

(No Model.)

3 Sheets—Sheet 1.

W. T. SYKES.
RING DOFFER FOR CARDING MACHINES.

No. 508,065.

Patented Nov. 7, 1893.

FIG:1

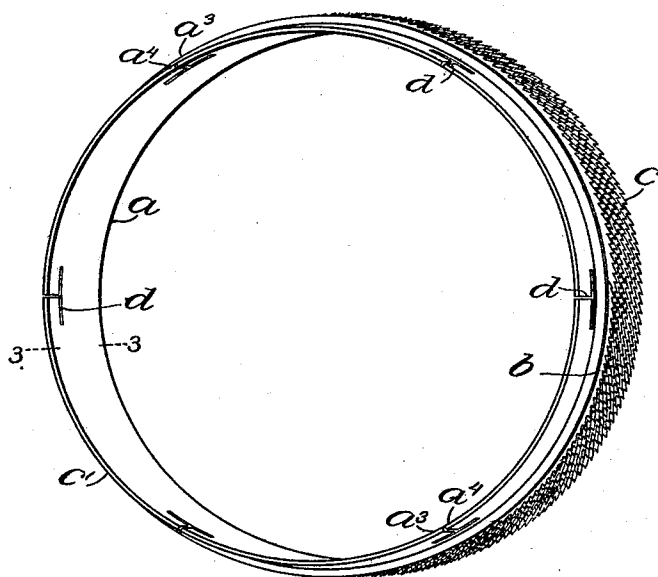


FIG:2

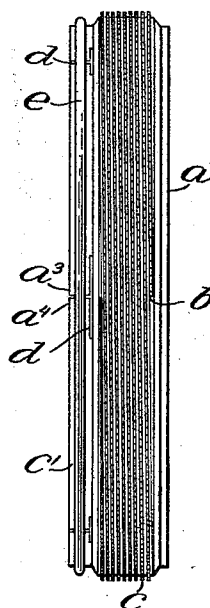


FIG:4

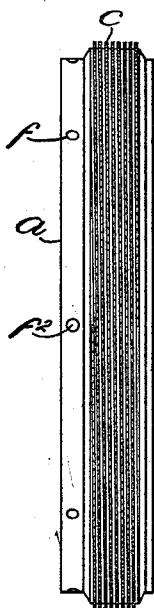


FIG:3

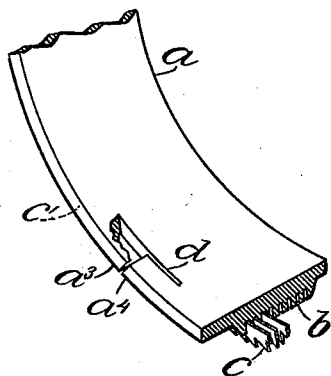
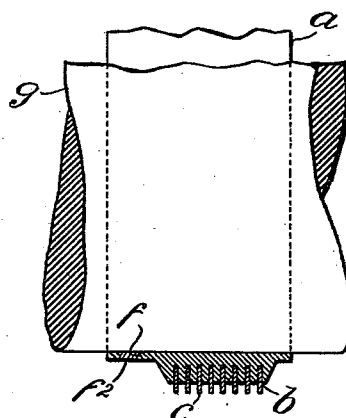


FIG:5



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Richard C. Maxwell.

INVENTOR:
Walter Thomas Sykes,
BY J. Walter Douglass.
ATT'Y.

(No Model.)

