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(54) **HYBRID MOLD VIBRATION**

HYBRIDE FORMVIBRATION

VIBRATION DE MOULE HYBRIDE

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Description

[0001] This application relates generally to concrete product manufacturing devices.

[0002] Concrete products machines generally include some form of vibration assembly to remove air pockets during the forming of a concrete product. Known vibration assemblies may employ vibration means such as rotary vibrations to shake the mold, or impact tables that strike the bottom of the production pallet to induce vibration. However, due to the variety of concrete products being molded, a given product may benefit from one vibration type, while being harmed by another. Current vibration technology for concrete products machines uses one or the other type of vibration, which is not optimal for every product. US 4,830,597 discloses a vibration assembly in accordance with the preamble of claim 1, more specifically it discloses a vibrator for a concrete block molding machine. US 4,238,177 discloses a concrete block molding machine.

[0003] A hybrid vibration assembly comprising a concrete product mold, a vibration frame positioned to transmit vibration to at least a portion of the mold, and a stationary frame carrying the vibration frame. The assembly also comprises knocker bars supportable on the stationary frame in positions where, when installed, they carry at least a portion of the mold, a motor operatively connected to a vibrator mounted on the vibration frame, and a mechanical frame/mold clamp positioned and actuable to alternately couple the vibration frame to the mold and decouple the vibration frame from the mold. The vibration frame may be positioned to carry at least a portion of the mold. The knocker bars may be supportable on the stationary frame for vertical adjustment relative to the stationary frame. Optionally, the motor is not operatively coupled to distribute motion among the knocker bars.

[0004] These and other features and advantages will become apparent to those skilled in the art in connection with the following detailed description and appended drawings of one or more embodiments of the invention, in which:

Figure 1 is a partially-exploded perspective view of a hybrid vibration assembly showing separation between a mold box, a pallet, and a stationary frame of the assembly, the stationary frame being shown supporting a vibration frame of the assembly, the stationary frame also being shown supporting knocker bars and pallet rubbers;

Figure 2 is a perspective view of the assembly's vibration frame of Figure 1;

Figure 3 is a perspective view of the assembly's stationary frame of Figure 1;

Figure 4 is a rotated perspective view of the stationary frame and vibration frame of Figure 1, shown without the knocker bars or pallet rubbers of Figure 1; Figure 5 is a perspective view of the stationary frame

and vibration frame of Figure 4, showing the assembly configured for operation in a traditional vibration mode including pallet rubbers and standoff extensions fastened atop standoffs of the vibration frame; Figure 6 is a perspective view of the stationary frame and vibration frame of Figure 4, showing the assembly configured for an impact vibration mode including knocker bars and standoff extensions installed on the vibration frame.

Figure 7 is a lower perspective view of the assembly of Figure 1 configured in impact mode, and showing motors attached to the vibration frame;

Figure 8 is a front view of the assembly of Figure 1 configured for the traditional vibration mode, showing knocker bars and pallet rubbers attached to the stationary frame;

Figure 9 is a front view of the assembly of Figure 1 configured for a clamped vibration mode, showing the vibration frame configured as shown in Figure 5 but with the mold clamped to the vibration frame; and

Figure 10 is a front view of the assembly of Figure 1, showing the vibration frame configured for impact mode as shown in Figure 6, with the addition of the mold seated above the vibration and stationary frames.

[0005] A hybrid vibration assembly for a concrete products machine is generally shown at 10 in the figures. As shown in Fig. 7, the assembly 10 comprises one or more motors 12 operatively connected to other components of the vibration assembly 10, so that the motors 12, when actuated, drive at least one vibrator 20 (which may comprise eccentric-weight rotary vibrators) mounted to a vibration frame 22 configured to carry a mold 14 of a concrete products machine, and thereby transmit vibration to the contents of the mold 14. The motors 12 and the vibration frame 22 may be supported by a stationary frame 18 of the assembly 10 (as best shown by comparing Figs. 2-4).

[0006] The motors 12 may be adjusted to change frequency and/or amplitude of the vibrators 20 by changing the speed and/or phase of the eccentric weight vibrators 20. The adjustment of the motors 12 may be either manually-adjusted, or via an automated controller programmed to respond to a remote operator input. While the motors are shown supported by stationary frame 18 in the preferred embodiment shown in Figure 7, in alternate embodiments the motors may be mounted anywhere on or adjacent the assembly 10, and may drive the vibrators directly, or via remote linkages such as flexible driveshafts known in the art.

[0007] As shown in Figures 1, 6, 7, 8, and 10, the stationary frame 18 may also support removable knocker bars 16. The knocker bars 16 may be removably supported on knocker bar mounting points 17 on the stationary frame 18. The knocker bar mounting points 17 may permit vertical adjustment of the knocker bars 16 relative to the stationary frame 18. The knocker bars 16

may be supportable on the stationary frame 18 in positions where, when installed, they carry at least a portion of the mold 14. The knocker bars 16 are preferably not used as agitation implements. The motors 12 are optionally not operatively coupled to the knocker bars 16 to distribute motion among the knocker bars 16.

[0008] The vibration frame 22 may be configured to carry, and transmit vibration to, the mold 14 in several different ways depending on the type of vibration desired for the mold 14. For example, the vibration frame 22 may include standoffs 26 mounted to an upper vibration frame surface 23. The vibration frame standoffs 26 may be configured to support the weight of the mold 14. The vibration frame 22 may further comprise frame connection points 28 for one or more mechanical frame/mold clamps 30 configured to alternately couple the vibration frame 22 to the mold 14 and decouple the vibration frame 22 from the mold 14. The vibration frame standoffs 26 may be positioned to be horizontally interleaved with the knocker bars 16 when the knocker bars 16 are supported on the stationary frame 18. However, the vibration frame standoffs 26 are not essential, and optionally the vibration frame 22 does not include vibration frame standoffs 26.

[0009] The mold 14 may comprise a typical concrete product pallet mold, i.e., comprising a mold box, and a pallet 32 configured to removably cover an open bottom 34 of the mold box, so that concrete products may be left on the pallet 32 after demolding. The standoffs 26 of the vibration frame 22 and/or the knocker bars 16 may be positioned to support the pallet 32. The frame/mold clamps 30 may also attach to the mold 14 at mold connection points 36 on the mold box. These mold connection points may alternatively be located anywhere on the mold 14, but in a preferred embodiment, none of these mold connection points 36 are located on the pallet 32.

[0010] The assembly may include pallet rubbers 38 made from a resilient material. The pallet rubbers 38 may be positioned between the pallet 32 and other components of the assembly 10 where a buffer is desired. In the preferred embodiment shown in the Figures, the pallet rubbers 38 are shown in several possible positions fastened atop the knocker bars 16 (in Figs. 1 and 8) and/or atop standoff extensions 40 (in Figs. 5 and 9).

[0011] The standoff extensions 40 comprise bars of a hard material that are removably supportable atop the standoffs 26. The extensions 40 are shaped to contact the mold when it is at least partially-supported by the knocker bars, effectively allowing transmission of vibration from the vibration frame 22 through the standoffs 26, and into the pallet 32.

[0012] The hybrid vibration assembly 10 may be configured to agitate the mold 14 in several different modes. These different modes may comprise variations in how the pallet 32 and mold 14 are supported and/or attached to the vibration frame 22, and variations in how the contents of the mold 14 are agitated.

[0013] In a first "traditional" vibration mode, shown in Figs. 1 and 8, the assembly 10 may be configured to

support the pallet 32 via the knocker bars 16 and to support the mold box via the vibration frame 22, allowing limited motion between the pallet 32 and mold box for a troweling effect on a concrete product being molded.

