in the name of DANIELI & C. OFFICINE MECC. S.p.A. at Buttrio.

5.

This invention concerns improvements to the heads of coil-
forming machines, and also the heads of coil-forming machines
10. which adopt said improvements.

To be more exact, the invention concerns improvements en-
visaged for coil-forming heads able to generate curved spirals
of wire rod having a substantially constant pitch and diameter,
the process starting with substantially straight continuous
15. wire rod.

Such machine are mainly employed to form coils of wire
rods coming from the rolling process.

Said wire rods come with a straight movement and pre-set
speed into a rotating guide so shaped as to induce the spiral
20. formation required.

Various kinds of coil-forming machines are known and, in
particular, various solutions of the coil-forming rotating
heads are known and employed in such machines.

Said rotating heads consist substantially of a spindle
25. cooperating with a shaped guide.

Gilberto Petraz

1. In said solutions the spindle is made to revolve by a .
motor means which is advantageously an electric motor and .
which is located at the side of, or else at a given distance .
from, the coil-forming head and can cooperate with said head .
5 through suitable means that transmit the motion. .

In particular, said means can be orthogonal or cylindri-
cal gear wheels which cooperate with a motor disposed ortho-
gonally or parallel to the axis of the spindle, or else said .
means can be gear wheels of another type or other mechanical .
10 means suitable for the purpose. .

Besides the disadvantage of their far from negligible .
intrinsic cost, said means to transmit motion need specific .
lubrication equipment and entail much noise, discontinuous .
working, low output, frequent maintenance and mechanical li-
15 mitations at the speed of rotation of the heads. .

Said known embodying solutions, moreover, involve an .
extra overall size of the structure of the coil-forming ma- .
chine. .

The improvements of our invention enable the drawbacks .
20 and restrictions of said known solutions to be obviated by .
envisaging the elimination of every supplementary means for .
transmitting motion and by making the motor means cooperate .
directly with the spindle of the coil-forming head. .

In this way a substantial reduction in the costs of con-
25 structing and running the machine is obtained owing to the .
lack of intermediate means to transmit motion, and an appre- .
ciable reduction in the overall size of the machine is also .
obtained. .

According to the invention the motor means have their .
30 armature solidly fixed to the spindle and located substantial- .
ly coaxial with and around said spindle. .

In other words, it is the spindle which acts as the ro- .
tation shaft of said motor means. .

Cilberto Duraz

1. Our invention therefore consists of improvements to the
heads of coil-forming machines comprising rotating guide means
and fixed structure means which support said rotating guide
means, said improvements being characterized by the fact that
5. the rotating guide means act substantially as the shaft of
the motor means which drives the coil-forming heads.

This invention is also pursued by the heads of coil-
forming machines which include rotating guide means and fixed
structure means that support said rotating guide means, said
10. heads being characterized by the fact that the rotating guide
means act substantially as the shaft of the motor means which
drives the coil-forming heads.

We shall describe hereinafter a preferential embodiment
of the invention as a non-restrictive example and shall refer
15. to the attached tables, wherein:-

Fig. I gives a view of a section of a coil-forming head im-
proved according to the invention;

Fig. 2 shows an outside view of the coil-forming head of
Fig. I

20. In the figures the same parts or parts having the same
functions bear the same reference numbers.

In particular, the coil-forming head shown 10 comprises
a fixed supporting structure II which consists substantially
of a frame I2 within which a rotating guide 53 is installed
25. at least partially.

Said rotating guide 53 comprises a spindle I4 supported
by bearings I5-II5 which are suitably sustained (I3-II3) and
located axially at the frontal ends of said frame I2.

Suitable flange means I6 which cooperate with and rest
30. against the supports I3 keep the bearings I5 in their working
position in relation to the frame I2.

