R. P. HERON.

TYPE WRITER PLATEN AND OTHER ROLLER.

APPLICATION FILED OCT. 2, 1909.

998,510.

Patented July 18, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

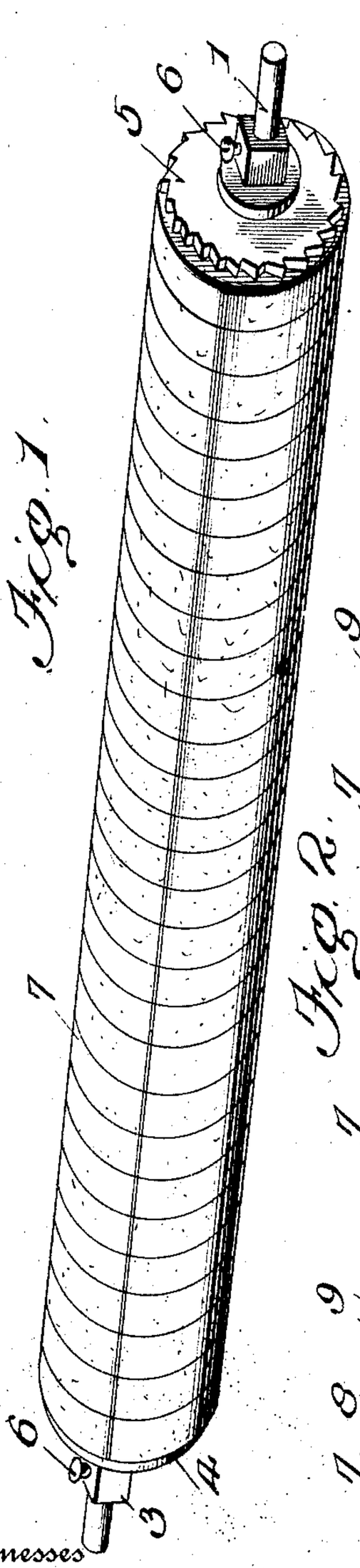

Fig. 2.

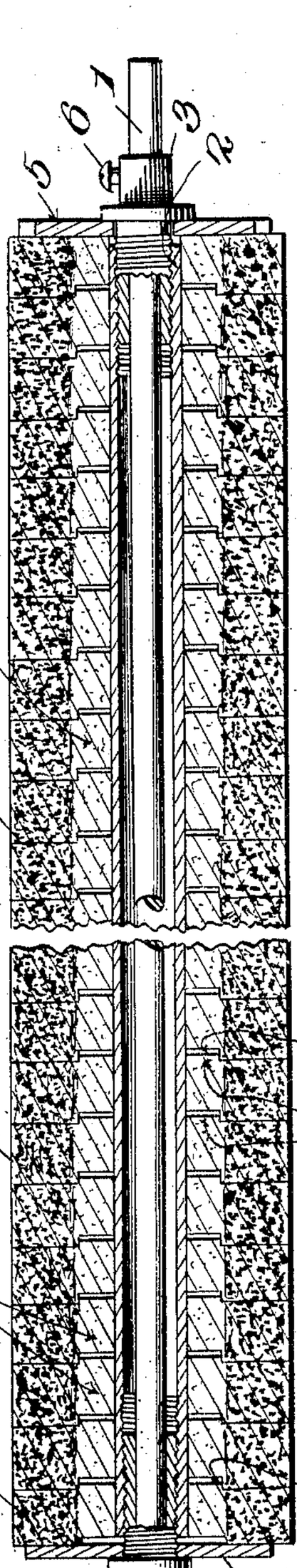

Fig. 5.