According to this configuration, the frame/mold clamps 30 are coupled, the knocker bars 16 are moved into engagement with the pallet 32; the knocker bars 16 are then mechanically locked stationary; and the motors 12 actuate the vibrators 20 mounted on the vibration frame 22, sending vibration into the mold box through the clamps 30, while the pallet 32 rides atop the knocker bars 16. In this classic vibration mode, the pallet rubbers 38 may be fastened atop the knocker bars 16 so that the pallet 32 rests on the rubbers 38. In this "traditional" vibration mode, the assembly 10 may approximate the effect of earlier known vibration devices, such as the Besser Servopac®.

[0014] In a second "clamped" mode, shown in Figs. 5 and 9, the assembly 10 is configured to impart vibratory motion to the mold 14 by coupling the frame/mold tie 30, moving the knocker bars 16 out of engagement with the pallet 32 (or by removing the knocker bars 16 from their mounting points 17), fastening standoff extensions 40 atop the vibration frame standoffs 26, fastening pallet rubbers 38 atop the vibration frame standoffs 26, and actuating the motors 12 to drive the vibrators 20 mounted to the vibrating frame 22. In this mode, the pallet 32 is clamped against the mold box via the vibration frame pallet rubbers 38 and the frame/mold clamps 30 so that the pallet 32 cannot move relative to the mold box.

[0015] In a third, "impact," mode, shown in Figs. 6, 7, and 10, the assembly 10 is configured to impart vibratory motion to the mold 14 by fastening the standoff extensions 40 (preferably lacking the pallet rubbers 38 of the second mode) to the vibration frame standoffs 26, decoupling the frame/mold clamps 30, installing knocker bars 16 and adjusting them to engage and support the mold 14, and actuating the motors 12 to cause the extensions 40 to vibrate with the vibration frame 22 and repeatedly strike the pallet 32 of the mold 14. In this configuration, the mold 14 is not attached to the vibration frame 22 via the frame/mold clamps 30, but the mobility of the mold 14 may still be limited to some degree by mold clamps or similar interfaces with a conventional concrete products machine known and typical in the art.

[0016] The word vibration, as used in this document, is intended to cover any rapid motion about and/or across an equilibrium position relative to one or more axes, and includes but is not limited to oscillatory motion, linear reciprocal motion, rotary reciprocal motion, and random motion.

[0017] This description, rather than describing limitations of an invention, only illustrates embodiments of the invention recited in the claims. The language of this description is therefore exclusively descriptive and is non-limiting. The skilled person would understand it is possible to modify this invention from what the description teaches without departing from the scope of the

claimed invention. Within the scope of the claims, one may practice the invention other than as described above.

Claims

1. A hybrid vibration assembly (10) comprising;

a concrete product mold (14);
 a vibration frame (22) positioned to transmit vibration to at least a portion of the mold (14);
 a stationary frame (18) carrying the vibration frame (22);
 knocker bars (16) supportable on the stationary frame (18) in positions where, when installed, they carry at least a portion of the mold (14);
 a motor (12) operatively connected to a vibrator (20) mounted on the vibration frame (22); and
 a mechanical frame/mold (14) clamp (30),
characterized in that the mechanical frame/mold (14) clamp (30) is positioned and actuable to alternately couple the vibration frame (22) to the mold (14) and decouple the vibration frame (22) from the mold (14).

2. The hybrid vibration assembly (10) of claim 1, in which the mold (14) comprises a mold box and a pallet (32) configured to removably cover an open bottom of the mold box.

3. The hybrid vibration assembly (10) of claim 2, in which the frame/mold (14) clamp (30) couples the vibration frame (22) to the mold (14) by coupling the vibration frame (22) to the mold box.

4. The hybrid vibration assembly (10) of any of claims 1 to 3, in which the vibration frame (22) includes vibration frame (22) standoffs mounted to an upper vibration frame (22) surface and optionally positioned to carry at least a portion of the mold (14), optionally wherein the knocker bars (16) and vibration frame (22) standoffs are horizontally interleaved when the knocker bars (16) are supported on the stationary frame (18).

5. The hybrid vibration assembly (10) of claim 4, in which:

the knocker bars (16) carry at least a portion of the mold (14);
 the standoffs are shorter than the extended knocker bars (16); and
 the assembly (10) includes vibration frame (22) standoff extensions (40) that are removably supportable atop the standoffs and shaped to contact the mold (14) when it is at least partially-supported by the knocker bars (16).

6. A method of configuring the assembly (10) of claim 3, to impart vibratory motion to a mold (14) by:

coupling the frame/mold (14) clamp (30);
 engaging the knocker bars (16) with the pallet (32); and
 actuating the motor (12) to vibrate the mold (14) vibrating frame.

7. The method of claim 6, in which the step of engaging the knocker bars (16) with the pallet (32) additionally comprises allowing limited relative motion between the pallet (32) and the mold (14) box during actuation of the motor (12).

8. The method of claim 6 or 7, including the additional step of attaching pallet rubbers 38 to the knocker bars (16) in positions permitting the pallet (32) to rest upon the pallet rubbers 38 when the knocker bars (16) engage the pallet (32).

9. A method of configuring the assembly (10) of claim 3, to impart vibratory motion to a mold (14) by:

coupling the frame/mold (14) clamp (30);
 keeping the knocker bars (16) out of engagement with the pallet (32);
 configuring the vibration frame (22) to hold the pallet (32) against the mold (14) box; and
 actuating the motor (12) to distribute motion to the vibrating frame (22) via the vibrator (20).

10. The method of Claim 9, in which the step of configuring the vibration frame (22) comprises fastening standoff extensions (40) to standoffs (26) protruding from an upper surface of the vibration frame (22), the extensions being positioned so that the pallet (32) is held against the mold (14) box by the standoff extensions (40), which are in turn supported by the standoffs (26), limiting pallet (32) motion relative to the mold (14) box.

11. The method of claim 10, in which the step of configuring the standoffs (26) further includes fastening pallet rubbers 38 to the vibration frame (22) standoff extensions (40) so that the pallet (32) is held against the mold (14) by the pallet rubbers 38, which are supported by the standoff extensions (40), which are supported by the standoffs (26).

12. The method of any of claims 9 to 11, in which the step of keeping the knocker bars (16) out of engagement with the pallet (32) comprises completely removing the knocker bars (16) from the vibration frame (22).

13. A method of configuring the assembly (10) of claim 2, to impart vibratory motion to a mold (14) by:

fastening hard standoff extensions (40) to the vibration frame (22);
 decoupling the frame/mold (14) clamp (30);
 supporting the mold (14) on the standoff extensions (40); and
 actuating the motor (12) to distribute motion to the vibration frame (22) via the vibrator (20).

14. The method of claim 13, in which the step of fastening hard standoff extensions (40) to the vibration frame (22) comprises fastening the standoff extensions (40) atop vibration frame (22) standoffs (26) protruding from an upper surface of the vibration frame (22) so that vibration of the vibration frame (22) will cause the standoff extensions (40) to strike against the mold (14) as they vibrate with the vibration frame (22), optionally wherein the standoff extensions (40) strike the pallet (32) of the mold (14).
15. The method of claim 13 or 14, including the additional step of installing the knocker bars (16) in respective positions where they will engage with the mold (14) and/or the pallet (32) before the step of actuating the motor (12).

