

Dec. 28, 1965

H. E. CABLE ETAL

3,226,027

MAGNETICALLY HELD TRACK AND THE LIKE

Filed March 29, 1963

2 Sheets-Sheet 1

Fig. 1.

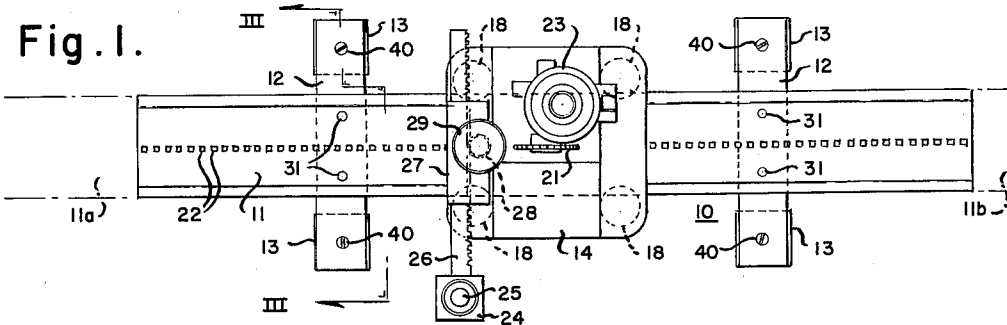


Fig. 2.

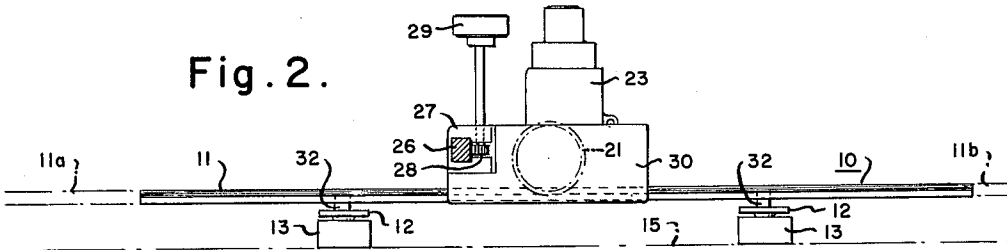


Fig. 4.

Fig. 3.

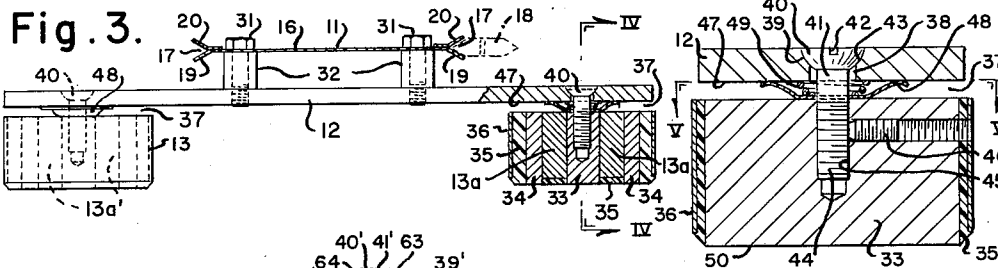


Fig. 6.

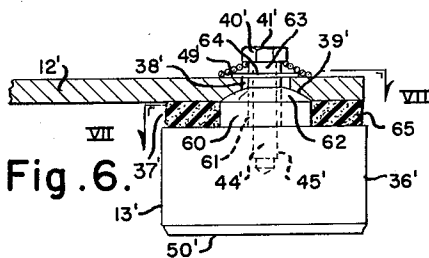


Fig. 7.

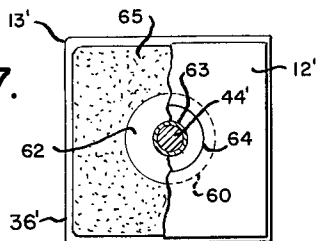
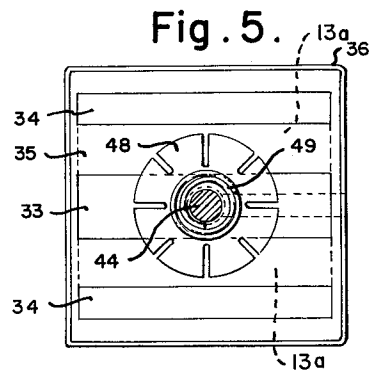


Fig. 5.