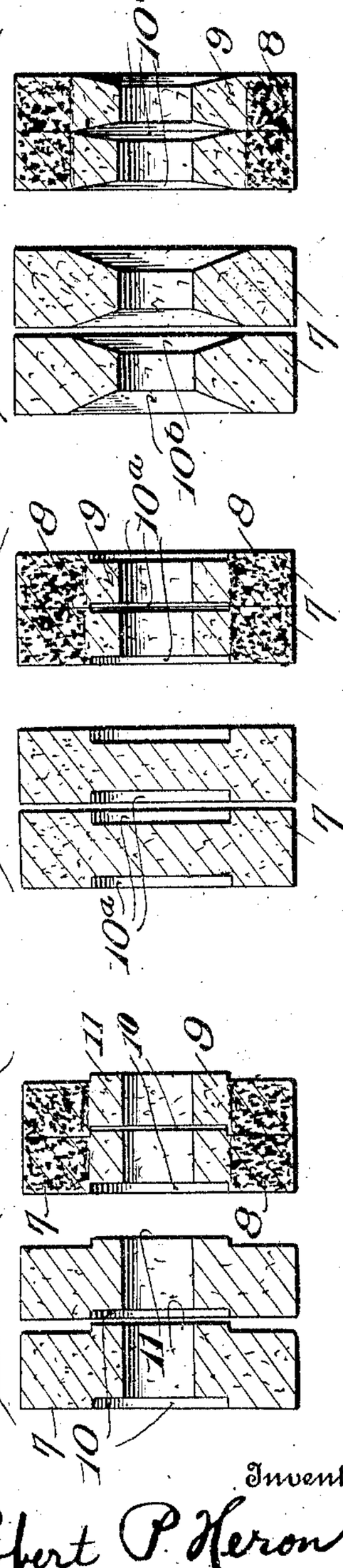

Fig. 4.

Fig. 3.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

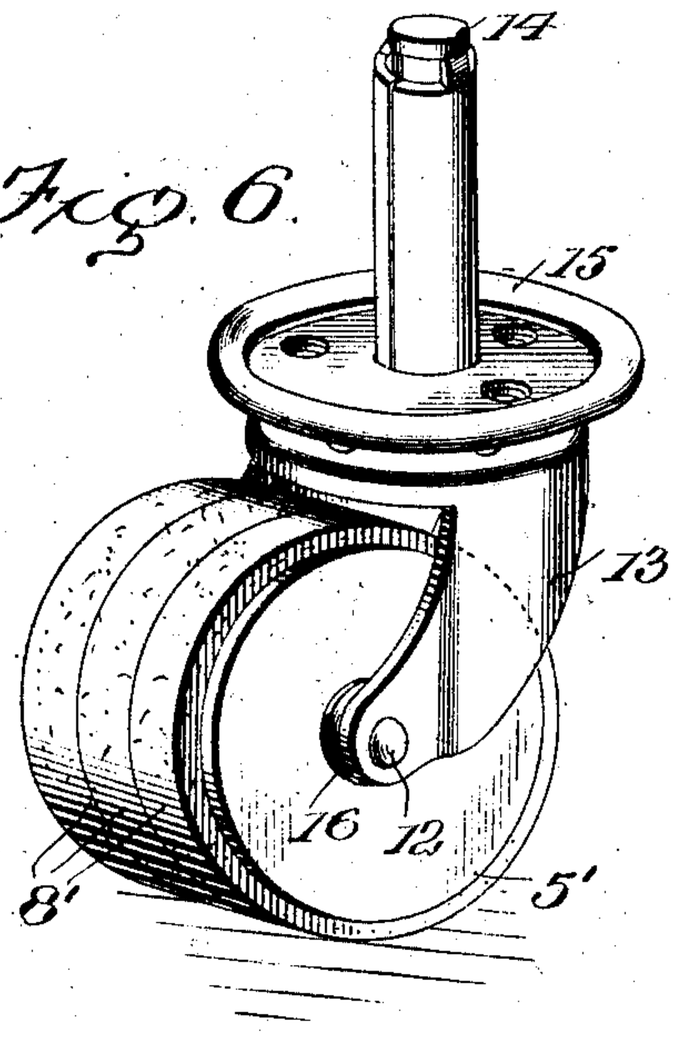


Fig. 7.