Patentansprüche

1. Hybride Vibrationsanordnung (10), umfassend
- eine Betonproduktform (14);
 - einen Vibrationsrahmen (22), der positioniert ist, um Vibration an mindestens einen Abschnitt der Form (14) zu übertragen;
 - einen stationären Rahmen (18), der den Vibrationsrahmen (22) trägt;
 - Klopferstangen (16), die an dem stationären Rahmen (18) in Positionen getragen werden können, in denen sie, wenn sie installiert sind, mindestens einen Abschnitt der Form (14) tragen;
 - einen Motor (12), der operativ mit einem Vibrator (20) verbunden ist, der an dem Vibrationsrahmen (22) montiert ist; und
 - eine mechanische Rahmen/Form (14) -Klammer (30),
- dadurch gekennzeichnet, dass** die mechanische Rahmen/Form (14) -Klammer (30) positioniert und betätigbar ist, um abwechselnd den Vibrationsrahmen (22) an die Form (14) zu koppeln und den Vibrationsrahmen (22) von der Form (14) zu entkoppeln.
2. Hybride Vibrationsanordnung (10) nach Anspruch 1, in der die Form (14) einen Formkasten und eine Palette (32) umfasst, die konfiguriert ist, um einen offenen Boden des Formkastens entfernt abzu-

decken.

3. Hybride Vibrationsanordnung (10) nach Anspruch 2, in der die mechanische Rahmen/Form (14) -Klammer (30) den Vibrationsrahmen (22) an die Form (14) koppelt durch Koppeln des Vibrationsrahmens (22) an den Formkasten.
4. Hybride Vibrationsanordnung (10) nach einem der Ansprüche 1 bis 3, in der der Vibrationsrahmen (22) Vibrationsrahmen (22) -Abstandshalter beinhaltet, die an eine obere Vibrationsrahmen (22) -Fläche montiert sind und optional positioniert sind, um mindestens einen Abschnitt der Form (14) zu tragen, wobei optional die Klopferstangen (16) und die Vibrationsrahmen (22) -Abstandshalter horizontal verschachtelt sind, wenn die Klopferstangen (16) an dem stationären Rahmen (18) getragen werden.
5. Hybride Vibrationsanordnung (10) nach Anspruch 4, in der:
- die Klopferstangen (16) mindestens einen Abschnitt der Form (14) tragen;
 - die Abstandshalter kürzer als die erweiterten Klopferstangen (16) sind; und
 - die Anordnung (10) Vibrationsrahmen (22) -Abstandshaltererweiterungen (40) beinhaltet, die entfernt auf den Abstandshaltern getragen werden können und eine Form aufweisen, um die Form (14) zu berühren, wenn sie mindestens teilweise durch die Klopferstangen (16) getragen wird.
6. Verfahren des Konfigurierens der Anordnung (10) nach Anspruch 3, um Vibrationsbewegung an eine Form (14) zu vermitteln durch:
- Koppeln der Rahmen/Form (14) -Klammer (30);
 - Eingreifen der Klopferstangen (16) mit der Palette (32); und
 - Betätigen des Motors (12), um den Form (14) -Vibrationsrahmen zum Vibrieren zu bringen.
7. Verfahren nach Anspruch 6, in dem der Schritt des Eingreifens der Klopferstangen (16) mit der Palette (32) zusätzlich das Zulassen von limitierter relativer Bewegung zwischen der Palette (32) und dem Form (14) -Kasten während der Betätigung des Motors (12) umfasst.
8. Verfahren nach Anspruch 6 oder 7, einschließlich des zusätzlichen Schritts des Befestigens von Palettengummis (38) an die Klopferstangen (16) in Positionen, die zulassen, dass die Palette (32) auf den Palettengummis (38) ruhen, wenn die Klopferstangen (16) die Palette (32) eingreifen.

9. Verfahren des Konfigurierens der Anordnung (10) nach Anspruch 3, um Vibrationsbewegung an eine Form (14) zu vermitteln durch:

Koppeln der Rahmen/Form (14)-Klammer (30);
Halten der Klopferstangen (16) außerhalb eines Eingriffs mit der Palette (32);
Konfigurieren des Vibrationsrahmens (22), um die Palette (32) gegen den Form (14)-Kasten zu halten; und
Betätigen des Motors (12), um Bewegung an den Vibrationsrahmen (22) über den Vibrator (20) zu verteilen.

10. Verfahren nach Anspruch 9, in dem der Schritt des Konfigurierens des Vibrationsrahmens (22) das Befestigen von Abstandshaltererweiterungen (40) an Abstandshalter (26) umfasst, die von einer Oberseite des Vibrationsrahmens (22) vorstehen, wobei die Erweiterungen positioniert sind, sodass die Palette (32) gegen den Form (14)-Kasten durch die Abstandshaltererweiterungen (40) gehalten wird, die wiederum durch die Abstandshalter (26) getragen werden, was die Bewegung der Palette (32) relativ zum Form (14)-Kasten einschränkt.

11. Verfahren nach Anspruch 10, in dem der Schritt des Konfigurierens der Abstandshalter (26) ferner das Befestigen von Palettengummis (38) an den Abstandshaltererweiterungen (40) des Vibrationsrahmens (22) beinhaltet, sodass die Palette (32) gegen die Form (14) durch die Palettengummis (38) gehalten wird, die durch die Abstandshaltererweiterungen (40) getragen werden, die durch die Abstandshalter (26) getragen werden.

12. Verfahren nach einem der Ansprüche 9 bis 11, in dem der Schritt des Haltens der Klopferstangen (16) außerhalb eines Eingriffs mit der Palette (32) das vollständige Entfernen der Klopferstangen (16) von dem Vibrationsrahmen (22) umfasst.

13. Verfahren des Konfigurierens der Anordnung (10) nach Anspruch 2, um Vibrationsbewegung an eine Form (14) zu vermitteln durch:

Befestigen von harten Abstandshaltererweiterungen (40) an dem Vibrationsrahmen (22);
Entkoppeln der Rahmen/Form (14)-Klammer (30);
Tragen der Form (14) auf den Abstandshaltererweiterungen (40); und
Betätigen des Motors (12), um Bewegung an den Vibrationsrahmen (22) über den Vibrator (20) zu verteilen.

14. Verfahren nach Anspruch 13, in dem der Schritt des Befestigens von harten Abstandshaltererweiterun-

gen (40) an dem Vibrationsrahmen (22) das Befestigen der Abstandshaltererweiterungen (40) auf Abstandshaltern (26) des Vibrationsrahmens (22) umfasst, die von einer Oberseite des Vibrationsrahmens (22) vorstehen, sodass Vibration des Vibrationsrahmens (22) verursacht wird, dass die Abstandshaltererweiterungen (40) gegen die Form (14) schlagen, während sie mit dem Vibrationsrahmen (22) vibrieren,
wobei optional die Abstandshaltererweiterungen (40) die Palette (32) der Form (14) schlagen.

15. Verfahren nach Anspruch 13 oder 14, einschließlich des zusätzlichen Schritts des Installierens der Klopferstangen (16) in jeweilige Positionen, wo sie mit der Form (14) und/oder der Palette (32) in Eingriff kommen werden, vor dem Schritt des Betätigens des Motors (12).

Revendications

1. Ensemble vibrant hybride (10) comprenant :

un moule pour produit en béton (14) ;
une structure vibrante (22) positionnée pour transmettre des vibrations à au moins une portion du moule (14) ;
une structure stationnaire (18) portant la structure vibrante (22) ;
des barres de frappe (16) pouvant être supportées par la structure stationnaire (18) dans des positions où, une fois installées, elles portent au moins une portion du moule (14) ;
un moteur (12) relié de manière fonctionnelle à un vibreur (20) monté sur la structure vibrante (22) ; et
une pince (30) de structure/moule (14) mécanique,
caractérisé en ce que la pince (30) de structure/moule (14) mécanique est positionnée et peut être actionnée pour coupler alternativement la structure vibrante (22) au moule (14) et découpler la structure vibrante (22) du moule (14).

2. Ensemble vibrant hybride (10) selon la revendication 1, dans lequel le moule (14) comprend un caisson de moulage et une palette (32) conçue pour couvrir de manière amovible un fond ouvert du caisson de moulage.

3. Ensemble vibrant hybride (10) selon la revendication 2, dans lequel la pince (30) de structure/moule (14) couple la structure vibrante (22) au moule (14) en couplant la structure vibrante (22) au caisson de moulage.