Spacer means I7-II7 cooperate in a coordinated manner
with, and are axially located on, the spindle I4 and keep

1. said bearings I5-II5 in position with the help of opposed con-
2. trast means I8-II8 respectively in coordinated cooperation
3. with said supports I3-II3 and said flange means I6.

4. Possible circumferential ring-wise closure means I9 may
5. be comprised on the front discharge part of the coil-forming
6. head IO.

7. In the opposite front part of said head IO means 20 are
8. included to guide axially the wire rod to be coiled and have
9. an inlet mouth 2I helpfully shaped so as to induct the wire
10. rod.

11. Said inlet mouth 2I is followed by a substantially stra-
12. ight conduit 22, the walls of which 23 can possibly contain,
13. at least partially, some interspaces or ducts 24 for a cool-
14. ing fluid such as water, for instance.

15. Forced air may perhaps be introduced into the conduit
16. 22 through one or more nozzles 25 machined in said guide means
17. 20 near said inlet mouth 2I.

18. Both these solutions enable the spindle of the coil-
19. forming head IO to be cooled advantageously.

20. Moreover, the forced air can be channelled into the spin-
21. dle I4 by means of through slits or holes 26 which may possi-
22. bly be comprised in suitable clamping means 27 located inside
23. said spindle I4.

24. Said clamping means 27 can grip and hold the inlet end
25. of specially shaped guide means 28, which are conformed in
26. our example like a shaped tubular conduit.

27. The wire rod or wire having a substantially straight
28. form is inserted at a pre-set speed into the mouth piece 29
29. axially aligned with the conduit 22 and said means 28.

30. In said shaped guide means 28 the wire rod is curved
31. progressively and is rotated at the same time with a pre-set
32. angular speed owing to the rotation of the spindle I4 so that
33. it takes up the desired spiral form.

1. The means 28 are fastened to the spindle I4 by the clamp-
ing means 27, as said earlier, so as to be set in rotation,
and their outlet end 32 is clamped by particular rotating and
supporting means 33 solidly fixed to the spindle itself I4.

5. In the examples of the figures shown, in particular, said
rotating and supporting means 33 are connected frontally to
the end part of the spindle I4 by a flange element 36 and ap-
propriate locking bolts 34.

This type of connection with bolts, however, can be re-
10. placed with another type of connection.

The rotating and supporting means 33 comprise also at
their unconnected end a circumferential element 35 of the type,
for instance, such as a wheel or disk onto which said outlet
end 32 is clamped.

15. Said element 35 and the flange element 36 are connected
axially by a lengthwise structure 37 which bears radial ele-
ments 38 to support the intermediate part of the guide means
28.

The figures also show a balancing structure 39, which in
20. our example consists of a tubular conduit the same as the con-
duit forming the shaped guide 28 and which is located diame-
trically in symmetry relatively to said guide 28.

It is possible to envisage the use of a structure 39
which has a different shape but which can produce the same
25. balancing effect for said tubular structure 28.

According to the invention the spindle I4 acts substant-
ially as a rotation shaft for the motor means 40, which in
our example is an electric motor cooperating with the coil-
forming head IO.

30. In particular, said motor means, which are of a direct
current type in the example shown in Fig.I, are supported on
a suitable carrying and alignment structure 41 and are anchor-
ed with the yoke 42 of the armature 43 outwardly to the spin-

1. dle I4.

The same Figure I shows the parts constituting said electric motor 40 and comprising substantially the stator 44, which consists of the yoke or body 45 and poles 46 cooperating with the stator windings 30, and the armature 43, which consists of the core of armature laminations 47 and the armature winding 48 with the relative connections 49 to the commutator 50, whereby some sliding contacts or brushes 51 are included which are solidly fixed to the stationary part of the motor 40 and feed the supply current to said armature winding 50.