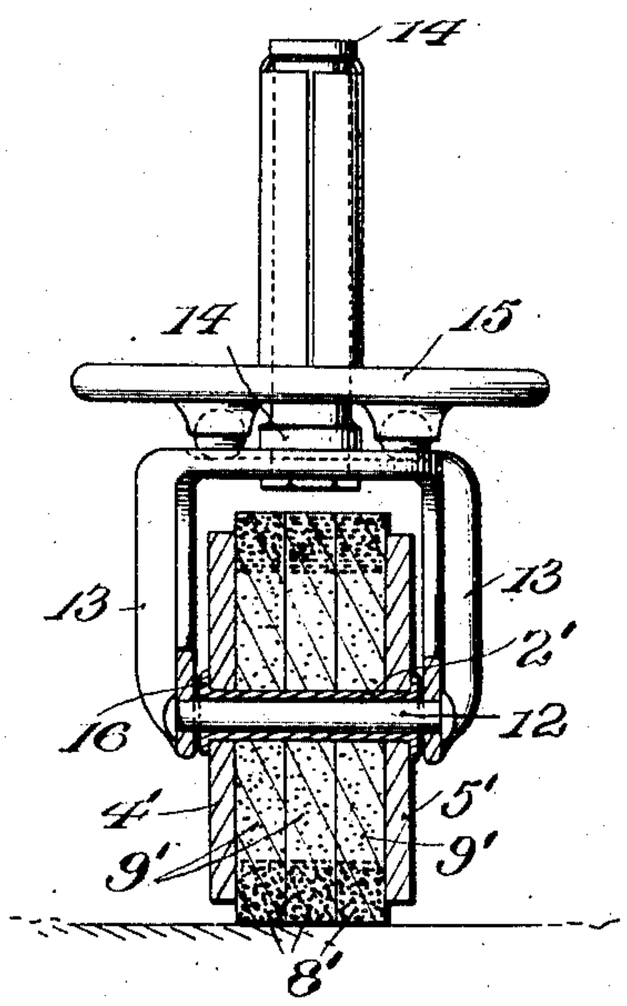
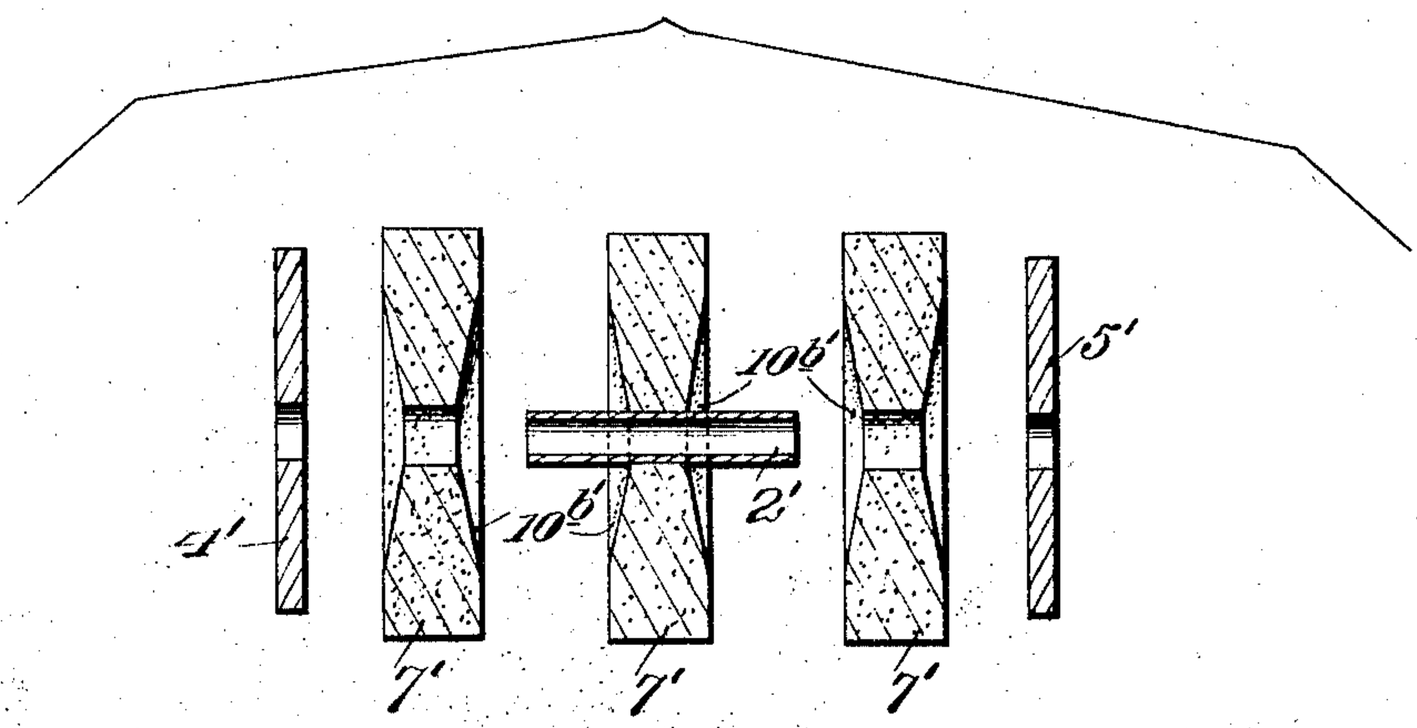


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT P. HERON, OF SYRACUSE, NEW YORK.