4. Ensemble vibrant hybride (10) selon l'une quelconque des revendications 1 à 3, dans lequel la structure vibrante (22) comprend des entretoises de structure vibrante (22) montées sur une surface supérieure de la structure vibrante (22) et éventuellement positionnées pour porter au moins une portion du moule (14),
lesdites barres de frappe (16) et lesdites entretoises de structure vibrante (22) étant éventuellement intercalées horizontalement lorsque les barres de frappe (16) sont supportées par la structure stationnaire (18).
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5. Ensemble vibrant hybride (10) selon la revendication 4, dans lequel :
- les barres de frappe (16) portent au moins une portion du moule (14) ;
les entretoises sont plus courtes que les barres de frappe (16) étendues ; et
l'ensemble (10) comprend des extensions (40) d'entretoises de structure vibrante (22) qui peuvent être supportées de manière amovible sur les entretoises et dont la forme leur permet d'être en contact avec le moule (14) lorsqu'il est au moins partiellement supporté par les barres de frappe (16).
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6. Procédé de configuration de l'ensemble (10) selon la revendication 3, pour transmettre un mouvement vibratoire à un moule (14) grâce aux étapes de :
- couplage de la pince (30) de structure/moule (14),
mise en contact des barres de frappe (16) avec la palette (32), et
actionnement du moteur (12) pour faire vibrer la structure vibrante du moule (14).
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7. Procédé selon la revendication 6, dans lequel l'étape de mise en contact des barres de frappe (16) avec la palette (32) comprend en outre la réalisation d'un mouvement relatif limité entre la palette (32) et le caisson de moulage (14) pendant l'actionnement du moteur (12).
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8. Procédé selon la revendication 6 ou 7, comprenant l'étape supplémentaire consistant à fixer des caoutchoucs de palette (38) aux barres de frappe (16) dans des positions permettant à la palette (32) de se reposer sur les caoutchoucs de palette (38) lorsque les barres de frappe (16) se mettent en contact avec la palette (32).
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9. Procédé de configuration de l'ensemble (10) selon la revendication 3, pour transmettre un mouvement vibratoire à un moule (14) grâce aux étapes de :
- couplage de la pince (30) de structure/moule (14),
maintien des barres de frappe (16) hors de contact avec la palette (32),
configuration de la structure vibrante (22) pour maintenir la palette (32) contre le caisson de moulage (14), et
actionnement du moteur (12) pour distribuer un mouvement à la structure vibrante (22) par l'intermédiaire du vibreur (20).
10. Procédé selon la revendication 9, dans lequel l'étape de configuration de la structure vibrante (22) comprend la fixation d'extensions (40) aux entretoises (26) faisant saillie d'une surface supérieure de la structure vibrante (22), les extensions étant positionnées de manière à ce que la palette (32) soit maintenue contre le caisson de moulage (14) par les extensions d'entretoises (40), qui sont elles-mêmes supportées par les entretoises (26), limitant ainsi le mouvement de la palette (32) par rapport au caisson de moulage (14).
11. Procédé selon la revendication 10, dans lequel l'étape de configuration des entretoises (26) comprend en outre la fixation de caoutchoucs de palette (38) aux extensions d'entretoises (40) de la structure vibrante (22) de telle façon que la palette (32) est maintenue contre le moule (14) par les caoutchoucs de palette (38), qui sont supportés par les extensions d'entretoises (40) supportées par les entretoises (26).
12. Procédé selon l'une quelconque des revendications 9 à 11, dans lequel l'étape qui consiste à maintenir les barres de frappe (16) hors de contact avec la palette (32) comprend le retrait complet des barres de frappe (16) de la structure vibrante (22).
13. Procédé de configuration de l'ensemble (10) selon la revendication 2, pour transmettre un mouvement vibratoire à un moule (14) grâce aux étapes de :
- fixation d'extensions d'entretoises (40) dures à la structure vibrante (22),
découplage de la pince (30) de structure/moule (14),
support du moule (14) sur les extensions d'entretoises (40), et
actionnement du moteur (12) pour distribuer un mouvement à la structure vibrante (22) par l'intermédiaire du vibreur (20).
14. Procédé selon la revendication 13, dans lequel l'étape de fixation des extensions d'entretoises (40) dures à la structure vibrante (22) comprend la fixation des extensions d'entretoises (40) aux entretoises (26) de la structure vibrante (22) faisant saillie de

la surface supérieure de la structure vibrante (22) de telle façon que les vibrations de la structure vibrante (22) entraînent la frappe des extensions d'entretoises (40) contre le moule (14) tandis qu'elles vibrent avec la structure vibrante (22),

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lesdites extensions d'entretoises (40) frappant éventuellement la palette (32) du moule (14).

- 15.** Procédé selon la revendication 13 ou 14, comprenant l'étape supplémentaire d'installation des barres de frappe (16) dans des positions respectives où elles se mettront en contact avec le moule (14) et/ou la palette (32) avant l'étape d'actionnement du moteur (12).

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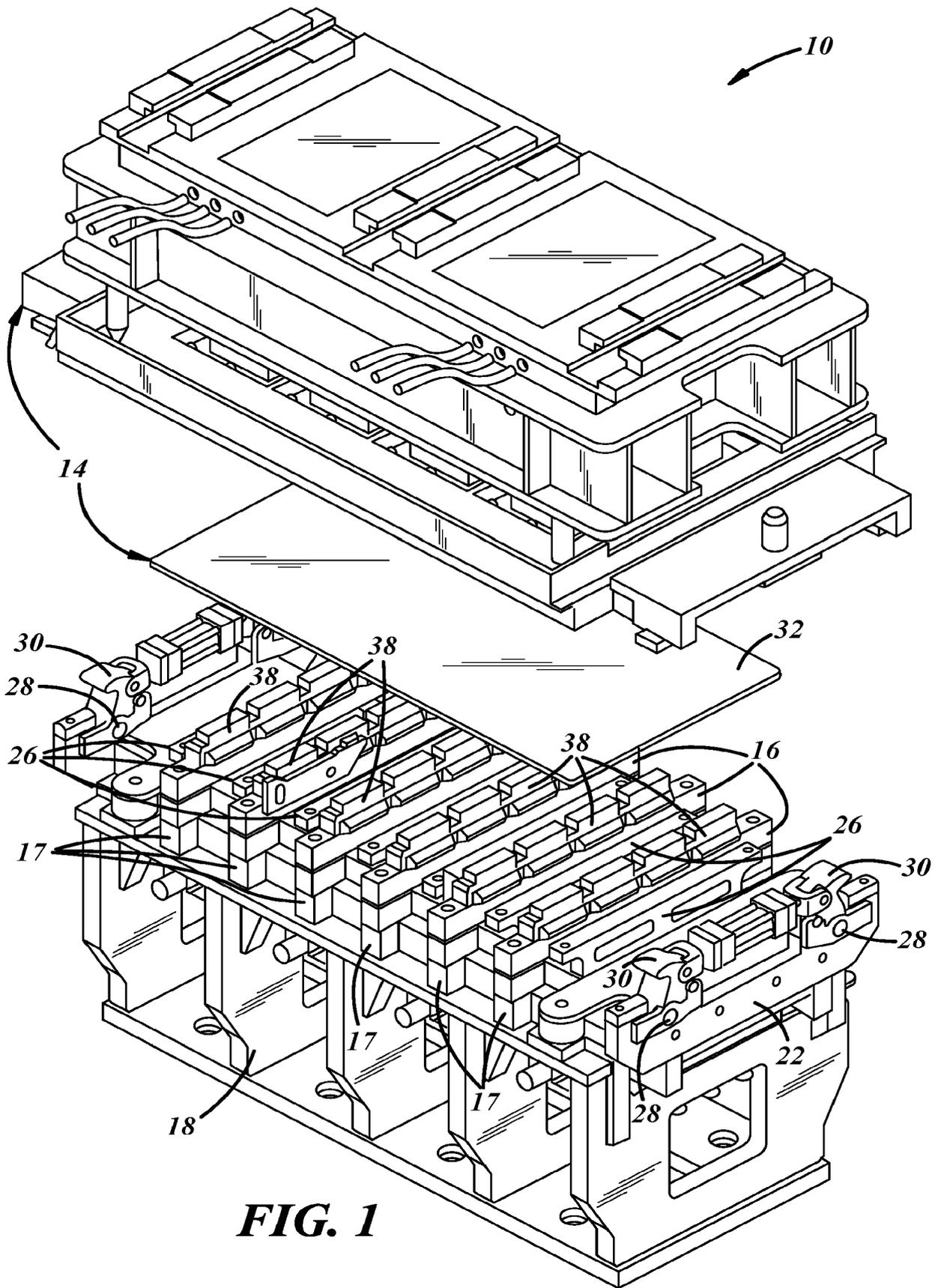