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2 Sheets-Sheet 2

Fig. 8.

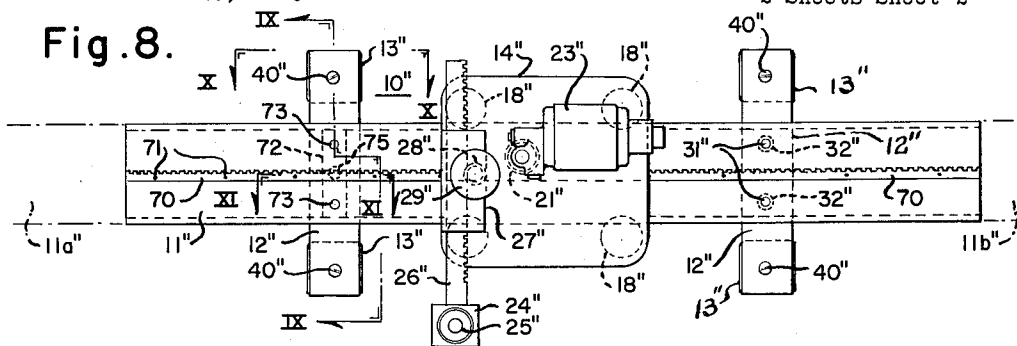


Fig. 9.

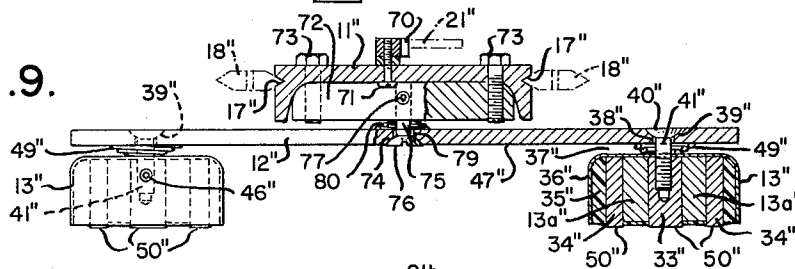


Fig. 12.

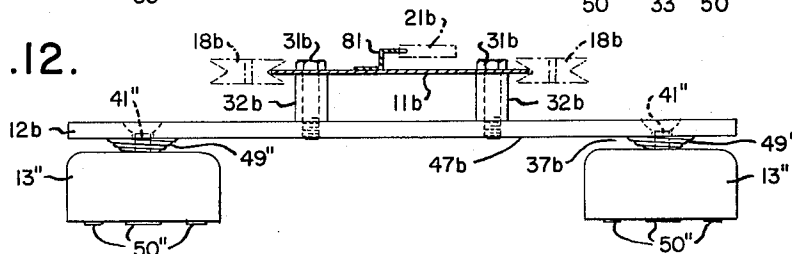


Fig. 10.

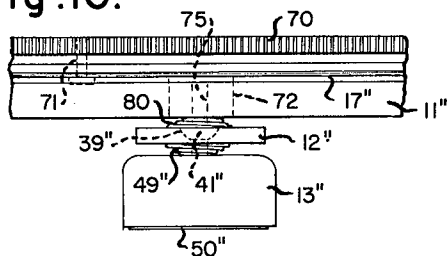


Fig. 11.

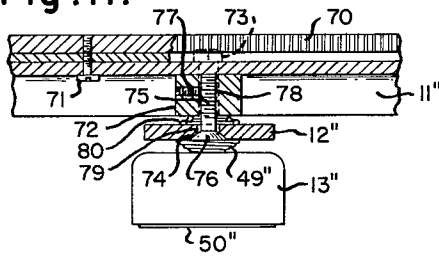


Fig. 13.

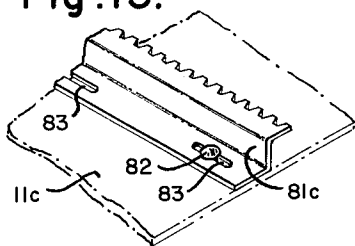
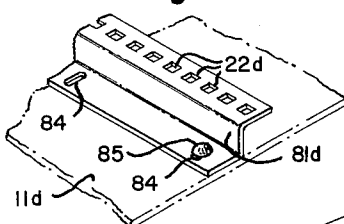


Fig. 14.