TYPE-WRITER PLATEN AND OTHER ROLLER.

998,510 Specification of Letters Patent. **Patented July 18, 1911.**

Application filed October 2, 1909. Serial No. 520,602.

To all whom it may concern:

Be it known that I, ROBERT P. HERON, a citizen of the United States, and a resident of Syracuse, county of Onondaga, State of New York, and formerly a resident of Dolgeville, New York, have invented certain new and useful Improvements in Type Writer Platens and other Rollers, of which the following is a specification.

My invention relates to typewriter platens, to casters and to other rollers in which the characteristics secured by it are desirable.

In this application I have illustrated and described the invention as applied to a typewriter platen and to a caster, and it is in fact especially adapted to the said uses. Nevertheless, as above suggested, I do not wish to be understood as limiting myself solely to these embodiments of it.

In both the illustrated embodiments the roller consists of felt disks of special shape compressed together to form a surface of higher density than the backing. The degree of absolute density of surface and backing may vary widely as may also their relative density, according to the needs to be met and the characteristics and properties required in rollers designed for different uses. The two embodiments shown in the drawings illustrate this. Obviously the caster must be much more dense than the platen.

Following the order of illustration in the drawings I shall refer first to the platen and then to the caster it being understood that much of the specification is of general application.

As applied to typewriter platens my invention has for its object the provision of a roller for this purpose of unusual efficiency in other respects and having the pronounced advantage of being practically noiseless. In typewriter platens, it is necessary to have a smooth surface sufficiently hard to insure the proper rebound of the type bars and to avoid permanent indentation by the type. To secure these results, platens are commonly made with a hollow wooden cylinder coated with rubber. This insures a high degree of elasticity, too much indeed, but is a very noisy construction. The desirability of a noiseless typewriter has long been recognized and many unsuccessful efforts have been made to produce such a machine. It is a well known fact that the chief source of noise in typewriters is the violent striking of the type upon the platen. This source of noise is almost wholly removed by my platen, which as will readily be understood, can be applied to any typewriter.

The body of my roller is composed of felt or similar material so arranged that it has a surface under a greater degree of compression and consequently of greater density than the portion of the material within the said surface, which I term the backing. The roller as shown is made of a plurality of felt disks, the fibers of which, run toward and from the periphery of the roller so that the disks have greater resisting power and so that in a platen the type strike upon the ends of the said fibers. These disks are provided on one or both sides with cut out portions or depressions, the depth, extent and shape of which, may be varied but which serve to permit the outer portions of the disks to be more highly compressed than the inner portions so that a surface, whose depth and density can be varied, as may be found desirable, is produced. In a platen this outer portion forms what I term a striking surface which has the requisite hardness and elasticity. The felt I employ is unsized and is of considerable hardness even before compression, sized felt being objectionable, if not wholly inadmissible in a platen, among other reasons, since the dry sizing is forced out as dust by the sharp impact of the type, and being furthermore harsh and likely to scratch the floor and to deteriorate when subjected to moisture, when used as a caster.

In rollers formed of disks of compressible material it is difficult to secure a smooth dense surface, but by the use of my invention this may be readily accomplished and a surface may even be secured of the exceedingly high density necessary in rollers whose function is to support weight without suffering deformation, the backing being sufficiently dense to support the surface properly.

My invention consists in a roller, the preferable embodiments of which are illustrated and described herein, whether designed to sustain the impact of type-bars, to endure pressure, to uphold weight, or for other purposes within the scope of the claims.