FIG. 1

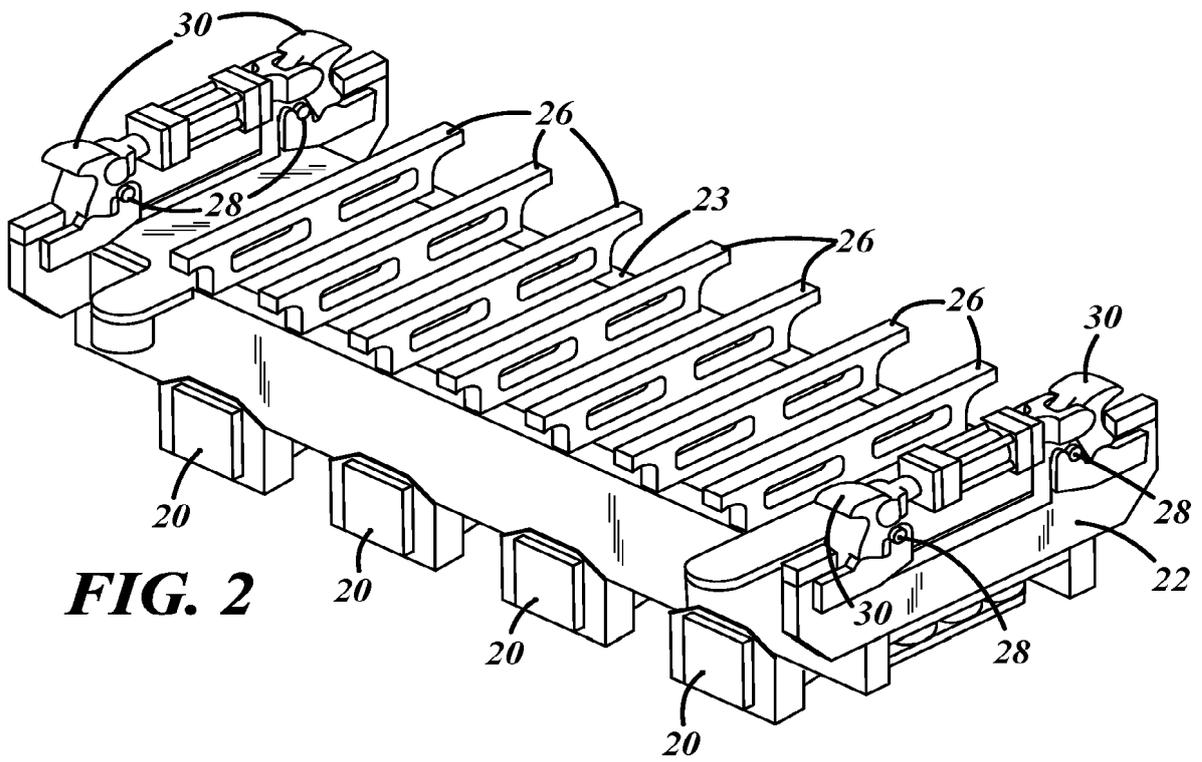


FIG. 2

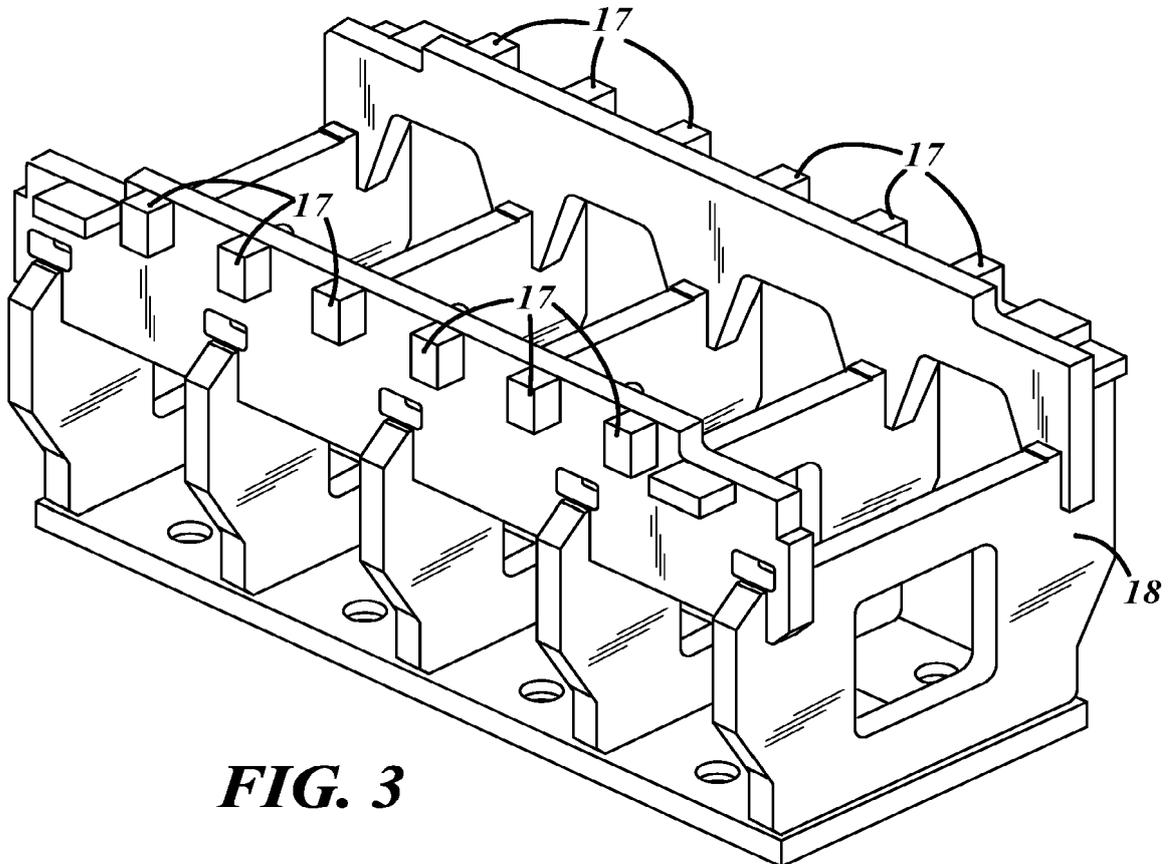


FIG. 3

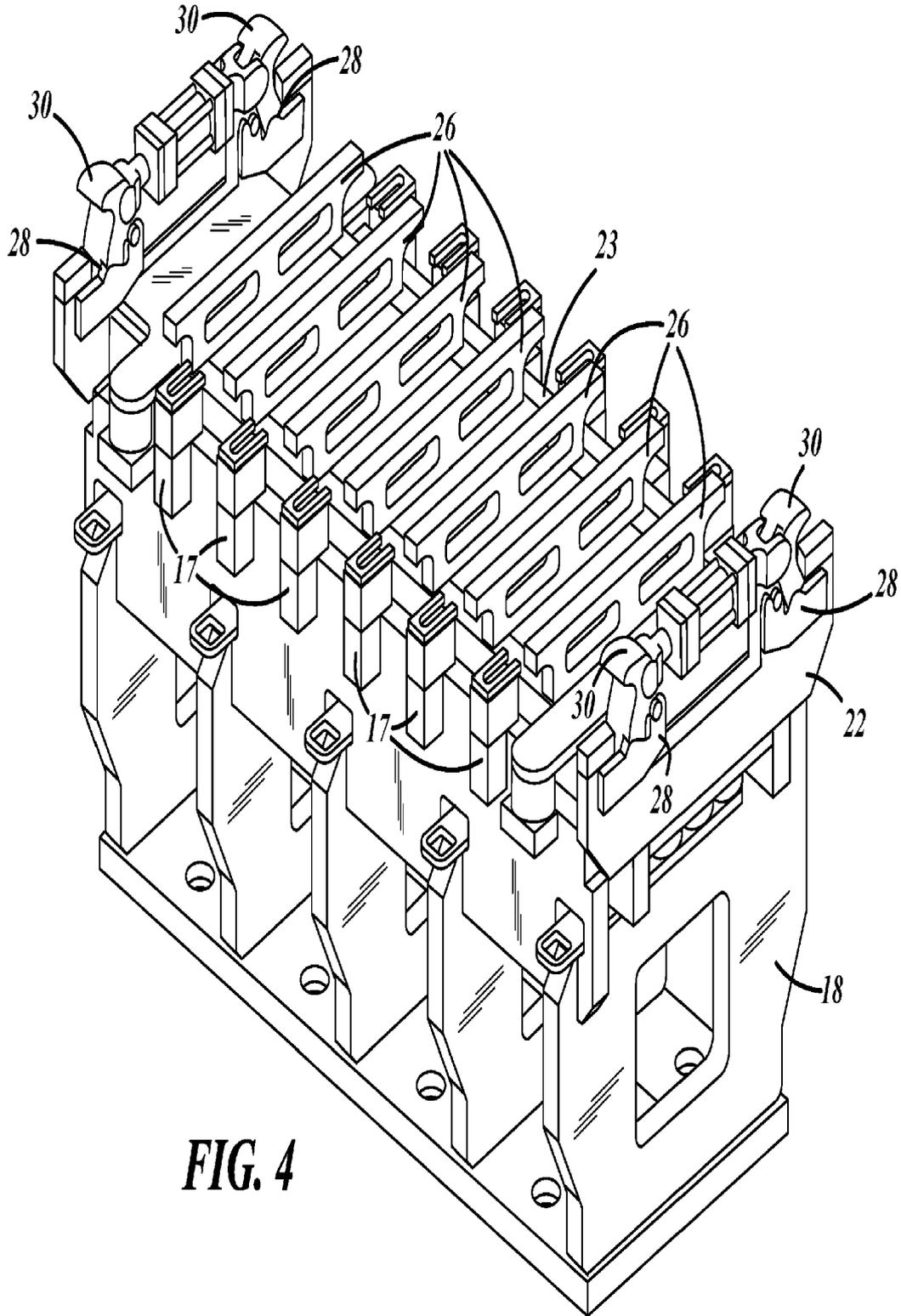