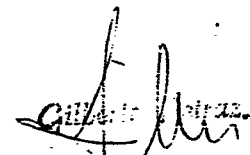
Cooling of the motor means 40 is performed with known means, which in our example consist of fans or other means for forced convection of cooling liquid 52 (Fig.2) which cause air or cooling liquid to circulate within the coil-forming head 10 in such a way that the circulation laps or comes into contact with the parts of the electric motor 40 and possibly also of the spindle I4 which have to be cooled.

We have described here a preferential embodiment of the invention but variants are possible for a technician in this field.

Thus the shapes and sizes can be changed and it is possible to envisage the use of a motor which is different from that of a direct current type described and shown here but which is still suitable for actuating the same kind of cooperation and axial link with the spindle I4.

It is possible to envisage a different type of anchorage of the hub 42 to the spindle I4 and said hub 42 can be differently conformed, or else it is possible to envisage that said hub 42 and the spindle I4 are made as one single casting.

These and other variants are all possible for a technician in this field within the scope of the idea of the solution.



C L A I M S

1. I. Improvements to the heads (10) of coil-forming machines comprising rotating guide means (53) and fixed structure means (11) which support said rotating guide means (53), said improvements being characterized by the fact that the rotating guide means (53) act substantially as the shaft of the motor means (40) driving the coil-forming heads (10).

2. Improvements to the heads (10) of coil-forming machines as in Claim I, characterized by the fact that the motor means (40) are electric motor means with their armature winding (48) solidly fixed to and located substantially at least partially around the spindle (14) of the rotating guide means (53), whereby the stator (44) is solidly anchored to the frame (12) of said head (10) of the coil-forming machine.

3. Improvements to the heads (10) of coil-forming machines as in Claim I or 2, characterized by the fact that nozzle means (25) are comprised which immit liquid into the means (20) guiding the wire rod to be coiled, so as to cool the spindle (14) and motor means (40) at least partially.

4. Improvements to the heads (10) of coil-forming machines as in Claim I or 2, characterized by the fact that interspace means or duct means (24) for cooling liquid are comprised and machined in the wall (23) of the guide means (20) so as to cool the spindle (14) and motor means (40) at least partially.

5. Improvements to the heads (10) of coil-forming machines as in Claim I and in one or another of the Claims thereafter, characterized by the fact that said nozzle means (25) immitting liquid and said interspace or duct means (24) are comprised so as to cool the spindle (14) and motor means (40) at least partially.

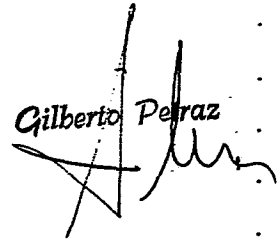
6. Improvements to the heads (10) of coil-forming ma-

1. chins as in Claim I or 2, characterized by the fact that
means (52) are comprised for the forced convection of cool-
ing liquid so as to cool the spindle (I4) and motor means
(40) at least partially.

5. 7. Improvements to the heads (IO) of coil-forming ma-
chines as in Claim I or 2 and in one or another of the Claims
thereafter, characterized by the fact that means (52) for
forced convection of cooling liquid are comprised.

10. 8. Heads (IO) of coil-forming machines as in Claim I
and in one or another of the Claims thereafter, comprising
rotating guide means (53) and fixed structure means (II) which
support said rotating guide means (53), characterized by the
fact that the rotating guide means (53) act substantially as
the shaft of the motor means (40) which drive the coil-form-
15. ing heads (IO).