Referring to the drawings, Figure 1 is a perspective view of a typewriter platen embodying my invention. Fig. 2 is a longitu-

dinal section of the platen broken away in the middle, the rod being shown in elevation. This figure illustrates interlocking disks. Figs. 3, 4 and 5 are sectional views of pairs of disks of different forms, but all embodying my invention, the pair of disks at the left of each figure being shown before compression, and the pair of disks at the right of each figure being shown substantially as they will appear after compression. It is to be understood, however, that in order to illustrate the difference in density of the different parts of the disks, an exaggerated space has been shown between adjacent disks. It will be apparent, however, that the depressions in the disks will be so proportioned and the pressure so regulated that the disks will in practice be in more or less intimate contact at all points of their contiguous surfaces or that there will be but a slight space between them near the center, this relation depending on the requirements to be met by a given roller. In a caster the backing is considerably compressed and no spaces remain. Fig. 6 is a perspective view of a caster embodying my invention. Fig. 7 is a cross-section showing the wheel in its compressed or finished state, and Fig. 8 is a similar view of the parts making up the caster wheel in their unassembled position before they have been subjected to compression.

Referring to Figs. 1–5 which illustrate the application of the invention to a typewriter platen, 1 is the usual platen rod. 2 is a tube thereon internally screw-threaded at its ends to coöperate with the externally screw-threaded bushings 3, 3, which bear against the end plates 4 and 5 of which the latter is the usual ratchet plate. These bushings are held in position on the rod by set screws 6. 7 are the disks, preferably of felt, which are assembled on the tube 2 and without being moistened are then compressed against one of the end plates by means of the other end plate, which is applied with the corresponding bushing after the disks are assembled and is made to compress them on the turning of the bushing, which by co-action of its thread with the corresponding thread on the tube 2, forces the disks toward the plate at the other end. The bushings are squared so that a wrench may be applied to one or both of them and the disks compressed from one or both ends of the platen. After the disks have been suitably compressed, one of the end plates is removed and additional disks are placed on the tube and compressed as above described until the striking surface is of the desired density. The surface of the resulting cylinder is then ground down to the desired diameter and all inequalities removed, the covering presenting a homogeneous unitary structure with a hard smooth surface. As shown in Fig. 2, the tube, plates, and bushings are so related to each other that after the proper compression is secured, there is still space to permit further compression should this become desirable in the use of the platen.

While the above method is entirely practicable for the making of the platen, it is not sufficiently rapid for commercial purposes and where platens are to be turned out in quantity gives way to methods securing equally good results at greater speed. Well known machinery, such as power presses, and well known methods may be employed to compress at once to the required degree all the disks making up the finished platen. Lateral expansion may be prevented by any well known means as a press chamber or tube of suitable shape.

8 represents the striking surface and 9, the backing which is of less density than the striking surface. Different forms of disk may be employed. Three such forms are illustrated. Each of these three forms of disk, as shown respectively in Figs. 3, 4 and 5, is provided at one side with depressions 10, 10^a, 10^b, the depth, extent and shape of which may be varied.

In Figs. 2 and 3, the disks are shown as interlocking, each being provided with a projection 11 on the opposite side of the disk to that in which the depression 10 is located and corresponding in general with the said depression, but being of less height than the depth of the depression. The projections, while not interfering with the desired difference in density, provide a special backing for the striking surface and make the danger of a breaking through of the outer surface between adjacent disks more remote. This construction also aids in maintaining the disks in exact registry.

The form of disk shown in Fig. 4 is provided with a depression 10^a on each of its surfaces and this depression as shown is, like the depression and projection of the interlocking form of disk, right angular or disk shaped. This form makes it possible to secure a greater difference between the density of the striking surface and of the backing than does the interlocking form as ordinarily constructed.

Fig. 5 shows a form of disk on the order of that illustrated by Fig. 4 which is dished out on both sides. The depressions differ in shape and usually also in extent from those of the disk illustrated in the preceding figure. This form makes the transition from the striking surface to the backing very gradual and makes it possible to employ a striking surface of less depth. Of course, the dished portion might extend to the outer edge of the disks but this would not ordinarily be judicious since the striking surface might not be sufficiently strong.

All of these forms of disk make it possible to obtain a surface of greater density than the density of the material nearer the center of the roller, since the disks must be considerably compressed near their peripheries before their inner parts can be compressed at all.

For a platen the disks are conveniently and suitably about $\frac{5}{16}$ of an inch in thickness and are formed out of a single layer of felt so that the ends of the fibers are exposed to the type. This gives high resisting power against the blows of the type, which can not sink in objectionably or injure the platen. High density of the striking surface is also most important.