FIG. 4

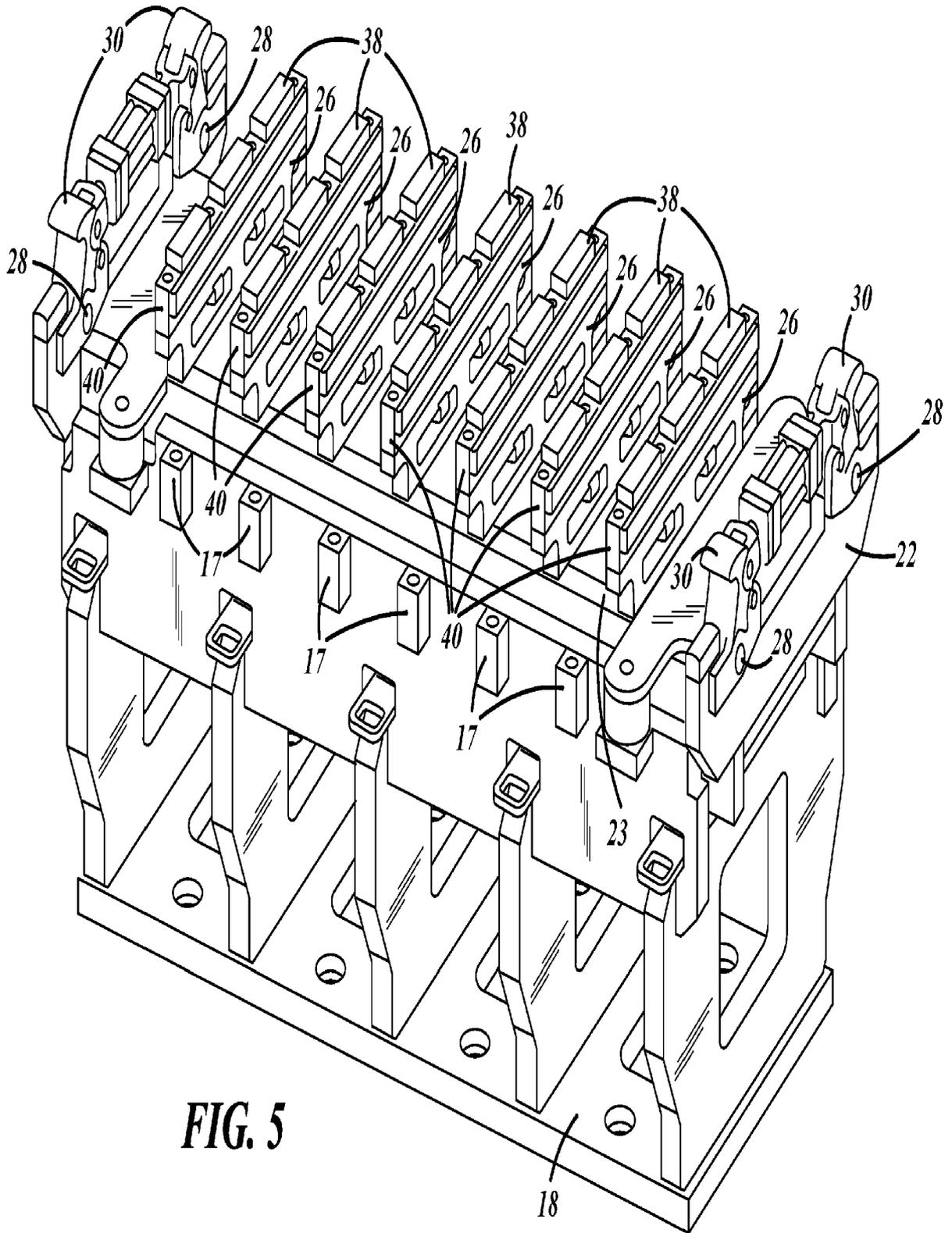


FIG. 5

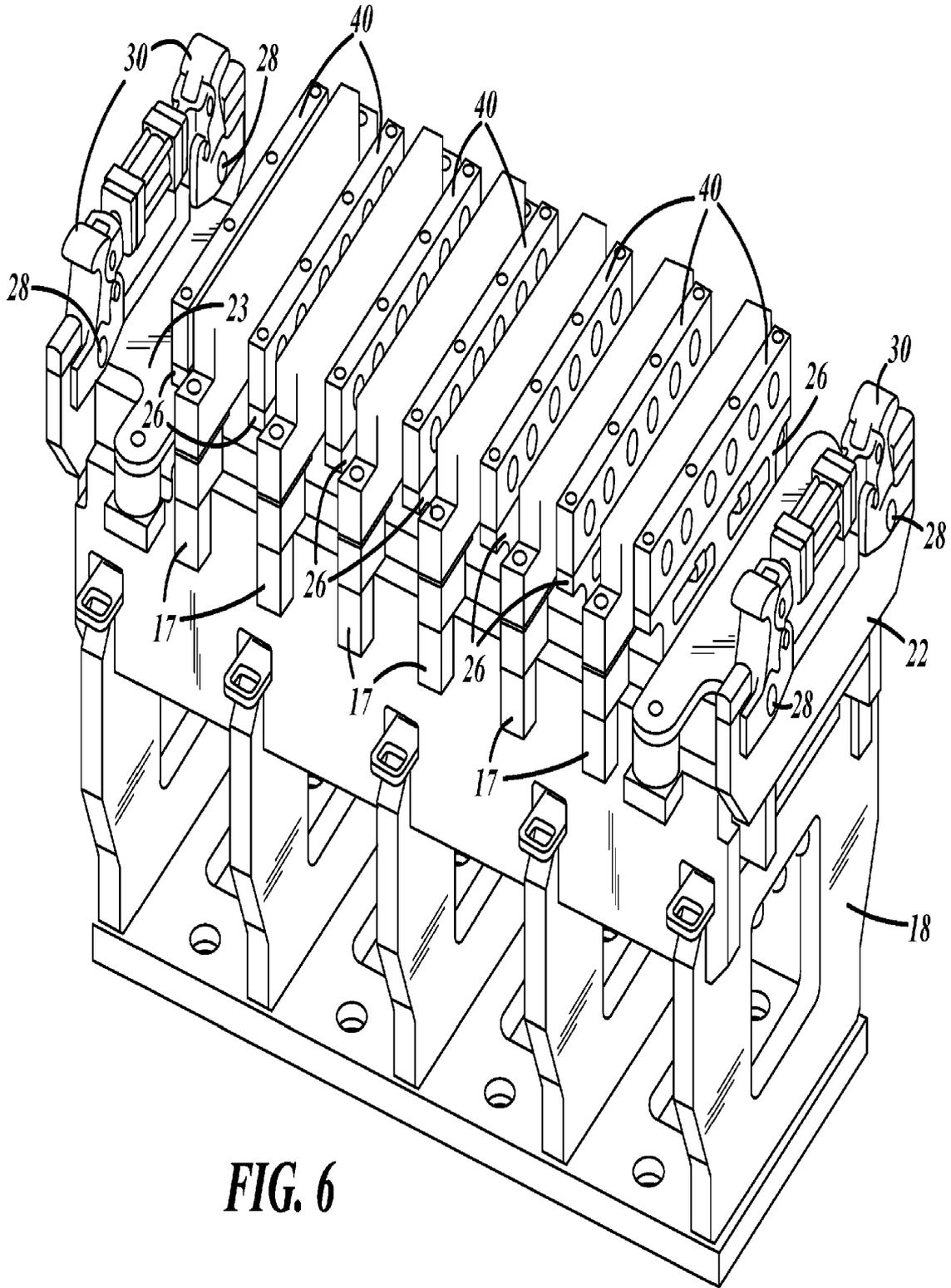


FIG. 6

