

No. 687,281.

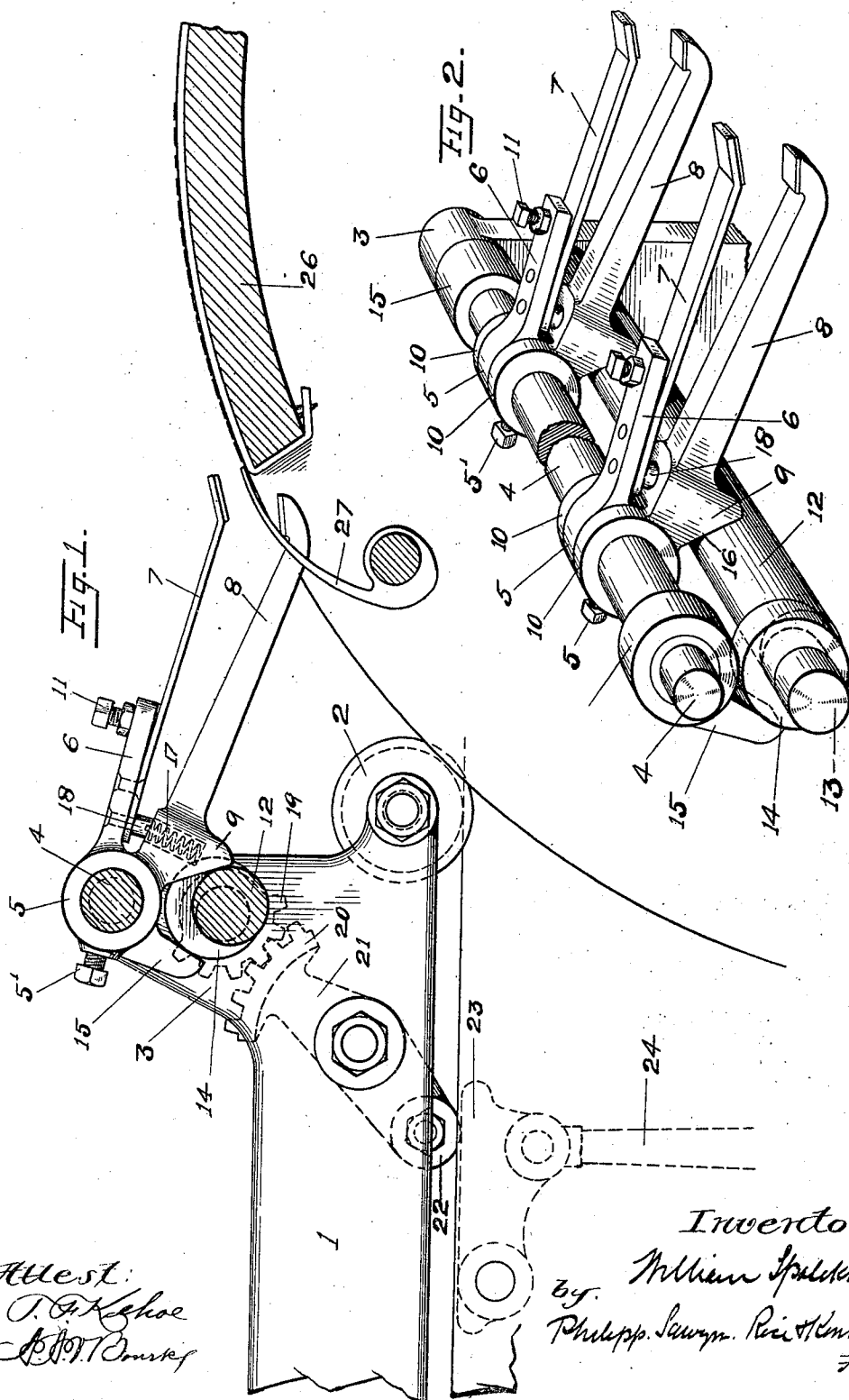
Patented Nov. 26, 1901.