It will be understood of course that the size of the disks, their thickness, and the size and shape of their depressions depend upon the functions to be performed by the individual roller and are chosen to that end. The compression of the disks must be sufficient to make them practically unitary or homogeneous so that even the sharp point of the period if striking in the plane of contact of adjacent disks, cannot be forced between the two disks to puncture the paper and injure the platen. In practice, there is no difficulty in obtaining sufficient compression of the striking surface by the use of disks of the general nature above set forth.

The specification thus far while containing much that is of general applicability to various kinds of rollers has dealt more particularly with typewriter platens. At this point the application of my invention to casters will be taken up and briefly discussed, an effort being made to avoid needless repetition.

In casters there is a necessity for wheels which will support weight without deformation and which nevertheless will not injure the floors. A material which admirably fulfils the latter requirement is unsized felt, and when this is given the first requisite, that of power to resist deformation, a thoroughly satisfactory caster results. I have found that my construction already described is particularly suitable to casters and produces a caster which meets both requirements being sufficiently dense to retain its form while at the same time retaining the natural characteristics of felt which make it particularly suitable for use in a caster. In applying my construction to casters I make the surface more dense than the backing thus insuring a very hard surface of perfectly symmetrical and unvarying contour. I also compress the backing, although to a lesser degree than the surface, sufficiently to sustain the latter.

Referring to Figs. 6, 7 and 8, the caster wheel is rotatably mounted on the pin 12 in the jaws of the caster horn 13, to which is secured the pintle 14. A caster socket 15 is illustrated in Figs. 6 and 7. The caster wheel consists of the disks 7′ having before compression dished portions 10^{b}′, mounted on the sleeve or bushing 2′ and retained in position by the plates 4′ 5′ against the edges of holes in the center of which the ends of the sleeve 2′ are beaded over at 16. The more highly compressed surface or tread is designated by 8′ and the backing by 9′. The thickness and number of the disks may be varied, and all disks in a given wheel need not necessarily be of the same thickness. Their size and number will of course depend considerably on the size of the finished caster and on the work it is to perform. Casters designed to support heavier weights are ordinarily larger and may be denser. The disks need not be cylindrical but may vary in contour according to the contour desired for the roller.

In practice for a 1½ inch caster I have found it satisfactory to use disks having an aggregate peripheral thickness of about twice the width of the tread desired in the finished caster. This however is only suggestive and I am obviously not limited to any such ratio.

In Figs. 1 and 6 the edges of adjacent disks are shown for clearness, although in fact the meeting point of adjacent disks would hardly be observable. While disks of various forms, such for instance as those illustrated in Figs. 3 and 4, may be used, I prefer to use those illustrated in Fig. 5 and in Fig. 8. In Fig. 7 which shows the disks under compression I have indicated the difference in density of the surface and backing but have shown the disks without intermediate spaces which would not in fact exist in the finished caster, the disks being to some extent merged together.

The elements making up the caster wheel are shown unassembled in Fig. 8. They are assembled and compressed into the complete caster wheel in any suitable power press. During compression, as suggested in connection with the description of the method of making the typewriter platen, lateral expansion is suitably guarded against by the provision of a press chamber of the proper shape having unyielding walls, and any tendency of the end plates to embed themselves in the end disks may be prevented by providing each end of the press chamber with an annular ring surrounding the end plate and terminating in the plane of its inner face or preferably in a bevel beyond said face toward the disks. While a caster wheel made with screw-threaded bushings like the type-writer platens shown in Figs. 1 and 2, could be made by the manual process described earlier in the specification, it is obvious that the construction illustrated in Figs. 6–8 is neater and more compact, and that the well known method just referred to

is better adapted to making casters, not only because of the increase in speed it gives, but because a higher density is more readily and certainly secured. As in the case of the platen I do not find it necessary to use water, sizing or any other liquid but prefer to compress the disks while dry. After the wheel has been formed in this manner it is a thoroughly good caster and may be used without finishing, but its rather rough and unfinished appearance is unattractive to the eye. It is therefore treated by any of the methods commonly employed for treating raw felt surfaces and raw surfaces of other compressible materials so as to eliminate any inequalities, insure perfect uniformity in the contour of the wheel, and improve its appearance.