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MAGNETICALLY HELD TRACK AND THE LIKE
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19 Claims. (Cl. 238—1)

This invention relates to a magnetically held track and the like in which magnets are provided with universal movement for more effectively holding and mounting of such track and the like. More particularly, this invention relates to a rail in combination with holding straps and swivelly mounted permanent magnets to enhance attachment and magnetic holding power of a track and the like of this invention against a work surface, either plane or curved, for use, e.g., with a traveling welding and/or cutting machine.

The instant invention is an improved magnetically held track and the like such as are useful to guide and hold a welding and/or cutting machine and the like against a selected work surface adapted to a magnetic holding. Thus, such holding may be in any position—horizontal, vertical, overhead, upside-down, at any angle, and, on inside and/or outside work surfaces. Such relative positional needs are encountered in shipboard work, on machinery, in vessels, on structural steel work and in many other connections. The rail utilized in such a track and the like of this invention may be rigid, or flexible. In either case, the swivel connections between the rails and holding magnets, which preferably are permanent plastic potted magnets, enable such rail to be more firmly held to a work surface adapted to magnetic holding, such as steel, even though paint or scale may be thereon. Such work surface may be planar or non-planar and regular or irregular. When the rail is flexible, the accommodation of a track and the like of this invention to a non-planar surface is enhanced, although compound swivel mounting hereunder for rigid tracks also provides compound curve accommodation. Swivel mounting of magnets in a combination of this invention provides for maximum paralleling thereof relative to and minimal distance from a work surface. Moreover, devices of this invention are easy to put together and remain trouble-free even under circumstances where there may be considerable industrial dirt and dust and/or vibration, without causing such magnetically held track and the like to become displaced or to slip from the position in which it is placed against the work surface.

Other objects, features and advantages of this invention will be apparent from the following description and the accompanying drawings, which are illustrative only, in which

FIGURE 1 is a plan view of one track embodiment of this invention utilized for a traveling flame cutting/welding machine;

FIGURE 2 is a view in elevation of the embodiment shown in FIGURE 1;

FIGURE 3 is a somewhat enlarged end view of the track embodiment shown in FIGURES 1 and 2 taken along line III—III of FIGURE 1;

FIGURE 4 is a view, in section and somewhat enlarged, taken along line IV—IV of FIGURE 3;

FIGURE 5 is a view, partly in section and somewhat enlarged, taken along line V—V of FIGURE 4;

FIGURE 6 is a partial view, partly in section, of a modified universal mounting for an embodiment of this invention;

FIGURE 7 is a view taken along line VII—VII of FIGURE 6;

FIGURE 8 is a plan view of another track embodiment

of this invention utilizing compound swivel mounting which is particularly useful with rigid rail sections;

FIGURE 9 is a somewhat enlarged view in elevation, partly in section with the machine removed, of the embodiment shown in FIGURE 8 taken along line IX—IX thereof;

FIGURE 10 is a view in side elevation somewhat enlarged taken along line X—X of FIGURE 8;

FIGURE 11 is a side sectional view somewhat enlarged taken along line XI—XI of FIGURE 8;

FIGURE 12 is a view generally similar to the view shown in FIGURE 3, but of a further modification of the embodiment shown in that FIGURE 3;

FIGURE 13 is a detail view of a stamped rack suitable for mounting upon the strip rail of FIGURE 12; and

FIGURE 14 is a detail view of a section of a further rack suitable for mounting upon the strip rail of FIGURE 12 for use in connection with a machine having a vertical cog wheel for the driving of a machine along such track.

Referring to the drawings, a length of track 10 made in accordance with this invention is illustrated and comprises a predetermined length of a flexible steel strip rail 11, a pair of transversely extending longitudinally spaced cross straps 12 affixed to the underside of said rail in spaced relation thereto and permanent magnets 13 positioned in spaced relation to the underside of the outer ends of the cross straps 12 and in universally mounted relation thereto. A powered traveling flame cutting/welding machine 14 engages the rail 11 along which it is adapted to travel in the course of its work on e.g., a steel work surface 15, against which track 10 is magnetically held as shown in FIGURE 2.

Rail 11, as shown, comprises a strip of flexible steel 16 and a pair of outer longitudinally extending vertically spaced edges on each side to define V-shaped grooves 17 which face in opposite lateral directions. Grooves 17 are adapted to receive and retain beveled wheels 18 of machine 14 to hold the machine on the track irrespective of whether track 10 is magnetically held against a work surface 15 which is horizontal, vertical, and whether or not the machine and track are right-side-up, or upside down as when the machine is used on the underside of a steel deck in a ship. Directional terms used herein including overhead, top, bottom, upper, lower, or under, are relative terms rather than being absolute orientations.