W. SPALCKHAVER.
GRIPPER MECHANISM.

(Application filed Mar. 28, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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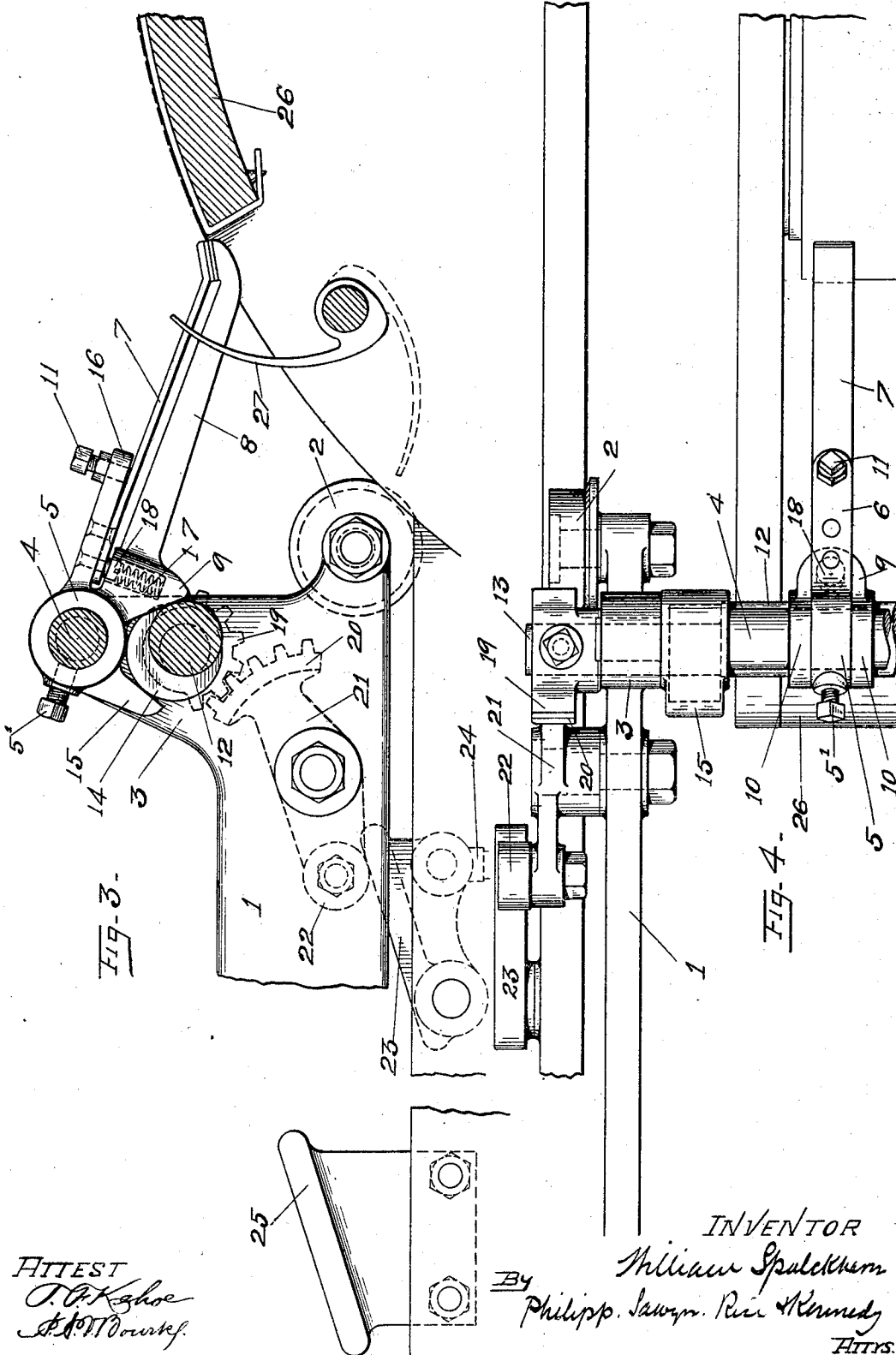
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UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT
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GRIPPER MECHANISM.

SPECIFICATION forming part of Letters Patent No. 687,281, dated November 26, 1901.

Application filed March 28, 1901. Serial No. 53,172. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SPALCKHAVER, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Gripper Mechanisms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to certain improvements in gripper mechanisms.

