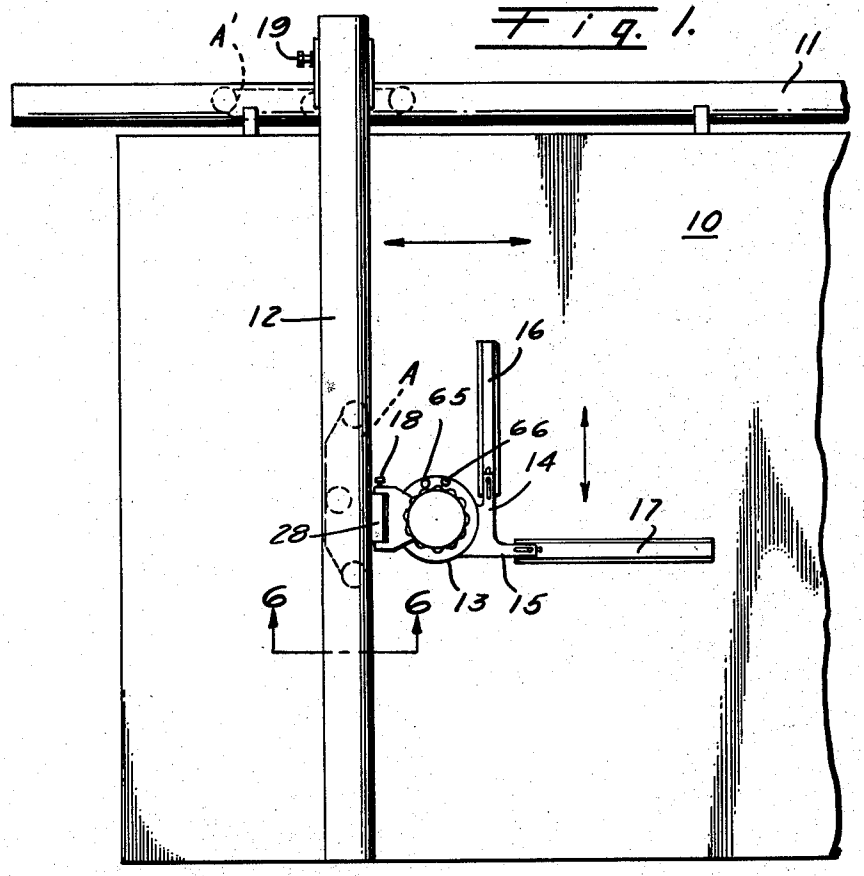
Oct. 20, 1964 H. N. HARRIS 3,153,284

DRAFTING MACHINE

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Fig. 1.



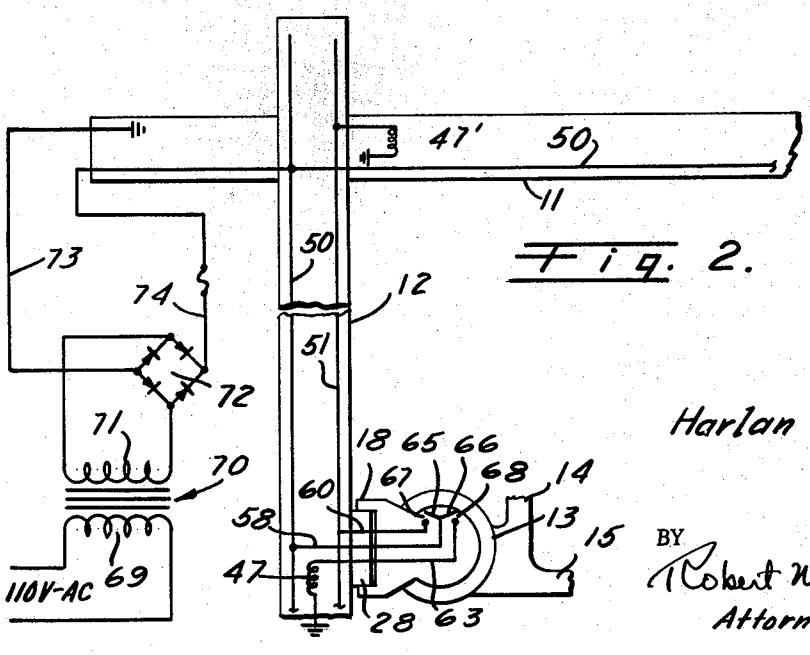


Fig. 2.

