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SUCTION CLEANER HAVING STEPPED FRONT
WHEELS TO PROVIDE NOZZLE ADJUSTMENT
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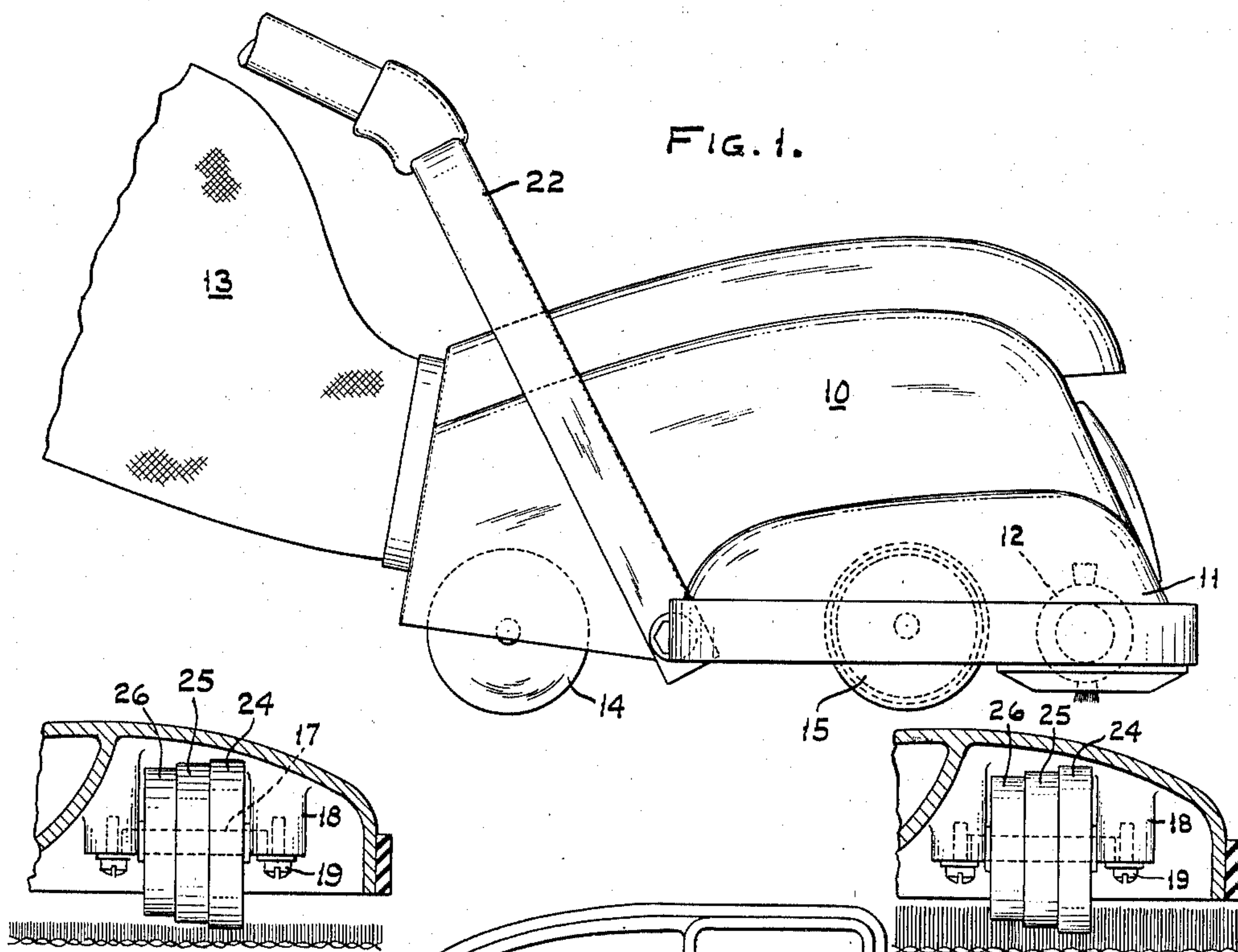


FIG. 3.