Each groove 17 comprises a bent-down edge 19 of the steel strip 16 and an upper edge 20 welded continuously along the sides of strip 16 to form opposed flanges to define the outwardly facing opposed grooves 17 for the wheels 18. Track 10 may comprise more than one length of rail 11 as shown in FIGURES 1 and 2 by being extended by further predetermined lengths of rail 11a and 11b in endwise alignment therewith with, if desired, any suitable aligning means, so that the machine 14 may travel over the entire length of a track of this invention of several rail lengths if so desired in the course of its work.

Rail 11 in the illustrated embodiment, is provided with meshing perforations 22 for the teeth of a power-driven cog 21 on machine 14, or it may be provided with a flexible rack to engage a regular gear 21, to cause positive movement in either direction of machine 14 depending upon the direction of rotation of a reversible electric motor 23. Motor 23 controlled by electric wires (not shown) extending therefrom to the person controlling the machine 14, or motor 23 may be controlled remotely without wires by known electronic means. Machine 14 is also provided with a torch holder 24 and torch 25 rigidly held thereby at a selected height and angle for the cutting and/or welding work desired to be performed upon work surface 15 as machine 14, usually, is moved along track 10. A tool arm 26 is provided with

a rack and slides in a sleeve 27 affixed to machine 14. The rack on arm 26 is engaged by pinion 28 controlled by a knob 29 which can be located in the position to which it is turned at the initiation of an operation. Other tool means than a torch may be held by the machine 14. The wheels 18 are also affixed to machine 14 beneath skirt 30 and hold the machine to the rail irrespective of the position of the rail in space.

As shown, rail 11 is flexible so that it can be bent about a transverse axis and it may also be twisted somewhat in spiral fashion to accommodate compound curvatures such as those met, for example, in the counter or bow of a ship. Rail 11 is fastened to each bar or cross strap 12 by stud bolts 31 at a predetermined distance therefrom provided by spacing collars 32 between the underside of the rail 11 and each strap 12 and surrounding the outside of the stem of the bolts. Locking means may be utilized with such stud bolts 31 if necessary to insure against loosening or separation thereof from the cross straps 12. Such straps 12 are made of metal, and preferably are of aluminum in the illustrated embodiment.

Each permanent magnet 13 is a so-called strength magnet and may be made in any of the variety of ways known to magnet manufacturers. As shown, each magnet 13 is provided with rectilinear ceramic magnet wafers 13a between respective rectilinear steel pole pieces 33 and 34, the central pole piece 33 being of opposite polarity to the outer pole pieces 34. The magnet assembly 13 is potted in plastic and encased in a metal case 36 made of a material like aluminum. The permanent magnets 13 may also be made in other forms such as concentric magnet rings of alternate polarity. Each magnet 13 is universally mounted to swivel on the underside of the outer ends of the strap 12 from which it is spaced by a space 37 to permit an appropriate range of swiveling movement for optimum support of track 10.

The universal mounting shown in the embodiment of FIGURES 1 to 5, inclusive, comprises an opening 38 vertically through the outer ends of the straps 12, respectively, the upper portion of each such opening being an annular spherical seat 39 for the head 40 of a fastener 41 to couple a strap 12 and its permanent magnets 13 together in swiveling relation. Fastener 41 is in the general form of a machine screw with a screwdriver slot 42 in the top of head 40. The underside of head 40 is a spherical surface 43 adapted to rotatably engage seat 39. Preferably, fastener 41 is made of a relatively non-magnetic material grade of stainless steel, which is relatively non-galling in relation to a metal like aluminum from which the bar straps 12 preferably are made in the illustrated embodiment. The shank of fastener 41 including the threaded portion 44 thereof is narrower than the diameter of opening 38 and that threaded portion 44 engages a vertical tapped hole 45 drilled centrally in magnet bar 33. The screw 41 and magnet 13 preferably are locked in engagement relation by means of a set-screw 46 after assembly of the parts.