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Fig. 3.

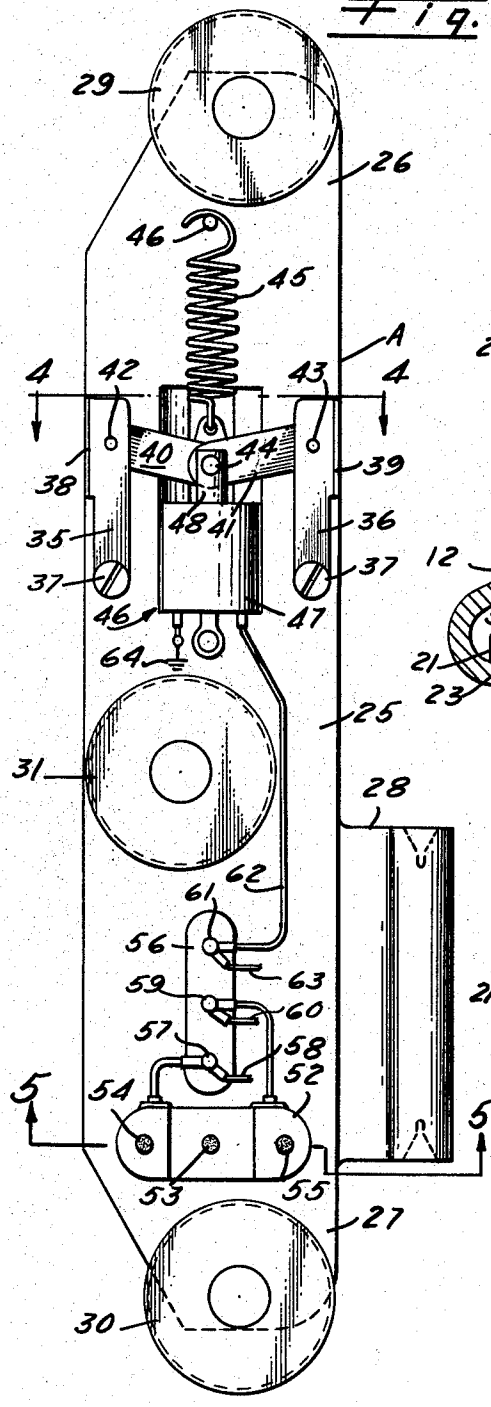


Fig. 4.

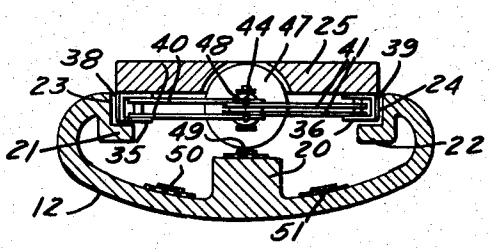


Fig. 5.

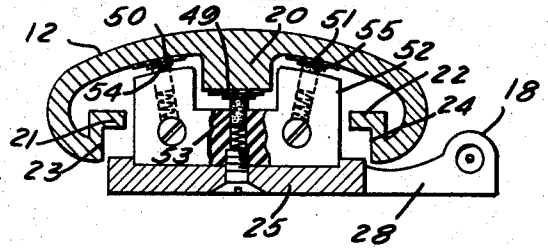
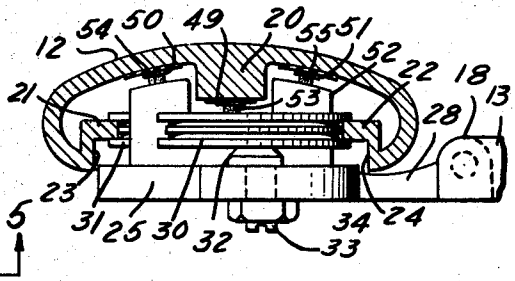


Fig. 6.