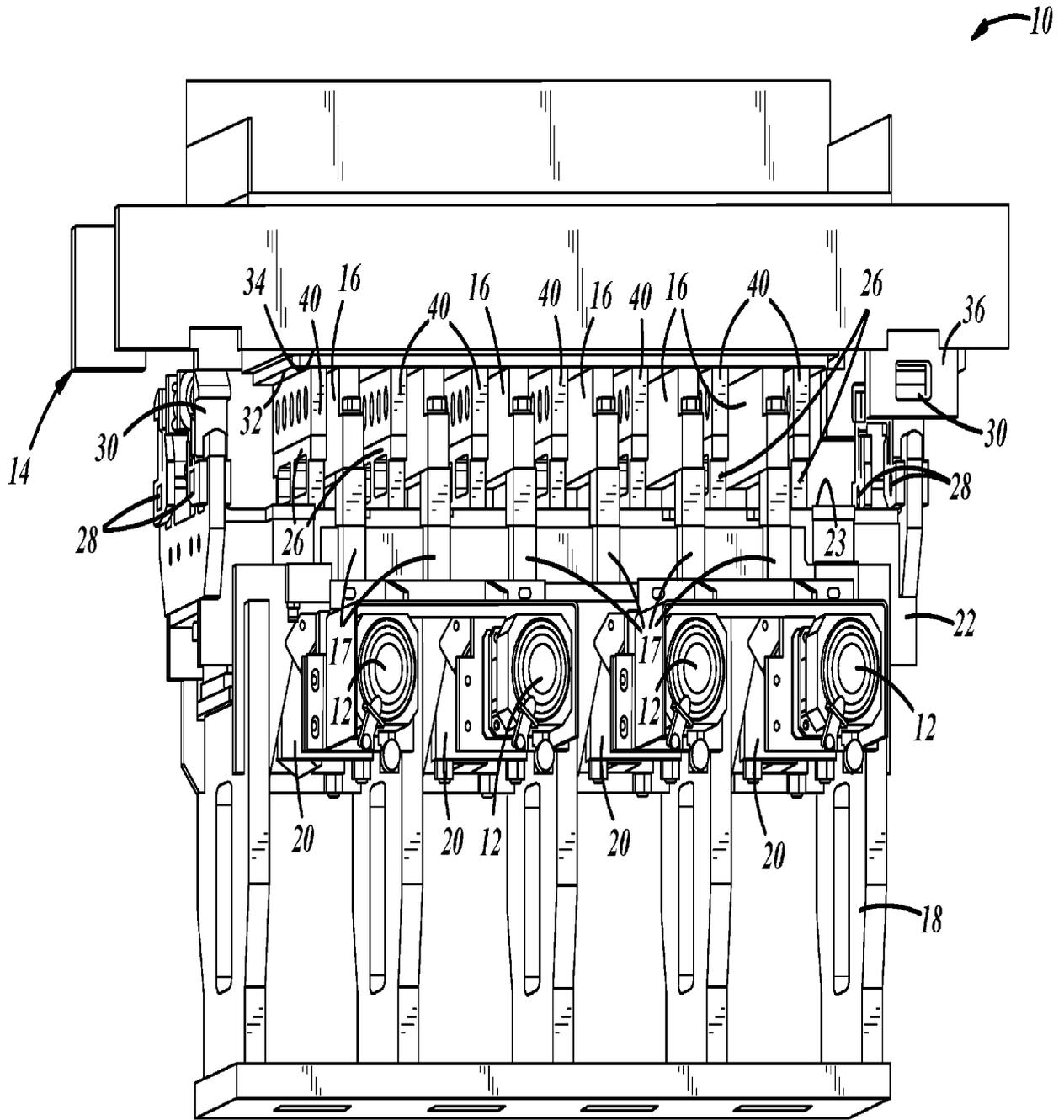


FIG. 7

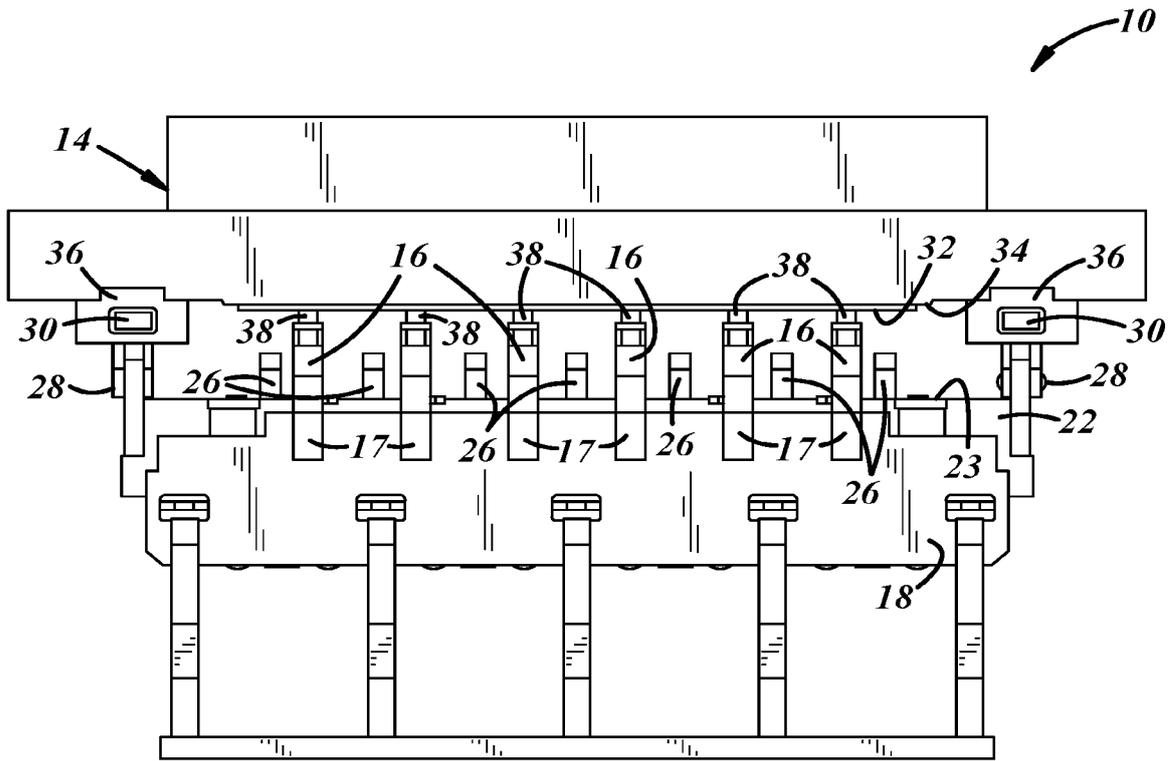


FIG. 8

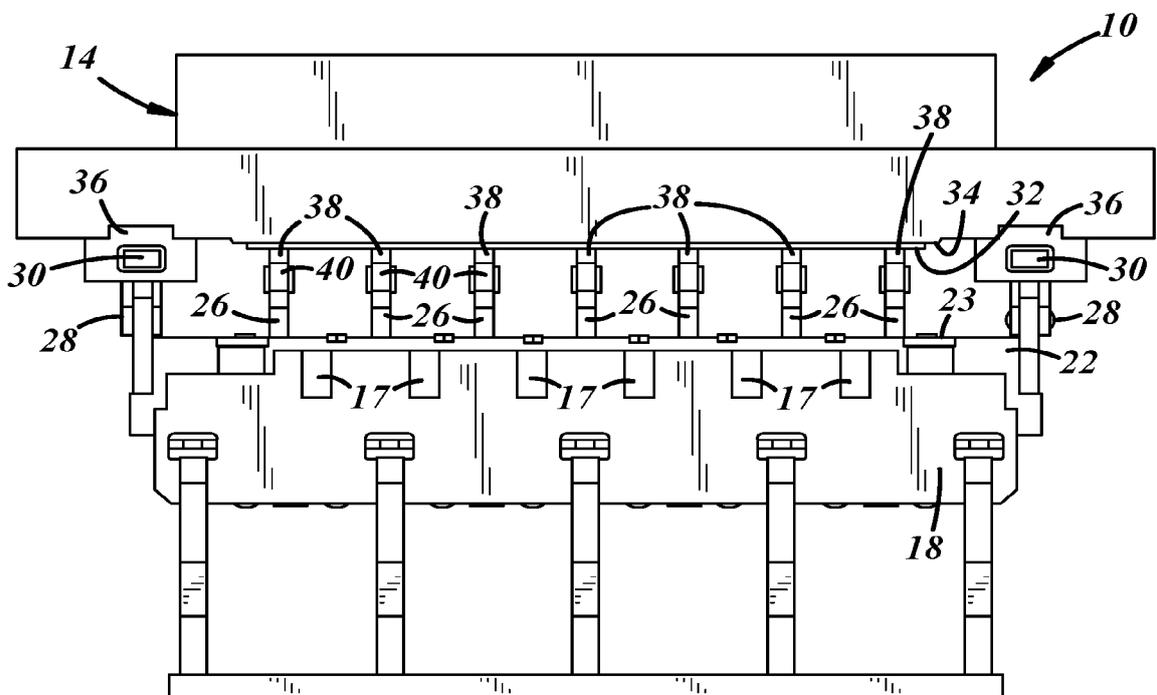


FIG. 9