Each magnet 13 is pressed away from the underside 47 of its strap 12 by a Belleville spring washer 48 and/or by a coil spring 49 under compression having an internal diameter larger than the diameter of opening 38 but smaller than washer 48 so that it can be retained inside washer 48. Thereby, the spaced surfaces 43 and 39 are resiliently held together to hold the magnet 13 in spaced relation to its strap 12 so that it can swivel to enable the lower face 50 of each magnet to seat itself in relatively intimate full parallel face alignment relation to and against work surface 15 for maximum holding effect of the magnets 13, even though work surface 15 may be non-planar and even though it may have some compound rather than simple curvature to it between magnets 13. Thus, the face 50 of each permanent magnet 13 may be in a different plane in the course of a holding operation of track 10 in parallel and alignment. Thereby, the swivelly held magnets 13 obtained maxi-

mum magnetic holding effect against work surfaces having magnetic attraction response. And, such is the case even if such surfaces are painted, oxidized or covered with dirt through which the magnetic attraction holding force may pass. Further, the swivel contact of the surfaces 39 and 43 in all relative positions respecting one another insures against attraction and/or penetration of dirt and particles therebetween which otherwise might impair freedom of universal movement of a magnet 13 relative to its strap 12, rail 11 and other magnets 13 in track 10.

A modification of the universal mounting of the magnets 13 in the first embodiment of FIGURES 1 through 5, is illustrated in FIGURES 6 and 7, where the same reference numerals are used for generally corresponding parts, with the addition of a prime accent thereto. Thus, an opening 38' is provided adjacent each outer end of each strap 12', with, however, the annular spherical seat 39' on the underside of the strap at the lower end of the opening 38'. Fastener 41' is shown in the form of a hexagonally headed machine screw or stud, the lower portion 44' of which threadedly engages threaded opening 45' drilled in the center of permanent magnet 13'. An articulation block 60 is provided having a vertical central opening 61 and its uppermost surface 62 in the form of an annular spherical segment of corresponding curvature to engage the annular spherical seat 39' for swivelling of each permanent magnet 13'.

The stem of stud bolt 41' is surrounded for a portion of the length thereof immediately beneath head 41' by a cylindrical spacing sleeve 63 extending to the top surface of magnet 13', opening 61 being sufficient to accommodate the same. Sleeve 63 serves to enable stud 41' to firmly bind magnet 13' when the stud is screwed thereinto. The upper end of opening 38' is covered by a round washer 64 which inhibits particles and dirt falling into opening 38'. A conical coil spring 49' is retained in compression between the underside of head 40' and the upper surface of strap 12' to constantly and resiliently keep surfaces 39' and 62 in engagement. Further, if desired, a foam pad 65 of some suitable, preferably high temperature elastomeric, material may be used to fill space 37' between the underside of strap 12' and the top of magnet 13' around block 60, thereby further insuring against intrusion of particles and dirt which otherwise might impair movement of the swivels of the magnets 13'. Another embodiment is illustrated in FIGURES 8 to 11, inclusive, to show a compound swiveling arrangement of this invention. Therein, parts corresponding generally in construction and function to those shown in the embodiment of FIGURES 1 to 5, inclusive, are provided with the same reference numerals, with the addition of a double prime accent thereto. The embodiment of FIGURES 8 to 11, inclusive, further, is especially suited to the use of a rigid rail 11'' either in a single rail length of track, or with a plurality of rail lengths in track sections in longitudinal alignment with one another, for travel therealong of a machine 14''. As shown, rail 11'' comprises an extruded aluminum section having opposed outwardly facing grooves 17'' therein for engagement by wheels 18'' of such a machine. Machine 14'' has the axis of motor 23'' horizontal to drive a horizontal cog 21'' through appropriate spiral gearing, the teeth of cog 21'' being in engagement with the teeth of a rack 70 fastened to rail 11'' at intervals by machine screws 71 extending upwardly from the underside of the web of rail 11''. Such screws 71 are longitudinally displaced from longitudinally spaced cross supports 72, to which rail 11'' is fixed by bolts 73.

Each cross strap 12'' is provided with annular swivel seats 39'' adjacent the ends thereof in the upper portion of the strap, while a further such annular spherical swivel seat 74 is provided in one of the two straps 12'' facing downwardly from the lower portion of such strap 12''. Each seat 39'' engages the spherical underside of a head

of a fastener 41" to swivel said seat in the manner shown in the enlarged view of FIGURE 4 with respect to fastener 41. The lower portion of the shank of each fastener 41" is threaded into the central pole piece 33" of the magnets 13". The casing 36" of the magnets 13" in the embodiment being described is in the form of an inverted cup for ease in the plastic plotting of each magnet.