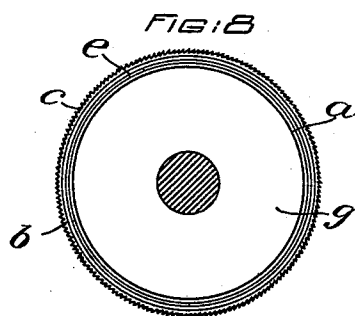
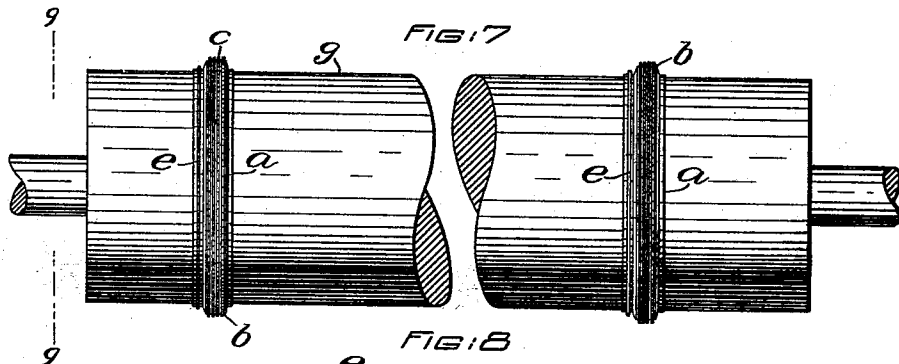
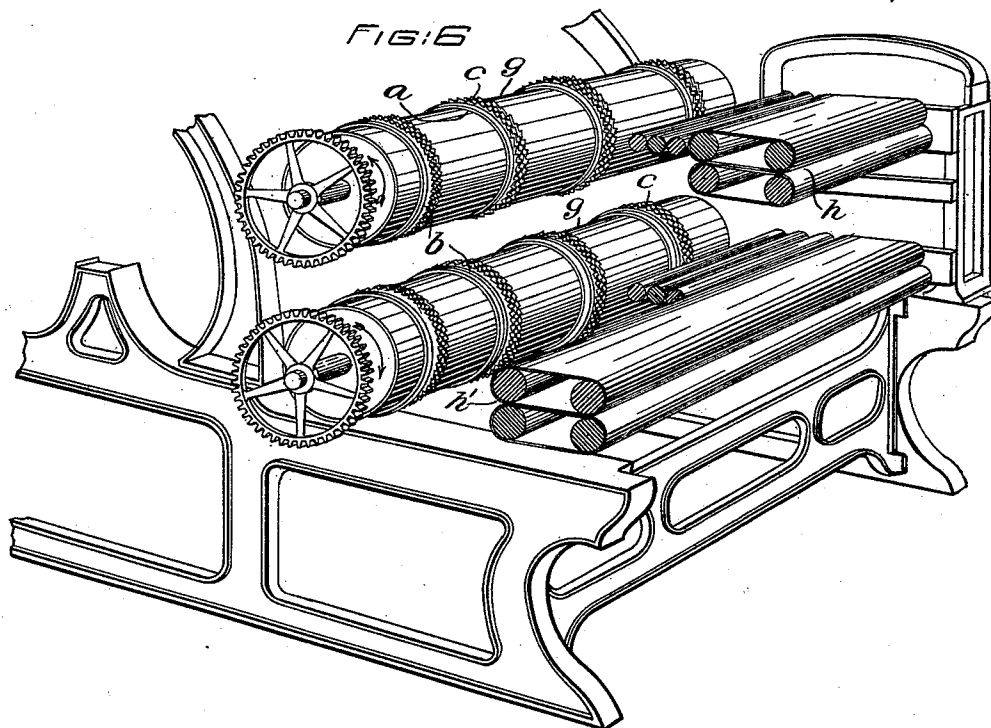
3 Sheets—Sheet 2.

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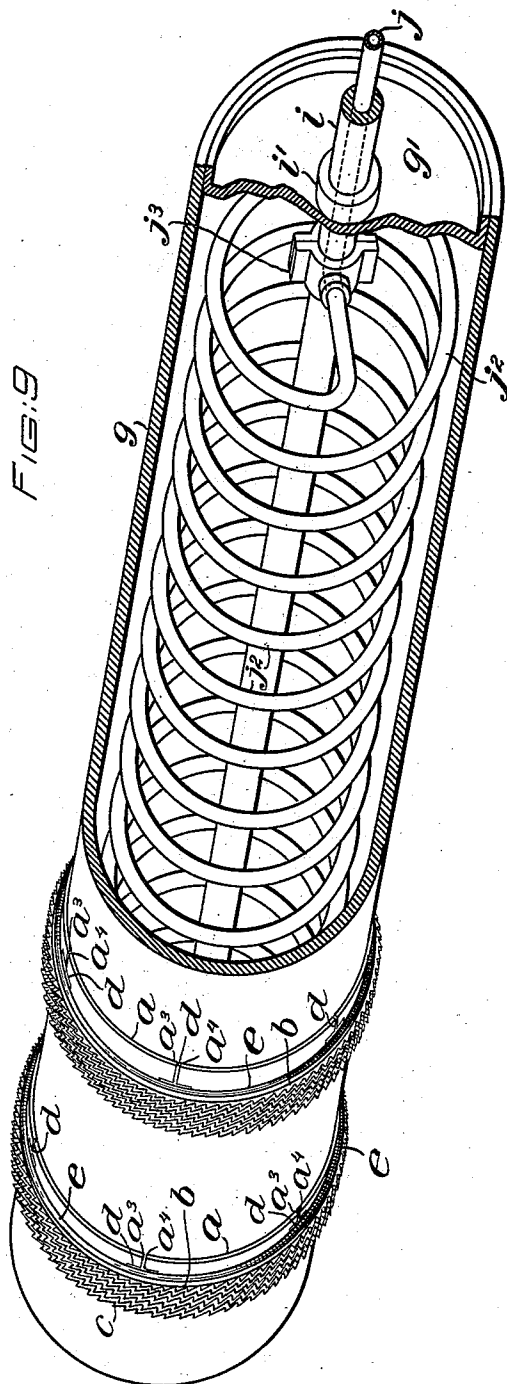
(No Model.)