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3,153,284

DRAFTING MACHINE

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3 Claims. (Cl. 33—79)

The present invention relates generally to drafting mechanism and devices, and is more particularly concerned with a drafting machine in which braking means are provided for retaining adjustably movable parts thereof in adjusted position.

Heretofore, drafting machines have conventionally been arranged with relatively movable rails in right angled relation, which could be manually manipulated to adjust and position an associated drafting device such as a scale, straight edge, angularly adjustable arm device, and the like; and wherein mechanical brake means were operable to secure the rails against movement from their adjusted position. The brake actuating means in these machines was remotely located with respect to the drafting device which was being utilized by the draftsman, and thus were inconvenient to operate for the reason that they necessitated that the draftsman remove his hands from the drafting device and reach to a remotely located point in order to actuate the brake mechanism.

Having the foregoing in mind, the present invention has for one object the provision of braking mechanism of the electro-mechanical type which is normally biased to a braking position, but which may be electrically energized to a non-braking position to permit adjusting movements of the drafting device to desired operating positions.

A further object of the invention is to provide brake mechanisms respectively for the adjustable rails with which the drafting device is associated, these braking mechanisms being selectively electrically operable from a central position at or contiguous to the drafting device, thus permitting the draftsman to conveniently adjust and position the drafting device as desired with a minimum of unnecessary movement of his hands away from the drafting device.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

FIG. 1 is a plan view of a drafting machine according to the present invention, showing the machine as applied to a drafting table;

FIG. 2 is a fragmentary view diagrammatically illustrating the adjustable rails of the drafting machine, and the schematic for the electrical controls of the braking mechanisms;

FIG. 3 is an enlarged detail plan view of the carriage mechanism and brake means as associated with each of the adjustable rails of the drafting machine;

FIG. 4 is an enlarged transverse sectional view taken through the carriage substantially on line 4—4 of FIG. 3, and showing the relationship with the associated rail member;

FIG. 5 is a similar view in which the section through the carriage is taken substantially on line 5—5 of FIG. 3; and

FIG. 6 is a transverse section taken through one of the rails substantially along line 6—6, and looking toward the adjacent end of the carriage of FIG. 3 showing its relation with the rail.

Referring more specifically to the drawings, for illustrative purposes, the drafting machine of the present invention is shown in FIG. 1 as being associated with the

top of a drafting table 10 or a drafting board of conventional character. The drafting machine embodies the usually conventional parts of associated track forming rails 11 and 12 in right angled relation, the rail 12 being slidable along the rail 11, and a drafting head 13 which carries scales or other drafting devices and is slidably movable along the rail 12. In the present instance, the drafting head is illustrated as having a pair of right angled arms 14 and 15 which respectively support elongate scale members 16 and 17, the drafting head being so arranged that the scale members may be moved as a unit and positioned in desired angular relation with respect to the horizontal and vertical loci of the drafting table.

Movement of the drafting head in opposite longitudinal directions of the rail 12 is accomplished by mounting the drafting head upon a carriage structure A, while movements of the rail 12 longitudinally of the rail 11 is accomplished by providing a similar carriage A'. These carriages are similarly constructed and have wheel supported movement with their associated rails, one of the carriages having a pivotal support 18 by which it is connected with the drafting head 13, and the other having a pivotal support 19 by means of which it is pivotally connected to the rail 12. These pivotal supports permit swinging movement of the rail 12 about the pivot 19, and the swinging movement of the drafting head 13 with respect to the rail 12. Since the carriage and its operative association with the adjacent rail are similar in each case, it is believed that a detailed description of one carriage only will be sufficient, and in this connection the carriage A will be described with respect to the rail 12 with which it is associated. As probably best shown in FIGS. 4, 5 and 6, the rails are fabricated as an extrusion in which the top surface is crowned and provided with a longitudinally extending central inner rib 20. Along each side of the rail the edge margins are reversely curved and formed to provide elongate track forming flanges 21 and 22 and adjacent longitudinal braking surfaces 23 and 24 along each side of the rail. As thus formed, the rail provides in effect a housing within which there may be mounted a carriage structure A as shown in FIG. 3.