Gilberto Pelraz



20

25

30

1/2

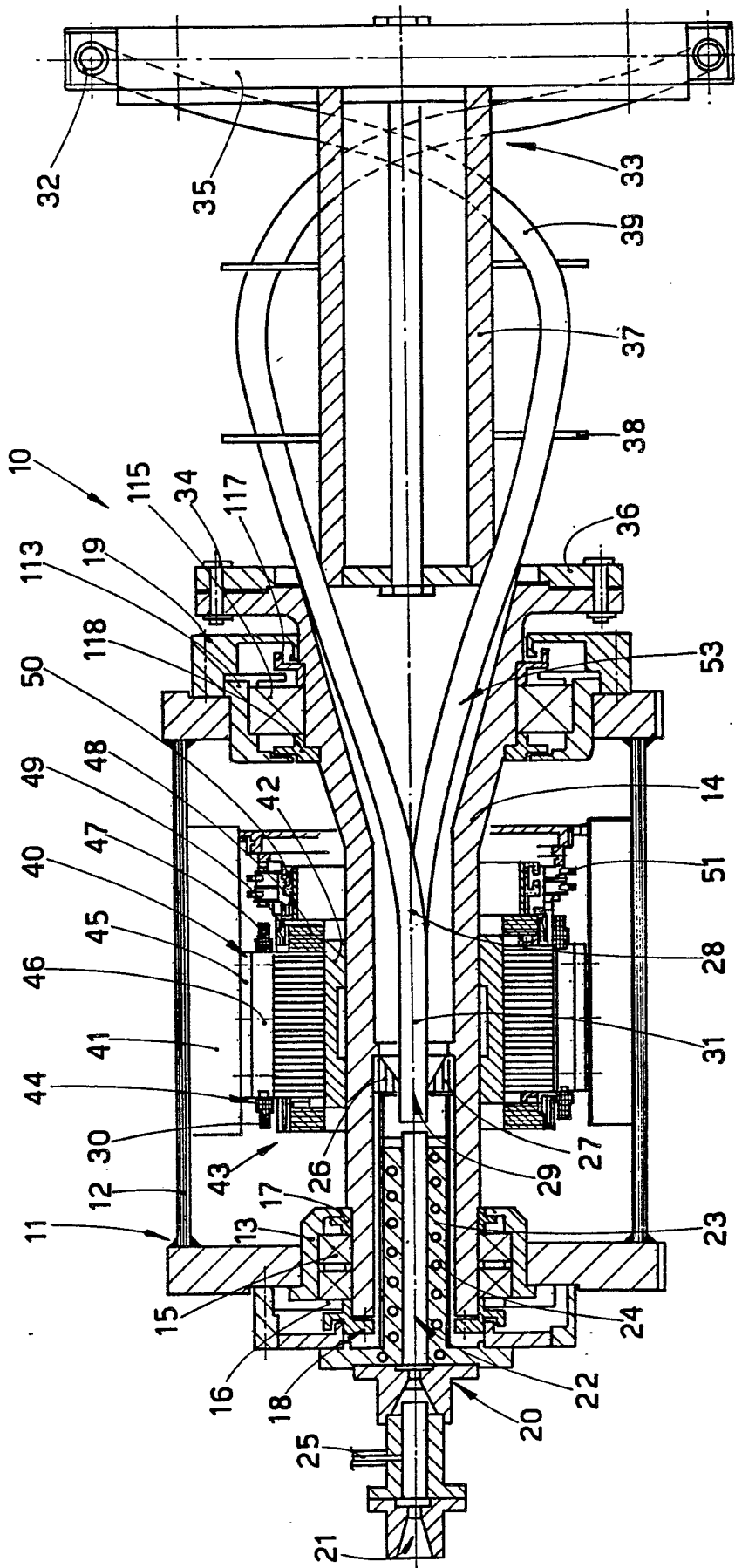


fig.1

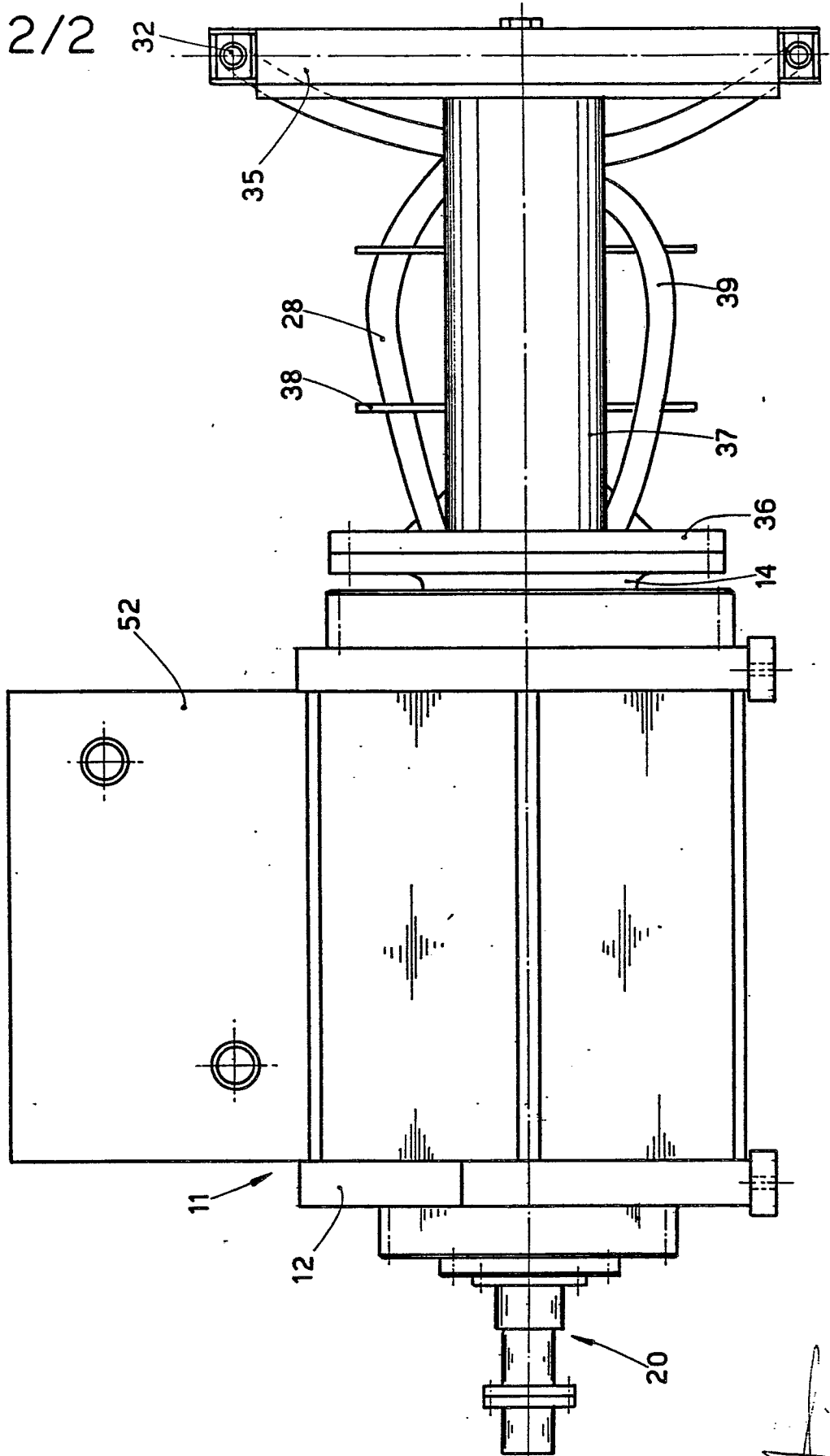


fig. 2

A. L.

0067127



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 82 83 0101

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X, Y	GB-A-1 031 656 (SCHLOEMANN) * Whole document *	1-8	B 21 C 47/14
Y	--- GB-A- 943 474 (LOEWY) * Claims; figures *	3-7	
A	--- US-A-1 672 917 (SOMMER)		
A	--- GB-A- 976 787 (SIEMAG) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			B 21 C B 21 B
Place of search THE HAGUE		Date of completion of the search 26-08-1982	THE K.H. Examiner
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	