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L. HOFFMANN.

PROCESS OF IRONING RAW STARCHED MATERIAL.

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Fig. 1.

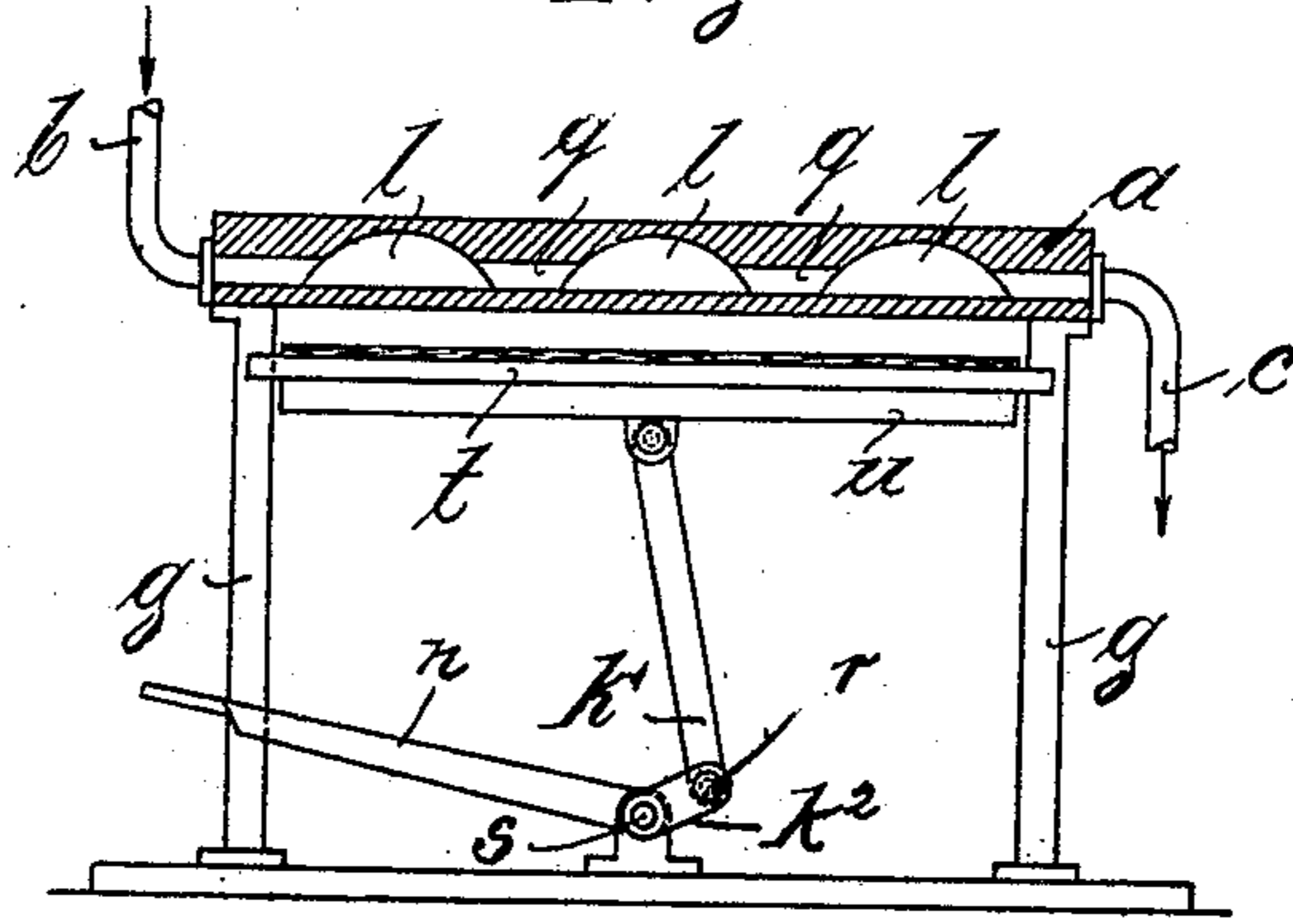


Fig. 2.