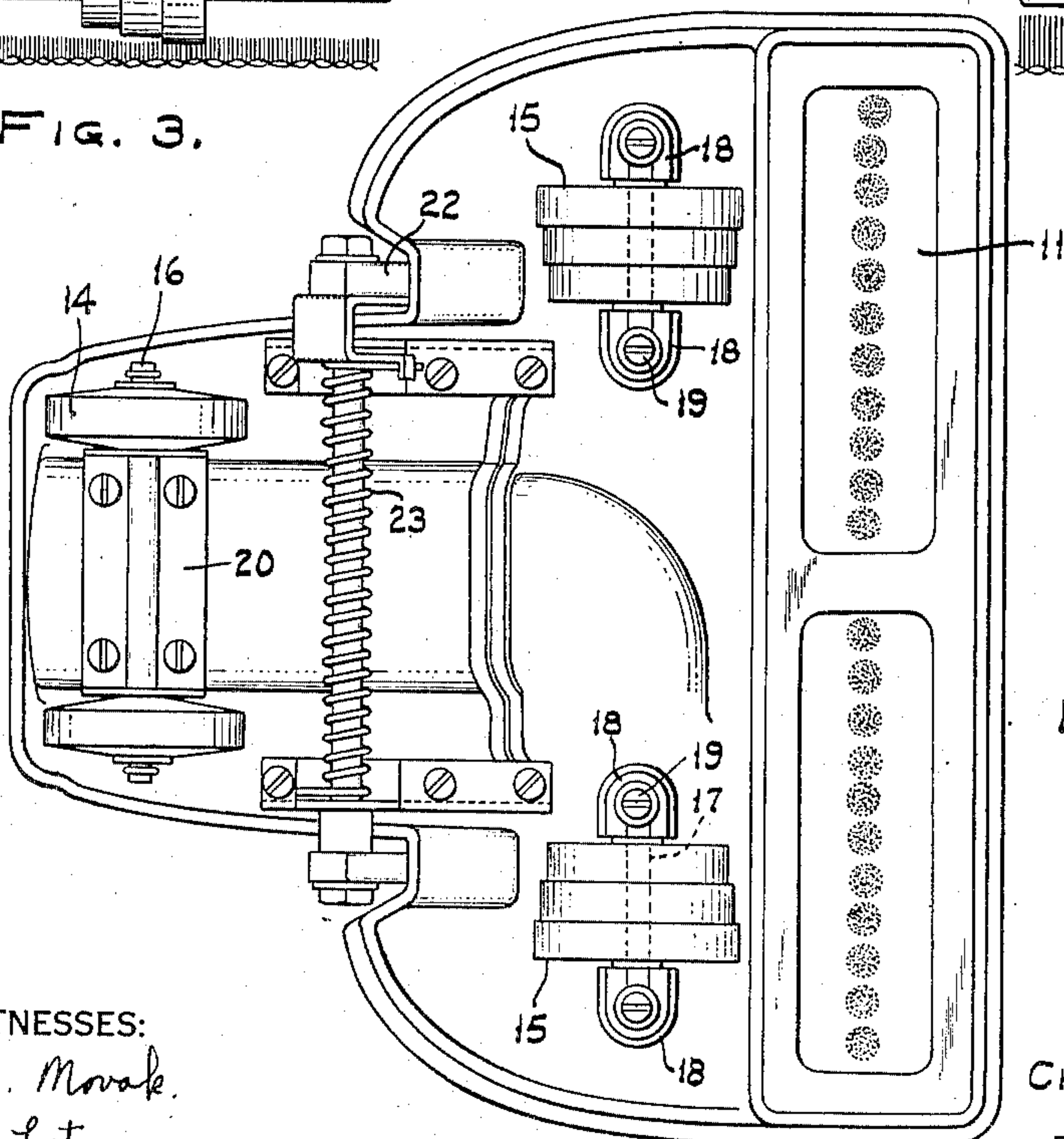


FIG. 2.