A like fastener 75 of non-magnetic stainless steel has a head 76 the underside of which is spherical to fit seat 74 and swivel with respect thereto. The shank of fastener 75 extends upwardly into a drilled and tapped hole 78 in the center of support 72, a set screw 77 being used to lock fastener 75 in operative position. The shank of each fastener 41" passes through a larger opening, similar to opening 38, extending through the underside of the straps 12". The shank of the fastener 75 extend upwardly through a larger hole 79 in the upper side of the one strap 12" having a support 72 thereabove with a drilled and tapped hole 78 therein, as aforesaid. Coiled springs 49" resiliently hold the heads of fasteners 41" in their swivel seats and magnets 13" spaced below the underside of each of the straps 12". A like coil spring 80 is positioned around the shank of fastener 75 between the upper side of the one strap 12" and the bottom of the support 72 immediately above, to resiliently hold head 76 in its spherical seat 74, and, support 72 and thereby rail 11" spaced above the respective strap 12".

The compound swivel embodiment of FIGURES 8 to 11, inclusive, provides augmentation of the parallel alignment quality of this invention and facilitates the use of rigid rail sections 11" on curved or irregular work surfaces where such otherwise might not be possible. At the same time, the magnetically adherent faces 50" of the magnets 13" can each develop its greatest magnetic holding force in full area engagement with whatever magnetic attraction work surface is in juxtaposition thereto. And, the central swiveling of the support 72 relative to the respective strap 12" provides greater scope for the alignment of a rigid rail section like rail 11". Thus, whether the work surface to which the embodiment 10" is affixed is curved in simple or in compound fashion, or otherwise irregular, within the swiveling limits of movement of the particular embodiment furnished, there is no loss of holding power, or loss of effectiveness of the operation of machine 14" in the course of its movement along rail 11" of track 10".

The modification of FIGURE 12 uses magnets 13" constructed and swivelly mounted on cross straps 12b in the manner shown in FIGURE 9. However, the cross bars 12b along a length of track of such modification have no centrally positioned swivel seat for a compound mounting. Instead, a flexible strip rail length section 11b, preferably made of a sufficiently rigid metal, is provided and fastened to each strap 12b by stud bolts 31b having the function and relation thereto that bolts 31 have to the embodiment shown in FIGURE 3. Spacing collars 32b extend between the underside of rail 11b and each strap 12b around the outside of the stem of the bolts 31b. Because 11b is a simple strip compared with flanged strip 11, it is more flexible and can be bent or twisted more extensively than the flexible rail 11 shown in FIGURES 1 to 3. Moreover, inasmuch as flexible rail 11b is not perforated, it is stronger for a given dimension than flexible rail 11. A machine such as machine 14" is held to rail 11 by wheels 18b which have V-grooves therein but otherwise function as do the wheels 18". A horizontal cog 21b in a machine such as machine 14" has teeth which engage the teeth along the upper edge of a Z-shaped rack 81. Rack 81 may be stamped out of sheet metal by a progressive die and spotwelded to rail 11b, when rail 11b is a suitable metal therefor, along the longitudinal center of the upper side of rail strip 11b for control of the movement, direction and speed of the machine to which wheels 18b are attached. The functioning of the modification of FIGURE 12 is similar to

the functioning of the embodiment of FIGURES 1 to 5, inclusive.

Alternative pressed or stamped Z-section rack arrangements are shown in FIGURES 13 and 14. In FIGURE 13, the rail length is designated 11c and is provided with a rack 81c, the upper edge of which is provided with teeth for a horizontal cog such as cog 21b. Rivets 82 extend through lengthwise slots 83 in the lower flange of the rack 81c, the lower heads of the rivets extending through rail 11c and being fastened to the underside thereof to lock rack 81c in place with provision for differential expansion between rack and rail. On the other hand, in the arrangement of rack 81d in FIGURE 14, a vertical cog, similar to cog 21, is adapted to have its teeth engage holes 22d in the upper flange of rack 81d, which holes 22d serve in the manner of holes 22 in the first above-described embodiment. Rivets 85 pass through cross slots 84 in the lower flange of the rack 81d to hold it to rail 11d; slots 84 being adapted to provide for differential expansion between rack 81d and rail 11d if it occurs.