Having described the nature and objects of the invention, what I claim as new and desire to secure by Letters Patent is:—

1. A roller comprising a covering constituting a surface and a backing, said covering being of the same material and substantially the same structure throughout and having its surface of greater density than the backing.

2. A roller comprising a support, and a compressible covering thereon, said covering presenting continuous material from the support to the periphery of the roller, and consisting of two portions of different densities, a backing extending from the support outward, and a surface of greater density than the backing.

3. A roller comprising contacting disks, each forming by continuous material a part of the surface and the backing, the surface and the backing being both under compression, and the surface being of greater density than the backing.

4. A roller comprising a covering of compressible material having contacting faces and constituting a surface and a backing, the backing having a part of one of the contacting faces cut away, and means for compressing the covering whereby the surface is made more dense than the backing.

5. A roller comprising a support, a covering therefor of felt compressed and forming a compressed backing and a compressed annular portion surrounding it, said felt extending continuously from the backing into the surrounding annular portion and said annular portion being more highly compressed than said backing.

6. A roller comprising a support and a covering of compressed felt disks forming a compressed backing and a compressed annular portion surrounding it, said felt extending continuously from the backing into said annular portion and said annular portion being more highly compressed than said backing.

7. In a roller a series of disks forming a part of both the surface and the backing, said disks having depressions in their contacting faces extending from the midst of the face to one of the edges thereof, and means for compressing said disks in the direction of the length of the roller and for retaining them under compression, whereby the surface and the backing are retained under different degrees of compression.

8. A roller comprising felt disks having projections surrounding their centers on one face and on the other corresponding depressions of greater depth than the height of the projections, each depression coacting with the projection on the adjacent disk, and means for compressing the disks, whereby they are rendered more dense near the periphery than near the center.

9. A roller comprising a plurality of contacting disks of compressible material having axial holes and having a portion of the face surrounding said holes and extending outward therefrom cut away, and means for compressing the disks together and for retaining them under compression.

10. A roller comprising a support, a felt covering thereon having parts cut away at and continuously outward from its center and made up of a plurality of contacting circular pieces of felt compressed together, whereby the roller is rendered more dense at and near its periphery than anywhere else, and plates for retaining the covering in place.

11. A roller, comprising contacting felt disks having depressions in one face surrounding the center and extending outward therefrom, and means for compressing said disks together.

12. A roller comprising disks under compression constituting a surface and a backing therefor, the surface being of greater density than the backing and the latter being of substantially uniform density.

13. In a roller, a disk having a depression in one side thereof and a corresponding projection on the other side thereof of less height than the depth of the depression.

14. In a roller, a support, felt disks thereon having depressions in one face surrounding the center and extending outward therefrom, said disks being compressed together, and retaining plates therefor.

15. A roller comprising a support, a compressible covering thereon constituting a surface and a backing therefor and presenting continuous material from the support to the periphery, the backing having contacting edges cut away to the support, plates near the ends of said support, and means for altering the position of the plates to compress the surface and the backing to different degrees.

16. A roller comprising a compressible covering, a support therefor, plates near the

ends thereof and means for forcing the plates toward each other to compress the covering, said covering when under the highest compression desirable in use extending beyond the ends of the support to permit further compression.

17. A roller comprising felt disks, a support therefor comprising a tube, plates near the ends of said tube, bushings co-acting with said tube to force said plates toward each other, said parts being so proportioned and related that when the disks are under compression there remains a space between the ends of the tube and the plates to permit further compression.

18. A typewriter platen comprising a support, felt disks on said support having parts of their faces surrounding the center cut away at and continuously outward therefrom, said disks being compressed to form a covering, a plate at each end of the platen one of said plates being a ratchet plate and both serving to retain the disks in place.

19. A typewriter platen comprising a rod, a supporting tube thereon, a covering of compressible material on said tube constituting a striking surface and a backing therefor, said covering being of the same material and substantially the same structure throughout, and the striking surface being of greater density than the backing, and plates on the supporting tube, one of said plates being a ratchet plate, to retain the covering in place.

Signed by me at Syracuse, N. Y. this 20th day of September 1909.

ROBERT P. HERON.

Witnesses:
RAE KAPLAN,
FRANK R. LENNOX.