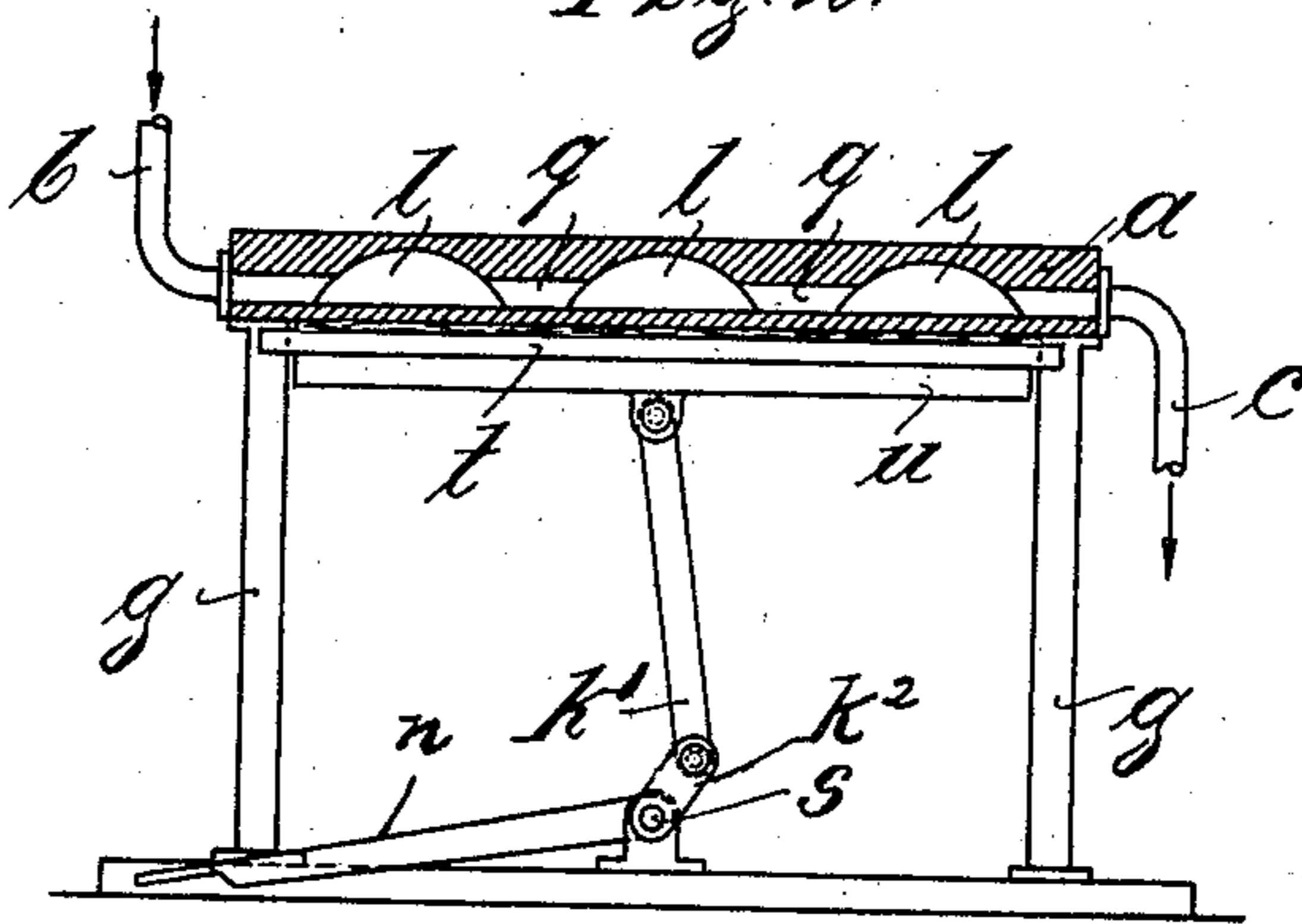
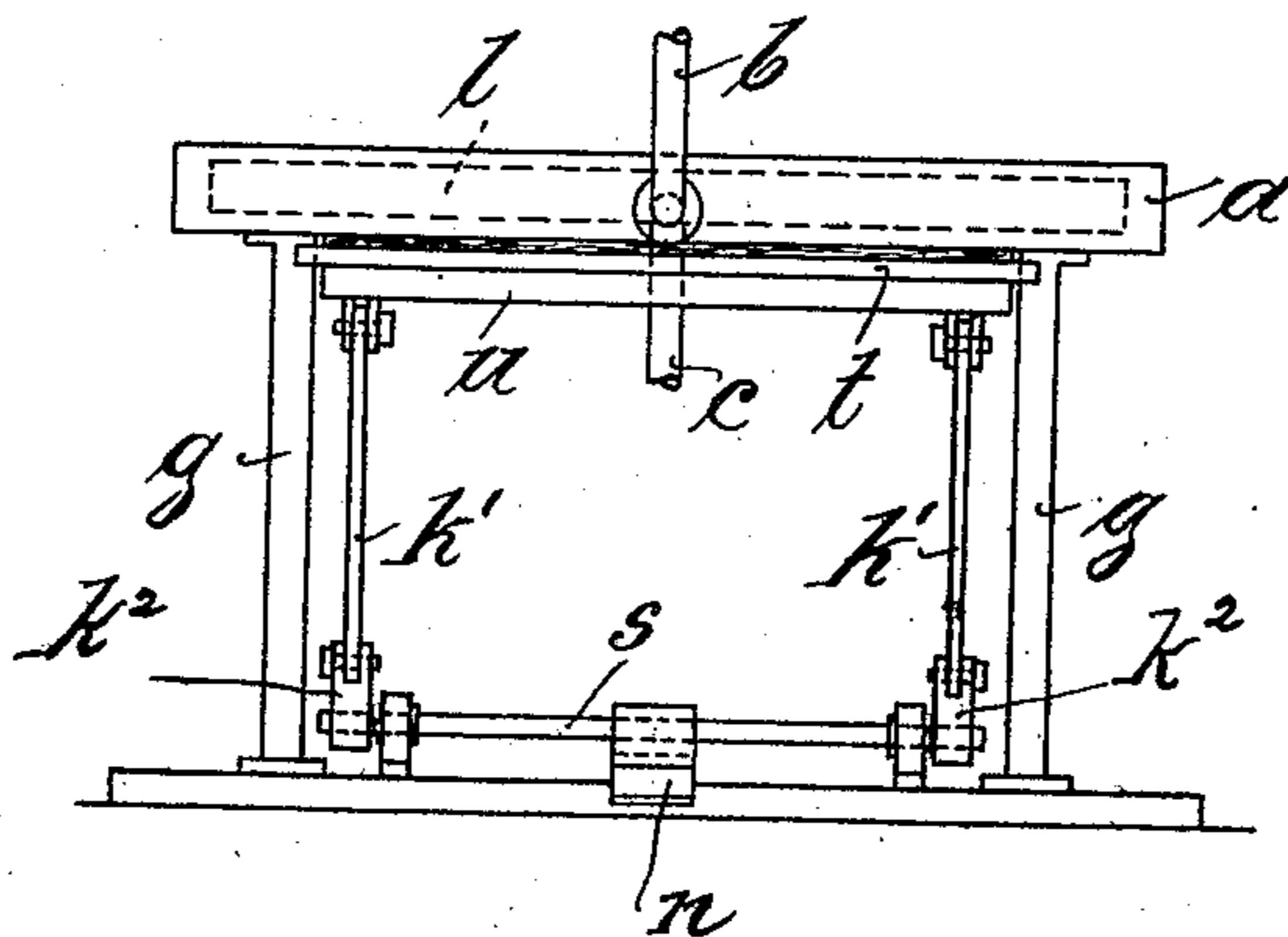