The carriage comprises an elongate plate-like frame member 25 having tapered ends 26 and 27 and adjacent the latter end a side extension 28 which in the case of carriage A forms a part of the pivotal support 18 for the drafting head 13, while in the case of the carriage A' forms a part of the pivotal support 19 for the rail 12.

Pivotally mounted for rotational movement of one side of the frame member 25 at the ends 26 and 27 are grooved wheels 29 and 30 which are arranged for engagement with the track flange 22, while intermediate the ends of the frame is a grooved wheel 31 which is arranged to engage the track flange 21, as best shown in FIG. 6. In order to permit removal of the carriage from its associated track, as well as permit adjustment of the wheel pressure against their associated tracks, one of the wheels, in this case wheel 30 has been mounted on an adjustable eccentric pivot 32 which has an axially offset mounting stem 33 supported for rotative adjustable movements in the frame member 25, and having threaded relation with a locking nut 34 by means of which the pivot may be secured in its adjusted position. Thus, by rotating the stem 33, the wheel 30 may be moved towards or away from its operative position of engagement with the track 22 into a position whereby the carriage may be readily removed, or the track and wheel pressures adjusted to a desired value.

Referring now to FIGS. 3 and 4, braking mechanism is provided adjacent the end 26 of the frame member 25. The braking mechanism comprises a pair of swingably mounted brake arms 35 and 36 which may be variously

constructed. In the present instance, these arms are formed from sheet material into arm members of U-shaped section and mounted with their open sides in confronting relation. At one end, each arm is mounted upon a pivot 37, and the outermost end of the arm has its bridging portion positioned to either of itself form a brake shoe or the mounting for a brake shoe of different material, the brake shoe portions being indicated by the numerals 38 and 39 in each case and which are adapted to respectively engage the braking surfaces 23 and 24, as shown in FIG. 4. The brake shoe ends of the arms 35 and 36 are interconnected by toggle link members 40 and 41 having their outermost ends connected to the brake shoes by pivots 42 and 43 and their innermost ends connected to a common pivot 44.

For actuating the toggle in a braking direction for the brake shoes, the pivot 44 is connected to one end of a tensioned coiled spring 45, the other end of this spring being connected to a fixed anchor pin 46. This spring normally urges the toggle links in a direction to cause outward or separating movement of the brake shoes into engagement with their associated braking surfaces. Thus the brake shoes operate to normally maintain the carriage in an adjusted position relative to its associated rail.

For releasing the braking mechanism, there is provided an electrically energizable solenoid 46 having a solenoid coil 47 operatively associated with a solenoid plunger 48, this plunger being connected on the opposite side of the common pivot 44 from the side to which the spring 45 is connected. As thus arranged energization of the solenoid will be effective to actuate the toggle links in a direction to move the brake shoes inwardly or towards each other so as to assume a non-braking position in which the carriage may be freely moved to an adjusted position on its associated rail.

Electric current is supplied to the movable carriages A and A' through a collector system. A ground conducting strip 49 is mounted on the inner face of the rib 20 and extends longitudinally thereof, while on opposite sides of the rib are insulated conducting strips 50 and 51 in the case of rail 12. In the case of rail 11, it is only necessary to have one conducting strip, which has been indicated as conducting strip 50. A support 52 of insulating material is carried by the frame member 25 and provides a mounting for spring urged collector brushes 53, 54 and 55 arranged to make sliding electric contact with the strips 49, 50 and 51 respectively.

Adjacent the support 52 is a terminal block 56 which provides a terminal connection 57 between the collector brush 54 and a conductor 58, a terminal connection 59 which provides connection between collector brush 55 and a conductor 60, and a terminal connection 61 which provides a connection between a current supply conductor 62 to the coil 47 and a conductor 63. The other terminal of coil 47 is grounded to the frame member 25 as indicated at 64.