3 Sheets—Sheet 3.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

WALTER THOMAS SYKES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE PHILADELPHIA TEXTILE MACHINERY COMPANY, OF SAME PLACE.

RING-DOFFER FOR CARDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 508,065, dated November 7, 1893.

Application filed May 17, 1893. Serial No. 474,508. (No model.)

To all whom it may concern:

Be it known that I, WALTER THOMAS SYKES, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ring-Doffers for Carding-Machines, of which the following is a specification.

My invention has relation to carding engines or machines; and it relates more particularly to the construction and arrangement of the doffer-rolls thereof.

Heretofore doffer-rolls have been provided with detachable rings formed of leather or like material provided with wires disposed at an angle to the surface thereof and the rings mounted on the roll at suitable distances apart. These rings have been formed by inserting wire staples into the leather or like material from the back and so as to project at an angle from the face thereof, but the main objections to such leather rings provided with projecting wire clothing have been that they required constant stripping for removal of accumulating extraneous matter around or about the same, which not only tended to disorganize the normal or operative positions of the wires for effective action, but also rendered it necessary to remove the doffer-rolls from the machine and to replace the same with other leather rings provided with wire clothing. Moreover, such rings only imperfectly straightened or combed out the fleece or fibrous material in its passage from the cylinder for treatment by the doffer-rolls preparatory to further treatment by rub-rolls and its delivery from the condenser or finisher card for spinning. Again such bands provided with wire clothing and fastened or tacked to the surface of the roll of wood or similar material have been found to present further objections, that of the constant tendency aside from clogging of the spaces around about them to warp and stretch and of the wires to break away along unprotected portions of the bands, thereby necessitating stopping of the machine for repairs to the leather rings or replacement of them by other bands with wire clothing.

The principal objects of my invention are first to provide a simple, durable, compara-

tively inexpensive and efficient doffer-roll or cylinder, comprising a series of detachable metallic rings applied thereto and each provided with spiral grooves into which are inserted strips or fillets of metal having saw teeth arranged along one edge thereof and the strips or fillets inserted and secured in the series of spiral grooves of each of the rings with the exposed saw-toothed edge of each arranged so that the teeth of each of the strips or fillets of the series occupy a staggered position with respect to the others and each of the rings detachably applied to the roll or cylinder provided with means for securing the same to position thereon, in order that the character of work in the use of such doffer-rolls or cylinders in a carding engine or machine may be appreciably enhanced and superior fleece or fibrous material thereby obtained for spinning; second, to provide a doffer-roll or cylinder, comprising a series of saw-toothed metal rings detachably secured to position on the roll or cylinder and consisting of bands or fillets of metal inserted into spiral grooves of each of the rings and the respective teeth of each of the fillets or bands of metal comprising the rings occupying staggered positions with respect to each other and calked to position in the spiral grooves of the rings detachably applied to the roll or cylinder; third, to provide a doffer-roll or cylinder with detachable saw-toothed rings and with means for clamping the same to position on the roll or cylinder at suitable distances apart along the periphery thereof, the construction and arrangement being such as that the fibrous material treated thereby is effectually and uniformly straightened or combed out preparatory to the delivery of the same to rub-rolls or aprons for further treatment; fourth, to provide a doffer-roll or cylinder for a condenser or finisher carding engine or machine having a series of detachable saw-toothed metal rings mounted thereon and each composed of a series of staggered exposed saw-toothed metal strips or fillets closely arranged and secured in the grooves of said rings and the rings provided with means for readily detaching the same from the cylinder; the construction and arrangement being such as to permit material

issuing from the carding cylinder to be taken up by the staggered teeth of said rings and thoroughly combed or straightened out in threads or courses and with extraneous matter that may be contained therein removed anterior to the delivery of the fibrous material as sliver to rub-rolls or aprons for transforming or converting the same into roving preparatory to the spinning thereof.