Gripper mechanisms as now ordinarily constructed, reference being had more particularly to the gripper mechanisms employed in printing-machines, consist of a stationary jaw or jaws with which coöperate a plurality of movable jaws. The movable jaws are usually fixedly mounted on a shaft which is rotated by means of a spring or springs, so that the jaws are closed by spring action. This construction is objectionable for the reason that if it is desired to give the gripper-jaws a firm hold upon the paper it is necessary to employ very strong springs. In opening the grippers it is of course necessary to operate against the force of these springs, the power being usually obtained through the medium of a suitable cam and coöperating devices—such, for instance, as a pin carried on an arm attached to the gripper-shaft. When powerful springs are employed, however, the resulting friction between the parts of the opening mechanism is so great as to cause excessive wear either in the cams or pins, or both, necessitating frequent renewal of the parts. Furthermore, when, as is usual, the movable member of the grippers consists of a series of fingers or jaws mounted on a shaft which is rotated by a spring or springs to close the grippers it is necessary that the operating-faces of the jaws be in perfect alinement, for if this is not the case some of the jaws will reach their closed position before others and, acting as stops, will prevent a further rotation of the shaft, and therefore keep the remaining jaws from closing. To set a series of movable jaws, however, so that their operating-faces are in perfect alinement requires very careful work and a considerable expenditure of time. Again, it is frequently desirable to adjust the jaws of the gripper mechanism

lengthwise on their supporting-shaft to provide for varying width of sheets or for other reasons. When, however, grippers of the character referred to are thus adjusted, the alinement is disturbed. Any adjustment of the grippers, therefore, requires careful workmanship and considerable time, for the reasons before stated.

It is one of the objects of this invention to produce a gripper mechanism in which both jaws of the gripper shall be positively actuated, as distinguished from spring actuation, hereinbefore referred to.

A further object of the invention is to produce a gripper mechanism which can be readily set and adjusted.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then more specifically pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a side elevation, partly in section, illustrating a gripper mechanism constructed in accordance with the invention, the gripper-jaws being shown open. Fig. 2 is a perspective view illustrating said gripper mechanism, the shafts being shown as broken in two. Fig. 3 is a view similar to Fig. 1, but showing the gripper-jaws in their closed position; and Fig. 4 is a plan view of the construction shown in Figs. 1 and 3.

Referring to the drawings, which illustrate one embodiment of the invention, the gripper mechanism which has been selected to illustrate the invention is that of an ordinary front-delivery mechanism. A portion of the reciprocating carriage of such a mechanism is indicated at 1, said carriage being mounted on truck-rolls 2 or in any other suitable manner. The carriage is shown as formed to provide uprights 3, in which is mounted a gripper-shaft 4, said shaft being journaled in bearings of any suitable description in the uprights 3.

The construction of the gripper mechanism may be varied within wide limits. Preferably, however, a plurality of grippers will be

employed, and each gripper will comprise a movable jaw and a cooperating abutment, which will also, preferably, be a movable jaw. In the drawings two pairs of jaws are shown; but it will be understood that as many pairs may be employed as are necessary or desirable. While the jaws which constitute each gripper may be of any suitable form, they will preferably be arranged for simultaneous sidewise movement. In the construction shown, which constitutes a preferred form of the invention, the gripper-shaft 4 will be provided with a plurality of collars 5, each of said collars having a suitable extension 6, to which is connected a gripper finger or jaw 7, which in the construction shown constitutes the upper member of the grippers. The lower member of each gripper is shown as consisting of a finger or jaw 8, which extends from and is preferably formed integral with a block 9. To this block are connected two collars 10, which surround the shaft 4. The collar 5 of the upper jaw of each gripper is located between the collars 10 of the lower jaw, so that the two may be simultaneously adjusted sidewise on the shaft 4.

In the preferred form of the construction both jaws of the grippers will be operated to open and close them, and the construction will be such that a yielding action is permitted between each pair of cooperating jaws after the jaws have come into contact in their closing movement. While these results may be effected in any suitable manner, the yielding action is preferably obtained by making the jaw 7 of spring material and by securing to the shaft 4 in any suitable manner, as by means of a set-screw 5'. Suitable adjusting means—such, for instance, as an adjusting-screw 11—will also be provided, said screw being tapped through the extension 6 and bearing upon the finger or jaw 7. When the upper jaws are fixed to the shaft in the manner described or in any other suitable manner, the collars 10 of the lower jaws will be formed so as to loosely surround the shaft 4. With this construction it will be seen that by positively actuating the shaft 4 and by operating the jaws 8 the grippers will be closed; the fact that the jaws 7 are spring-jaws permitting the yielding action before adverted to.