WITNESSES:
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UNITED STATES PATENT OFFICE

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SUCTION CLEANER HAVING STEPPED
FRONT WHEELS TO PROVIDE NOZZLE
ADJUSTMENT

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1 Claim. (Cl. 15—362)

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My invention relates to suction cleaning ap-
paratus, more particularly to a suction cleaner
constructed so that the nozzle is automatically
positioned with respect to the surface of the
carpet being cleaned. The term "carpet" is used
generically herein, to include rugs or any other
floor covering of a fabric or textile character.

It is an object of my invention to provide a
suction cleaner having improved nozzle adjust-
ment characteristics, more particularly a suc-
tion cleaner which will provide adjustment be-
tween a loosely woven and a closely woven rela-
tively thin carpet, moving the nozzle to a lower
position for the more loosely woven carpet. By
a relatively thin carpet is meant a relatively low
nap carpet, or a carpet of small dimension be-
tween the top and bottom sides of the carpet.

It has heretofore been proposed to provide
automatic adjustment of the nozzle with respect
to the surface of the carpet by inherent con-
struction of the suction cleaner, the principal
characteristic of which is large diameter and wide
tread of the front wheels. By providing large
contact area between the front wheels and the
carpet, the weight per unit area is low, so that
the front wheels do not penetrate deeply into the
carpet but are maintained near the surface of the
carpet and thus maintain the mouth of the noz-
zle in proper relation to such surface regardless
of the thickness of the carpet. The front wheels
do, however, penetrate further into a thick or
high nap carpet than into a thin, or low nap
carpet, but this is compensated to some extent by
the tilting of the cleaner produced by the rear
wheels penetrating more deeply than the front
wheels. Such construction provides adjustment
as between different thicknesses of rugs, but it
does not provide substantial adjustment as be-
tween different types of carpet of a given thick-
ness.

In accordance with the present invention, I
provide front wheels of such characteristics, but
which wheels have the tread divided into por-
tions of different diameter, and which wheels
may be referred to as "stepped" wheels. The
form of the wheels is such that for relatively thin
carpets, only the tread portion of greatest diam-
eter penetrates the carpet, at least to an extent
to carry a substantial portion of the weight.
Such relatively narrow tread portion sinks more
deeply into a loosely woven carpet than into a
closely woven carpet. This is desirable because
it is more difficult to seal the nozzle lips with
respect to the loosely woven carpet, so that a
lower position of the nozzle is required to ob-

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tain the desired air seal. When used on a closely
woven thin carpet, however, the wheels do not
sink to as great an extent and the nozzle lips
are maintained at a higher position, which is
desirable to avoid too great a suction on the car-
pet.

These and other objects are effected by my
invention as will be apparent from the follow-
ing description and claim taken in connection
with the accompanying drawings, forming a part
of this application, in which:

Fig. 1 is a side elevation of a suction cleaner
incorporating the invention;

Fig. 2 is a bottom plan view thereof; and

Figs. 3 and 4 are fragmentary vertical sections
showing one of the front wheels on a relatively
thin carpet and a relatively thick carpet, respec-
tively.

Referring now to the drawing in detail, the
suction cleaner includes a casing or body mem-
ber 10 having a floor nozzle 11 at the front. A
brush roll 12 is rotatably mounted within the
nozzle in conventional manner. A conventional
fan motor unit (not shown) is housed within the
casing 10 to provide suction in the nozzle 11. A
conventional dust bag 13 is also provided.

A pair of rear wheels 14 are mounted on the
casing 10 adjacent the rear thereof, as shown on
the drawing. A pair of front wheels 15 are
mounted on the casing toward the front of the
casing, just rearwardly of the nozzle, as shown in
the drawing. The wheels may be mounted in any
suitable manner, except that they are mounted
to rotate on axes which are fixed with respect to
the casing. In the illustrated embodiment, the
rear wheels 14 are shown as mounted on the op-
posite end portions of a shaft or axle 16 carried
by a bracket 20 fastened to the casing. Each of
the front wheels 15 is shown as mounted on a
shaft or axle 17, the ends of which are received
in recesses formed in bosses 18 and held in such
recesses by screws 19.