10 My invention consists of a doffer-roll or cylinder provided with staggered saw-toothed metal rings arranged at suitable distances apart thereon, and means for clamping the rims of said rings to the roll or cylinder.

15 My invention further consists of a doffer-roll or cylinder for a carding engine or machine, comprising a series of saw-toothed metal rings arranged at suitable distances apart along the periphery of the roll or cylinder and each of the rings provided with means for detachably supporting the same to position on the roll or cylinder.

20 My invention further consists of a doffer-roll for a carding machine, comprising a cylinder, means for heating the same, detachable saw-toothed metal rings arranged at suitable distances apart on the cylinder, and means for clamping the rings to position thereon.

30 My invention further consists of a doffer-roll provided at suitable distances apart with detachable rings having saw-toothed metal strips or fillets set into spiral grooves formed in the rings and the respective teeth of each of the rings arranged so as to occupy staggered positions with respect to each other, and means for clamping the rings to position on said roll or cylinder.

35 My invention further consists of a doffer-roll for a condenser or finisher carding engine or machine provided with a series of detachable saw-toothed metal rings and means for clamping the same to position on the roll; and my invention further consists of the improvements in doffer-rolls hereinafter described and claimed.

40 The nature and characteristic features of my invention will be more fully understood from the following description taken in connection with the accompanying drawings, forming part hereof, and in which—

45 Figure 1, is a perspective view of a saw-toothed metal ring embodying the features of my invention and having formed integral therewith a recessed tapering and slotted rim or band adapted for the reception of a wire ring for firmly clamping the saw-toothed metal ring to position on a cylinder or roll. Fig. 2, is a front elevational view of the same, showing the clamping device secured to position thereon. Fig. 3, is a perspective view of a section of the ring on the line 3—3, of Fig. 1, showing one of the slots in the rim or band formed integral with the toothed metal doffer-ring. Fig. 4, is a front elevational view of the toothed metal doffer ring, showing the recessed integral rim or band of the same pro-

vided with openings for running solder or similar material into the same for firmly securing the rim or band to position in contact with the cylinder or roll. Fig. 5, is a view partly in section and partly in elevation of a section of the cylinder with a section of the ring shown in application thereto and showing solder or similar material inserted in the apertures disposed at suitable distances apart along the rim or band thereof for holding the ring to position in contact with the cylinder. Fig. 6, is a perspective view, showing so much of a condenser or finisher carding machine rub-roll or apron mechanism as will serve to illustrate the application of my improved doffer-rolls thereto. Fig. 7, is an elevational view partly in broken section of the roll or cylinder showing two of such rings as embody the features of my invention in application thereto with the clamping means in engagement with the integral recessed or slotted rims or bands thereof, illustrating thereby one means of clamping the rings to position on the roll or cylinder. Fig. 8, is a transverse section on the line 9—9, of Fig. 8, showing a toothed strip or fillet of metal mounted in one of the grooves of the doffer-ring detachably secured to the cylinder; and Fig. 9, is a perspective view of a doffer-roll, comprising a hollow cylinder with a steam or heating coil mounted therein and provided with detachable metal saw-toothed rings arranged at suitable distances apart along the periphery thereof, for enabling moist or damp fibrous material to be worked thereby in order to enhance the quality or character of the resultant fibrous product.