Any suitable means may be employed for positively actuating the shaft 4 and for actuating the fingers 8. As shown, however, a shaft 12 is provided, said shaft having eccentric journals 13. This shaft is also further preferably provided with a cam or cams 14, located at or near each of its ends. While a single cam might be used, two will preferably be employed. The shaft 4 has preferably secured to it arms 15, which bear on the cams 14. The blocks 9 of gripper-jaws 8 are shaped to provide inclined surfaces 16, and these inclined surfaces rest on the shaft 12. With this

construction it will be seen that as the shaft 12 is rocked the jaws 8 will be thrown upward by the action of the eccentric shaft 12 on the inclined surfaces 16, and at the same time the shaft 4, through the cams 14 and the arms 15, will be rocked, so as to throw the jaws 7 downward, the movement of the cooperating parts being such as to close the jaws firmly. By this construction it will be seen that the grippers may be readily positioned and adjusted, and that, furthermore, the action of the grippers will not be disturbed if the faces of one or more of them are slightly out of alinement, for since the shaft 4, which carries one of the jaws of each gripper, is positively actuated, and therefore has a definite movement, the shaft will not be stopped until its movement is completed. If, therefore, any of the grippers reach their closing position before the movement of the shaft is completed, the movement will continue, this being permitted by the yielding action between the gripper-jaws. If, however, the shaft were spring-actuated, it will be seen that when one pair of jaws had closed it would serve to prevent any further movement of the shaft by its actuating-spring. When, as in the construction which has been described, the grippers consist of a number of cooperating pairs of jaws, the results referred to might be obtained by positively actuating one jaw of each pair, the other being spring-actuated. Preferably, however, the construction will be that which has been described—namely, one in which both jaws are positively actuated.

Suitable means will preferably be provided to open the jaws when the rotation of the shaft 12 has thrown its eccentric portion and its cams out of operation. While these means may be varied widely in the construction shown, each of the blocks 9 is provided with a socket in which is located a spring 17, which bears against a projection 18, secured to the jaw 7 or the extension by which it is carried.

Any suitable means may be provided for operating the shaft 12. As shown, this shaft is provided with a segmental gear 19, which meshes with a rack 20, carried on a segment-arm 21, pivoted to the frame. This segment arm or lever 21 is operated to rock the shaft 12 to close the grippers by means of a movable block or cam 23, operated through a rod 24 from any suitable moving part of the machine, and a stationary cam 25 is or may be provided, which is located in such position as to strike the arm 21 and rock the shaft 12 to permit the grippers to open when the carriage has reached the end of its outward movement.

In Fig. 1 the gripper-jaws are shown as open and in the act of taking a sheet from the impression-surface 26, a portion only of such surface and of the cylinder which carries it being shown, the sheet being held on the surface by the usual cylinder-grippers 27. In Fig. 3 the grippers are shown in the posi-

tion which they assume when they are closed upon the sheet, the cylinder-grippers 27 being rocked back out of the way.

The operation of the construction will be clear from what has been said before. It may be remarked, however, that by positively actuating the grippers in the manner described it is possible to get a very firm grip upon the sheet without the use of strong springs, thus obviating the objections which arise from such constructions.

While the invention has been described as embodied in the grippers of a front-delivery mechanism, it is to be understood that it is by no means confined to such a mechanism, as the invention is capable of embodiment in constructions which may be used in other relations. Furthermore, while the instrumentalities by which the invention is carried into effect are effective for the purpose described the invention is not to be confined thereto, as the means by which it is carried out may be varied within wide limits.