Various changes may be made in details of the illustrated embodiments and modifications of this invention and other embodiments and modifications provided, without departing from the spirit of this invention or the scope of the appended claims.

We claim:

1. A magnetically held track and the like, comprising, in combination, a generally longitudinally extending rail, magnet holding means having an opening and connected to said rail for holding said rail against a work surface in spaced relation thereto and therealong, said opening having one end fashioned in the form of an annular spherical seat, a member associated with said magnet holding means and having an annular spherical surface in universal engagement with said seat, a fastener having a stem having its transverse dimension narrower than the transverse dimension of said opening, a magnet positioned on the underside of said opening in spaced relation to the lower end thereof, said stem projecting downwardly through said opening and fixed to said magnet to hold said annular spherical surface adjacent said seat, and means surrounding said stem above said magnet and below the top of said fastener, to hold said annular spherical surface against said seat, whereby said magnet is swivelly mounted relative to said track and the like.

2. A magnetically held track and the like, comprising, in combination, a longitudinally extending rail to guide and retain in any position of said rail a machine adapted to travel along said rail, magnet holding means connected to the underside thereof for holding said rail against a work surface in spaced relation thereto and therealong, longitudinally spaced transverse straps in said magnetic holding means each having an opening outwardly of said rail, the upper side of a plurality of said openings each being fashioned in the form of an annular spherical seat, a fastener for each of said openings having an annular spherical surface to universally engage said seat, said stem having a diameter less than the diameter of its said opening, a permanent magnet having a flat underside positioned beneath said opening in spaced relation thereto, said stem projecting downwardly through said opening and centrally fixed to said magnet, spring means positioned between the upper side of said magnet and the adjacent underside of its strap, whereby said magnets are swivelly mounted on said track and the like to enable it to be magnetically held with greater effect against said work surface.

3. A magnetically held track and the like as set forth in claim 2, comprising, said rail being made of flexible material and having wheel-retaining portions along the respective edges thereof adapted to engage wheels of said machine.

4. A magnetically held track and the like as set forth in claim 2, comprising, means for locking said stem in assembled relation to its respective said magnet and strap and a pad of resilient material positioned in the space between each magnet and strap surrounding said stem to exclude dirt, dust and particles therefrom.

5. A magnetically held track and the like, comprising, in combination, a longitudinally extending rail to guide and retain in any position of said rail a machine adapted to travel along said rail, magnet holding means connected to the underside thereof in spaced relation thereto for holding said rail against a work surface, said magnetic holding means having a plurality of longitudinally spaced transversely extending straps, each of said straps having an opening outwardly of said rail, the underside of each said opening being fashioned in the form of an annular spherical seat, a fastener having a head and a stem, a block on the underside of said strap having an upwardly facing annular spherical surface to universally engage said seat, said stem having a diameter less than the diameter of said opening and extending therethrough and through said block, a permanent magnet having a flat underside positioned beneath said block in spaced relation to its strap, said stem being fixed centrally to said magnet, spring means positioned between said head of said fastener and said strap, whereby said magnet is swivelly mounted on said track and the like to enable it to be magnetically held with greater effect against said work surface.

6. A magnetically held track and the like as set forth in claim 5, comprising, a spacing sleeve surrounding said stem and extending between the underside of said head and the upper side of said magnet, a washer surrounding said stem and covering the upper end of said opening and said spring means being substantially positioned above said washer.

7. A magnetically held track and the like as set forth in claim 5, comprising, means for locking said stem in assembled relation to its respective said magnet and strap and a pad of resilient material positioned in the space between each magnet and strap surrounding said stem to exclude dirt, dust and particles therefrom.

8. In a magnetically held track and the like, apparatus comprising, in combination, a length of rail having machine wheel-retaining portions along each longitudinal edge thereof irrespective of the position in space of said rail, magnet holding members, spacer means for mounting said rail on said magnet holding members, said members extending laterally outwardly of said portions of said rail, and a permanent magnet having a flat underside and universally mounted on the underside of each member adjacent each laterally outer portion thereof respectively, whereby said track and the like may be magnetically held against planar and non-planar surfaces by said magnets with said magnets in better engagement with a work surface.

9. In a magnetically held track and the like as set forth in claim 8, comprising, said length of rail being made of flexible material capable of being bent about a transverse axis and/or of being twisted to parallel a work surface of compound curvature.