Referring to the drawings *a*, is a metal ring provided with grooves *b*, arranged in parallel courses and into which grooves are inserted the metal strips or fillets *c*, having saw teeth arranged along one edge thereof and in their engagement with the grooves of the rings so arranged as to occupy staggered positions with respect to each other. The ring *a*, in Figs. 1, 2 and 3, is provided with an integral recessed and tapering rim or band *c'*, provided with transverse *T* or other shaped slots *d*, at suitable distances apart around the periphery and extending through the body thereof.

e, is a band of wire or similar material for insertion into the rim or band *c'*, and serving as one means for clamping the saw-toothed rings to position on the cylinder *g*. The saw-toothed metal strips or fillets *c*, inserted into the grooves *b*, of each ring *a*, are suitably calked or otherwise secured to position so as to become an integral part of the ring, and in such manner as to effect a thorough combing or straightening out of fleece or fibrous material in the rotation of each ring mounted on the roll or cylinder *g*.

In Fig. 4, the recessed rim or band formed integral with the saw-toothed ring *a* is provided with openings *f*, for the reception of solder or similar material *f'*, as shown in Fig.

5, for maintaining the said ring firmly to position on the roll or cylinder *g*. The upper portion of the T-shaped slots formed in the band of the saw-toothed rings *a*, as shown in Figs. 1, 2 and 3, is slightly tapered from each end to the middle thereof, in order to enhance its clamping effect in connection with the cylinder upon the application of the wire *e*, to the surface of the rim or band, by reason of the fact that as the wire is drawn closer to the inner edge of the same, the metal at the points *a*³ and *a*⁴, of the band, is brought more intimately into contact with the surface of the roll, thereby increasing the biting effect of the same thereto and more firmly clamping the ring to position thereon.

In Fig. 6, are shown doffer-rolls constructed according to my invention in application to so much of a condenser or finisher carding engine or machine as will serve to illustrate their positions therein, the arrows indicating the direction of rotation of the upper and lower doffer rolls employed in such a machine. *h* and *h'*, are rub-aprons in broken section adapted to form fibrous material into sliver; threads or skeins after passage around and treatment by the upper and lower doffer rolls as illustrated in Fig. 6.

In Fig. 9 is illustrated a hollow-cylinder provided with end journals *i*, having collars *i'*, mounted thereon and abutting against the ends or heads *g'*, at the respective ends of the cylinder *g*. *j*, is a pipe extending through the journals *i*, and formed into coils *j*², in the interior of the cylinder *g*, for the passage therethrough of steam or other heating medium, in order to warm the surface of the cylinder carrying the series of detachable metal saw-toothed doffer-rings. The end of the coiled pipe *j*², is connected with the pipe *j*, of the journal *i*, by means of a two-part coupling device *j*³, or in any other preferred manner and the extremity of the pipe *i*, is coupled to a heat supply, not shown, but which will be readily understood, whereby under due regulation the surface of the cylinder is maintained in a more or less heated condition for purposes to be hereinafter fully explained.

In some instances the fibrous material to undergo treatment requires a mild heat to successfully work and give as a resultant product by such treatment of the doffer-rolls, a superior sliver for subsequent use. Moreover, the coarse or more common fibrous materials, such as used in the making of a low grade of carpet fabrics, required to be treated by such machines as hereinbefore described, are at certain seasons presented thereto for being worked in a more or less moist or wet state, and in such condition it is very difficult to satisfactorily work the same, and hence considerable waste even with undue care exercised, will accumulate. Practice has also demonstrated that such fibrous materials as require treatment in carding engines or machines, are affected by changes of temperature, and in such manner as to cause the ma-

terial to become rampant or wild, and it is a source of considerable trouble at times to properly manipulate or handle the same so as to secure uniformity or regularity in the delivery from the carding cylinder to the doffer-rolls or cylinders. In the employment of doffer-rolls such as hitherto employed with leather bands having staples inserted there- through to form teeth projecting from the face thereof, in the introduction of heat into the interior of the cylinder, it has been found in attempts made in that direction, that such deleteriously affects the leather, that is, causes the same to warp, as well as destroys the position and efficiency of the staples forming the clothing thereof. Moreover, the warping of the leather band has superinduced undue clogging of extraneous matter around and about the staples and to overcome which has been a desideratum for a long time and a dilemma which has been regarded as insurmountable, because means have not proven in the past to be at hand to overcome successfully the same or accomplish the desired results, until a doffer-roll or cylinder constructed according to my invention was designed, and practice has fully demonstrated, that the above mentioned objectionable features are entirely overcome, whereby such materials as hereinbefore described can be treated with the employment of such doffer-rolls or cylinders under any and all conditions or changes of temperature with a resultant superior product by such treatment and with thereby a great saving of waste made. Moreover, with a saving of time and labor of stopping the machine to strip the doffer-rings of the rolls or cylinders, because such rings are self strippers in this respect, that the fibrous material by reason of the arrangement of the teeth in staggered position in close spiral courses, will not adhere thereto, and after a long interval of time in the treatment of the material and stopping of the machine, it will be observed that the series of teeth in courses of the rings due to the manner of arranging the same as hereinbefore described and securing them to the rings comprising the doffer rolls or cylinders, are maintained entirely free from any matter whatsoever, which is a result not heretofore regarded as possible or obtainable.