What is claimed is—

1. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, and positive means for operating both jaws to close the gripper, substantially as described.
2. In a gripper mechanism, the combination with a pair of gripper-jaws, of a support therefor, a shaft independent of the support, means carried by the shaft for positively closing one of the jaws, and means whereby the movement of the shaft closes the other jaw, substantially as described.
3. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws one of said jaws being secured to the shaft and the other loosely mounted thereon, a second shaft, means for actuating said shaft, and means whereby the movement of the shaft operates to positively close both gripper-jaws, substantially as described.
4. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws one of said jaws being secured to the shaft and the other loosely mounted thereon, a second shaft, positive means actuated by the second shaft for closing one of the jaws, and means for closing the other jaw, substantially as described.
5. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws one of said jaws being secured to the shaft and the other loosely mounted thereon, a second shaft, a cam on said shaft, means whereby the cam rocks the gripper-carrying shaft to close one of the jaws of the pair, and means whereby the movement of the shaft closes the other jaw of the pair, substantially as described.
6. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws, one of said jaws being secured to the shaft and the other loosely mounted thereon, an arm secured to the shaft, an eccentrically-mounted shaft, a cam on said shaft on which the arm

of the first shaft bears, and a projection on the loosely-mounted jaw bearing on said eccentric shaft whereby the movement of the eccentric shaft rocks the first shaft to close one of the gripper-jaws and at the same time close the other jaw, substantially as described.

7. In a gripper mechanism, the combination with a set of jaws, of a set of abutments co-operating therewith, positive means for operating one of said sets to produce a closing movement, and means whereby a relative yielding movement may occur between each jaw and its abutment, substantially as described.

8. In a gripper mechanism, the combination with a shaft, of a pair of jaws mounted thereon, one jaw of said pair being connected to the shaft so as to turn therewith and the other jaw of the pair being loosely mounted on the shaft, positive means for rocking the shaft, means for operating the loosely-mounted jaw, and means whereby a relative yielding action is permitted between the pair of jaws, substantially as described.

9. In a gripper mechanism, the combination with a shaft, of a plurality of jaws loosely mounted thereon, a plurality of yielding jaws connected to the shaft so as to turn therewith, positive means for rocking the shaft, and means for actuating the loosely-mounted jaws, substantially as described.

10. In a gripper mechanism, the combination with a shaft, of a pair of jaws mounted thereon, said jaws being connected for simultaneous sidewise adjustment, means for connecting one of said jaws to the shaft so that it may turn therewith, means for actuating the shaft, and means for operating the other jaw, substantially as described.

11. In a gripper mechanism, the combination with a shaft, of a pair of jaws mounted thereon, said jaws being connected for simultaneous sidewise adjustment, means for connecting one of said jaws to the shaft so that it may turn therewith, positive means for actuating the shaft, and means for operating the other jaw, substantially as described.

12. In a gripper mechanism, the combination with a shaft, of a pair of jaws mounted thereon, said jaws being connected for simultaneous sidewise adjustment, means for connecting one of said jaws to the shaft so that it may turn therewith, positive means for actuating the shaft, and positive means for operating the other jaw, substantially as described.

13. In a gripper mechanism, the combination with a shaft, of a jaw, a pair of collars connected to the jaw, a collar located between said pair of collars, a jaw carried by said collar, means for connecting one of the jaws to the shaft, means for operating the shaft, and means for operating the other jaw, substantially as described.

14. In a gripper mechanism, the combination with a shaft, of a jaw, a pair of collars connected to the jaw, a collar located between

said pair of collars, a jaw carried by said collar, means for connecting one of the jaws to the shaft, positive means for operating the shaft, and positive means for operating the other jaw, substantially as described.

15. In a gripper mechanism, the combination with a shaft, of a jaw, a pair of collars connected to the jaw, and loosely surrounding the shaft, means for operating said jaw, a collar located between the pair of collars, means for connecting said collar to the shaft so that it will turn therewith, means for operating the shaft, and means for operating the other jaw, substantially as described.

16. In a gripper mechanism, the combination with a shaft, of a jaw, a pair of collars connected to the jaw and loosely surrounding the shaft, means for operating said jaw, a collar located between the pair of collars, means for connecting said collar to the shaft so that it will turn therewith, positive means for operating the shaft, and positive means for operating the other jaw, substantially as described.

17. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, and means for rotating each jaw in opposite directions around the axis of the shaft, substantially as described.

18. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, and positive means for rotating each jaw in opposite directions around the axis of the shaft, substantially as described.

19. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, one of said jaws being loosely mounted on the shaft and the other being connected to the shaft so as to turn therewith, means for operating the shaft, and means for giving the other jaw a movement in a direction opposite to that in which the first jaw moves, substantially as described.

20. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, one of said jaws being loosely mounted on the shaft and the other being connected to the shaft so as to turn therewith, positive means for operating the shaft, and positive means for giving the other jaw a movement in a direction opposite to that in which the first jaw moves, substantially as described.

21. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, a second shaft, and means whereby said second shaft gives each jaw a movement to close the grippers, substantially as described.

22. In a gripper mechanism, the combination with a shaft, of a pair of gripper-jaws mounted thereon, a second shaft, and means whereby said second shaft gives each jaw a positive movement to close the grippers, substantially as described.

23. In a gripper mechanism, the combina-

tion with a shaft, of a plurality of pairs of gripper-jaws mounted thereon, one jaw of each pair being connected to the shaft so as to turn therewith, and the other jaw of each pair being loosely mounted thereon, a second shaft, means whereby the movement of said second shaft rocks the gripper-carrying shaft and operates the loosely-mounted jaw, substantially as described.

24. In a gripper mechanism, the combination with a shaft, of a plurality of pairs of gripper-jaws mounted thereon, one jaw of each pair being connected to the shaft so as to turn therewith and the other jaw of each pair being loosely mounted thereon, a second shaft, and positive means whereby the movement of said second shaft rocks the gripper-carrying shaft and positively operates the loosely-mounted jaws, substantially as described.

25. In a gripper mechanism, the combination with a shaft, of a plurality of yielding gripper-jaws mounted thereon and turning therewith, a plurality of jaws loosely mounted on the shaft, an eccentric shaft against which said loosely-mounted jaws rest, and means whereby said eccentric shaft rocks the gripper-carrying shaft, substantially as described.

26. In a gripper mechanism, the combination with a shaft, of a plurality of yielding gripper-jaws mounted thereon and turning therewith, a plurality of jaws loosely mounted on the shaft an eccentric shaft against which said loosely-mounted jaws rest, and positive means whereby said eccentric shaft rocks the gripper-carrying shaft, substantially as described.

27. In a gripper mechanism, the combination with a shaft, of a plurality of yielding gripper-jaws mounted thereon and turning therewith, a plurality of jaws loosely mounted on the shaft, an eccentric shaft against which said loosely-mounted jaws rest, a cam on said eccentric shaft, and an arm connected to the gripper-carrying shaft and bearing against said cam, substantially as described.

28. In a gripper mechanism, the combination with a shaft, of a plurality of yielding jaws connected thereto and turning therewith, a plurality of loosely-mounted cooperating jaws, an eccentric shaft against which said jaws rest, means for forcing the jaws apart, means for rotating the eccentric shaft, and means for rocking the gripper-carrying shaft, substantially as described.

29. In a gripper mechanism, the combination with a shaft, of a plurality of yielding jaws connected thereto and turning therewith, a plurality of loosely-mounted cooperating jaws, an eccentric shaft against which said jaws rest, means for forcing the jaws apart, means for rotating the eccentric shaft, and means carried by the eccentric shaft for rocking the gripper-carrying shaft, substantially as described.

30. In a gripper mechanism, the combina-

tion with a shaft, of a plurality of collars
mounted on the shaft, an extension from each
collar, a spring-jaw carried by each exten-
sion, adjusting-screws for forcing the spring-
jaws away from the extensions, a plurality of
5 jaws loosely mounted on the shaft, an eccen-
tric shaft against which said loosely-mounted
jaws rest, a spring between each pair of co-
operating jaws, means for rotating the eccen-
10 tric shaft, cams on said shaft, and arms con-

nected to the gripper-carrying shaft and bear-
ing on said cams, substantially as described.

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

WILLIAM SPALCKHAVER.

Witnesses:

F. W. H. CRANE,
L. ROEHM.

It is hereby certified that in Letters Patent No. 687,281, granted November 26, 1901, upon the application of William Spalekhaver, of New York, N. Y., for an improvement in "Gripper Mechanism," an error appears in the printed specification requiring correction, as follows: The words and figure "the collar 5, to which it is connected, fixedly," now constituting line 35, page 2, should be stricken out and inserted between lines 38 and 39, same page, as now numbered; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 18th day of March, A. D., 1902.

[SEAL.]

F. L. CAMPBELL,
Assistant Secretary of the Interior.

Countersigned:

F. I. ALLEN,
Commissioner of Patents.