A handle 22 is pivoted to the cleaner casing on
an axis parallel to and between the axes of the
front and rear wheels, as shown on the drawing.
In the illustrated embodiment, there is a helical
torsion spring 23 wound around the shaft on
which the handle 22 is pivoted and serving to
bias the cleaner relative to the handle 22 in coun-
terclockwise direction, as seen in Fig. 1; in other
words, tending to lift the front end of the cleaner
to reduce the penetration of the front wheels into
the carpet.

The front wheels are formed with a tread
which is relatively wide and of relatively great

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diameter, thereby providing relatively great contact area on the rug. Thus, the weight per unit area is relatively low so that the front wheels do not sink so deeply into thick carpets but are maintained more nearly at the surface, and therefore, maintain the nozzle in more nearly uniform relation to the surface of the carpet for carpets of different thickness.

In accordance with the present invention, the tread of the front wheels is divided into portions of different diameter, each portion being of a width substantially as great as that of any of the rear wheels. In the illustrated embodiment, for example, each front wheel comprises three tread portions 24, 25 and 26, the widths of which are $\frac{7}{8}$ inch, $\frac{1}{2}$ inch and $\frac{1}{2}$ inch, respectively, and whose diameters are 2 inches, $1\frac{1}{2}$ inches and $1\frac{7}{8}$ inches, respectively.

The dimensions of the several tread portions of the front wheels of a cleaner of given characteristics, such as its weight and the force of the torsion spring 23, are such that when the cleaner is used on a relatively thin carpet, only the tread portion of greatest diameter penetrates the carpet and supports the front end of the cleaner. The other tread portions of lesser diameter are spaced above the surface of the carpet, as shown in Fig. 3, or at least penetrate so slightly that they do not carry any appreciable weight. Due to the reduced tread width and contact area, the weight per unit area of contact with the carpet is greater than if the full width of the tread contacted the carpet. Thus, the front wheels penetrate more deeply into a loosely woven thin carpet than into a more closely woven thin carpet. This is desirable for the reasons explained above.

When the cleaner is used on a relatively thick rug, the wheels penetrate until all of the tread portions penetrate sufficiently to give support to the front end of the cleaner. The nozzle is then adjusted in substantially the same manner as wide wheels heretofore used.

It will, thus, be seen that I have provided a cleaner which inherently adjusts the nozzle substantially as heretofore proposed, but which provides further adjustment as between loosely and closely woven thin carpets.

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While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

A suction cleaner comprising a casing having a floor nozzle at the front, a rear wheel or wheels mounted on the casing adjacent the rear thereof, and a pair of front wheels mounted on the casing adjacent said nozzle, said wheels being mounted on axes which are fixed with respect to the casing, each front wheel having tread portions of different diameters, each tread portion being of a uniform diameter and of a width substantially as great as that of any of the rear wheels and substantially not less than $\frac{7}{8}$ inch, the difference between the greatest and the smallest diameters of said tread portions being substantially no greater than $\frac{1}{8}$ inch and substantially not less than $\frac{1}{16}$ inch, whereby on a relatively thin or low-nap carpet, only the tread portion of greatest diameter penetrates the carpet sufficiently to carry any appreciable weight and on a relatively thick or high-nap carpet, the tread portions have sufficient tread area to support the nozzle with a limited penetration or sink.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
809,266	LaFever	Jan. 2, 1906
1,033,563	English	July 23, 1912
1,181,094	McDaniel	Apr. 25, 1916
1,265,789	Kirby	May 14, 1918
2,203,001	Taylor	June 4, 1940
2,232,766	Boyle	Feb. 25, 1941
2,244,132	Taylor	June 3, 1941
2,267,765	Taylor	Dec. 30, 1941
2,334,733	Davis	Nov. 23, 1943