Among the advantageous features incident to the use of a doffer-roll or cylinder such as hereinbefore described, may be mentioned, first, that the fleece or fibrous material treated thereby is thoroughly combed or straightened out and stripped of extraneous matter before being presented to the rub-rolls or aprons for forming the same into sliver; second, by reason of the arrangement of the saw-toothed fillets or strips securely in the groups of grooves of the series of rings detachably applied to the roll or cylinder *g*, and with the respective teeth thereof occupying staggered positions with respect to each other, are due the superior results obtained of the thorough

combing out of the material undergoing treatment thereby and the utter lack of adherence of extraneous matter thereto, because practice has demonstrated that they do not become clogged with such matter or with the fleece or fibrous material undergoing treatment, and hence stopping of the machine is entirely avoided and the fleece or fibrous material combed or straightened out into parallel threads or courses thereby, is appreciably enhanced and commands a higher figure as an article; third, greater uniformity in the working of the material is effected and a far better resultant product by the treatment is obtained; and, fourth, owing to the solid character of the saw-toothed rings there is an entire absence of any tendency of the same to warp or to work loose on the roll or cylinder; and moreover, these doffer-rolls or cylinders can be set closer to the carding cylinder, thereby insuring more perfect clearance for the stock or other matter delivered therefrom and thus to enable the carding cylinder to present a superior quality or character of material for the complete or thorough straightening, combing out or cleaning by the doffer rolls and anterior to the presentation of the same to the rub-rolls or aprons for transforming the fibrous or fleecy material into sliver preparatory to the spinning thereof for subsequent uses in the arts.

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

1. In a carding machine, a roll or cylinder, rings arranged on said roll or cylinder with intervening spaces between the rings, saw-toothed metal strips arranged in the body of the rings and means for securing the rings to said roll or cylinder, substantially as and for the purpose set forth.

2. In a carding machine, a smooth surfaced roll or cylinder, rings with recessed rims applied to said roll or cylinder with intervening spaces between the rings, saw-toothed metal strips arranged in the body of said rings, and means for securing said rings to said roll or cylinder, substantially as and for the purposes set forth.

3. In a carding machine, a roll or cylinder, a saw-toothed metal ring having an integral

recessed and slotted rim, and means for clamping said rim to said roll or cylinder, substantially as and for the purposes set forth.

4. In a carding-machine, a doffer-roll comprising a cylinder provided with a detachable saw toothed metal ring having the teeth thereof arranged in parallel courses and occupying staggered positions with respect to each other and with a slotted band and wire-ring for clamping the band to the cylinder and holding said ring to position, substantially as and for the purposes set forth.

5. In a carding-machine, a doffer-roll comprising a cylinder provided with detachable rings having grooves formed in parallel courses therein and with metal saw toothed strips or fillets occupying staggered positions with respect to each other and said rings provided with recessed integral bands with openings therein, and means for securing the same to position on the cylinder, substantially as and for the purposes set forth.

6. In a carding-machine, a doffer-roll comprising a cylinder, detachable saw toothed metal rings mounted thereon and provided with recessed bands having transverse slots formed therein and means for detachably clamping said bands to position on said cylinder, substantially as and for the purposes set forth.

7. In a carding machine, a doffer-roll comprising a cylinder, means for heating the same, saw-toothed bands or rings mounted at suitable distances apart on said cylinder, and means for clamping said bands to position thereon, substantially as and for the purposes set forth.

8. In a carding-machine, a doffer-roll provided with detachable saw toothed metal rings having teeth arranged in parallel courses and in staggered positions and a recessed and slotted band provided with a detachable wire ring, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

WALTER THOMAS SYKES.

Witnesses:

THOMAS M. SMITH,
RICHARD C. MAXWELL.