10. In a magnetically held track and the like as set forth in claim 9, comprising, said length of rail having tooth-engaging openings along the length thereof between the edges thereof and adapted to engage teeth of a cog or the like of a machine adapted to travel along said length of rail.

11. A universally held track and the like, comprising, in combination, a rail of metal strip which is relatively flexible about a transverse axis and can be twisted to accommodate it to compound curvatures, wheel-retaining portions along the edges of said rail comprising longitudinally extending grooves facing outwardly in opposite directions away from the longitudinal centerline of said rail, longitudinally extending positive gear-engaging means

along said rail between said edges adapted to provide for longitudinal movement thereof of a powered traveling machine having a drive gear to engage said means and guide and retention wheels to engage said grooves, and a plurality of holding means swivelly connected to said rail to hold it against a work surface.

12. A universally held track and the like as set forth in claim 11, comprising, said length of rail having tooth-engaging openings along the length thereof between the edges thereof and adapted to engage teeth of a cog or the like of a machine adapted to travel along said length of rail.

13. In combination, a magnet holding rigid cross member for a vehicle track and the like, said member having an opening therethrough, one end of said opening comprising an annular spherical swivel seat surrounding said opening, a magnet in spaced relation to the other end of said opening in said member, a swivel member adapted to swivelly engage said seat, means having a portion extending through said opening smaller than the lateral dimension of said opening to connect said swivel member and said magnet, and means to yieldably maintain said portion in tension and said magnet spaced from said member but movable toward said member and in swivel relation thereto.

14. A magnetically held track and the like, comprising, in combination, a longitudinally extending rail, longitudinally spaced cross straps positioned adjacent to the underside of said rail, magnets respectively positioned adjacent the underside of said straps near the ends thereof, swivel fastener means extending through said straps near those ends for rigid connection to said magnets, spring means to resiliently space said magnets from said straps and to hold said swivel fastener means in tension only and in swiveling engagement relative to said straps, support members for said rail rigidly fixed thereto and spaced near but above said straps, swivel fastener means extending upwardly through the center of said straps into rigid connections to said support members, and resilient means positioned between said support members and said center of said straps to hold said last-named swivel fastener means in tension only and in swiveling engagement relative to said straps, whereby a rigid rail may be held in a compound swiveling arrangement to provide maximum magnetic holding effect against a magnetic attraction work surface whether or not said surface is parallel to the axis of said rail.

15. A magnetically held track and the like, comprising, in combination, a rail, spaced members positioned adjacent to the underside of said rail, magnets positioned adjacent the underside of said members, swivel means extending through said members for connection to said magnets, means to yieldably space said magnets from said members and to hold said swivel means in swiveling engagement relative to said members, swivel means extending through the said members for connection to said rail, means to yieldably space said rail from said members and to hold said last-named swivel means in swiveling engagement relative to said members.

16. In combination, a magnetically held track and the like, comprising, a relatively flexible strip rail of structural material, longitudinally extending positive gear-engaging means fixed to one side of said rail between its edges and adapted to provide for longitudinal movement of a powered traveling machine having grooved wheels adapted to engage the opposite edges of said rail to hold said machine to said rail during said movement, and magnet means universally connected to said rail out of the way of said wheels and adapted to be movable to provide parallel alignment between the face of said magnet means and a magnetic attraction work surface for maximum holding effect.

17. Apparatus as set forth in claim 16, comprising, said gear-engaging means is a sheet metal Z-shaped rack, means for fixing said rack to said strip rail adapted to

permit differential expansion and said grooved wheels have V-grooves therein.

18. A magnetically held track and the like, comprising, in combination, an elongated rail, spaced transverse straps positioned to one side of said rail in spaced relation thereto, swivelly mounted magnets positioned on the side of said straps opposite the side toward said rail and connected thereto, and swivel mounting means connecting said rail to said straps centrally of the ends of said straps.

19. A magnetically held track and the like comprising, in combination, an elongated rail, spaced holding members connected to one side of said rail in spaced relation thereto, magnets positioned on the other side of said holding members, mounting means swivelly connected to said holding members and extending through them into fixed relation to said magnets, said mounting means and magnets being swivelable relative to their

respective holding members and movable theretoward, and yieldable means to keep said magnets in spaced relation to said holding members and said mounting means in swivelable engagement therewith.

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