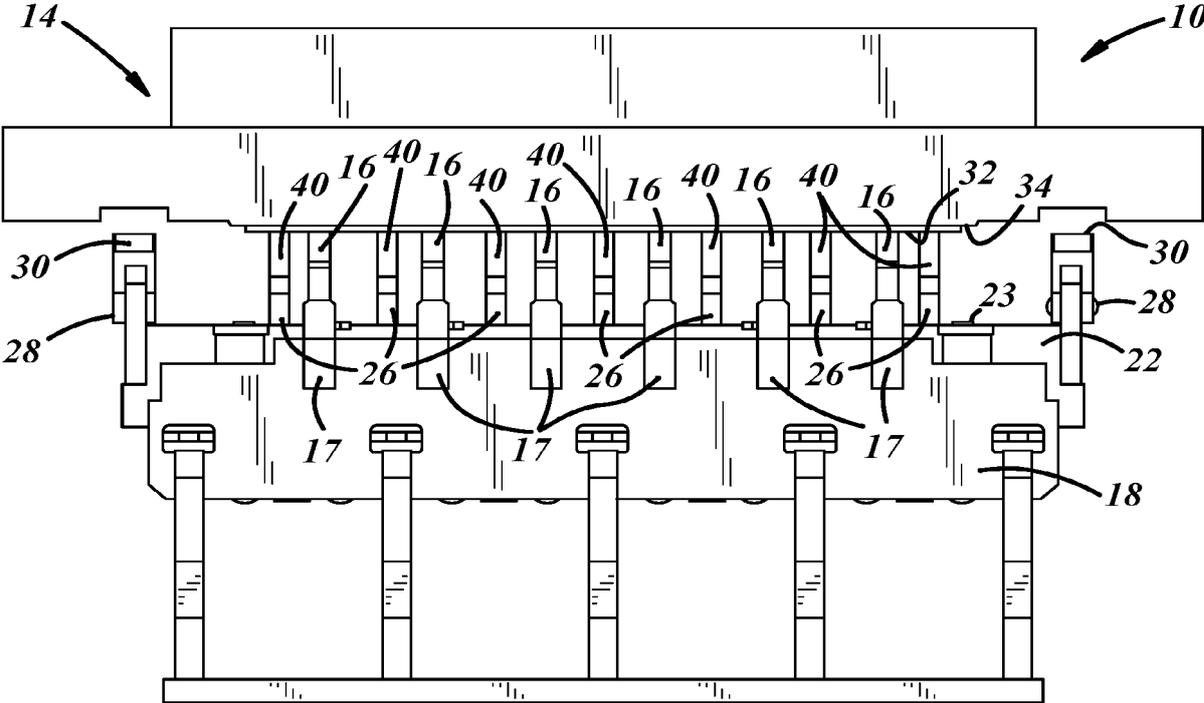


FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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