The conductors 58, 60 and 63 are carried to the drafting head 13 where push buttons 65 and 66 respectively are provided to control normally open contacts 67 and 68 respectively. Contacts 67 are operable by push button 65 to connect conductor 58 with conductor 60, whereas the contacts 68 are selectively operable by push button 66 to connect the conductor 58 with conductor 63.

Electrical source of supply is provided to the drafting machine from any domestic distribution circuit of 110 volts A.C. which is fed to the primary winding 69 of a step-down transformer 70, this transformer having a secondary winding 71 which is connected to a full wave bridge rectifier 72 from which output circuit conductors 73–74 supply low voltage operating D.C. current of the order of 24 volts to the drafting machine for energizing the solenoid coils 47 and 47' for selectively releasing the braking mechanisms depending upon whether push button 65 or push button 66 is operated by the draftsman.

As illustrated in FIG. 2, the conductor 73 is grounded, while conductor 74 is electrically connected with conducting strip 50. It will now be apparent that by manipulating the push button 65, establishment of a connection between conductor 58 and conductor 60 will complete an energizing circuit through conductor 51 to the solenoid coil 47' so that the braking mechanism associated with this coil will be released so long as the push button is depressed. Likewise, actuation of the push button 66 will close contacts 68, thus connecting the conductor 58 with conductor 63 so as to energize conductor 62 of coil 47 which will operate to release its associated braking mechanism. Fingertip selectivity and control of the braking mechanisms is thus provided at the drafting head within easy reach for convenient operation by the draftsman.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and, hence, I do not wish to be restricted to the specific forms shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. In a drafting machine:
(A) a track member;
(B) scale means including an adjustable head member;
(C) means supporting said scale means for adjusting linear movement along said track member including a wheeled carriage;
(D) braking means on said carriage having braking shoes normally biased to a position in engagement with portions of said track member for holding said supporting means against movement from an adjusted position;
(E) electro-magnetic means on said carriage energizable to release said braking means;
(F) an energizing circuit for said electro-magnetic means including slide contacts on said carriage having conducting engagement with fixed conductors on said track member; and
(G) means for controlling the energization of said electro-magnetic means from said energizing circuit, including manually operable contacts on said head member.

2. In a drafting machine:
(A) an elongate rail of channel section having elongate spaced apart inwardly projecting side flanges providing a track;
(B) a carriage structure supported for adjusting movement along said track by track engaging wheels;
(C) a drafting device carried by said carriage, and movable therewith along said track;
(D) braking means on said carriage including a pair of brake shoes respectively mounted on opposite sides of said carriage for outward and retractive movements to braking and non-braking positions with respect to side braking surfaces adjacent said side flanges;
(E) a toggle linkage interconnecting said brake shoes;
(F) a spring urging said linkage in a direction to move said shoes towards said braking position;
(G) electro-magnetic means energizable to actuate said linkage in a direction to move said shoes towards said non-braking position;
(H) an energizing circuit for said electro-magnetic means including slide contacts on said carriage having conducting engagement with fixed conductors mounted within said rail; and
(I) means for controlling energization of said electro-magnetic means from said circuit, including a control switch movable with said drafting device.

3. In a drafting machine:
(A) a pair of elongate rail members having right-angled relation;
(B) drafting device means;

(C) a first carriage interconnecting one of said rail members for relative adjustment movements along the other of said rail members;

(D) a second carriage connecting said drafting device means for relative adjustment movements along said one of said rails;

(E) electro-mechanical braking means carried by each of said carriages normally operable to a braking position opposing said adjustment movements, and operable upon energization to non-braking position;

(F) energizing circuits for said braking means including slide contacts carried by said carriages for electrical conducting engagement with fixed conductors carried by their associated rail members; and

(G) controls for selectively energizing said braking means for actuation to non-braking position including a pair of push button switches on said drafting device means operable through said energizing circuits for selectively controlling said braking means.

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