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

LEBERECHT HOFFMANN, OF SALZUFLEN, GERMANY, ASSIGNOR TO THE FIRM OF HOFFMANN'S STARKEFABRIKEN AKTIENGESELLSCHAFT, OF SALZUFLEN, GERMANY.

PROCESS OF IRONING RAW STARCHED MATERIAL.

No. 862,477.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEBERECHT HOFFMANN, a subject of the Prince of Lippe, and a resident of Salzuflen, in the Principality of Lippe, German Empire, have
5 invented a certain new and useful Process of Ironing Raw Starched Material, of which the following is an exact specification.

It is known that material starched with raw starch has the advantage of being easily penetrated by the
10 thin liquefied starch but there is the defect that the penetrated starch can be easily displaced during the ironing operation from one point to another so that some portions of the material retain a large and other portions a small quantity of starch. This defect is
15 present to a great extent when the ironing operation is carried out in a mechanical manner by the material being rubbed on suitable surfaces and the tendency to displace the starch is so great in such cases that some parts of the material are completely exhausted of
20 starch before the necessary boiling operation is effected, when the ironing takes place.

Another important defect is present when the ironing of raw starched material takes place in a mechanical manner in that the starch is not boiled at some
25 places in consequence of its being heated for a very short time by reason of the rollers resting only on certain parts of the material. Naturally this result happens very often when ironing by hand and then usually the quality of the starch is considered to be bad
30 if certain places of the starched material remain soft while as a matter of fact only an insufficient boiling has taken place at various places.

The following described mechanical ironing process is based therefore upon the following knowledge:

35 1. It is necessary to subject the material to the action of a certain heating effect equally distributed over the whole surface and increasing till a certain high temperature has been attained.

2. The heating action should not be effected successively at different parts of the material by rubbing
40 the raw starched material against the ironing mechanism but the heat action is to be applied when the material to be ironed is stationary relative to the ironing mechanism.

45 It is further found that there is a possibility at a certain temperature of the material sticking to the moving metallic heating surface and the easy loosening of the same is not effected unless a certain higher temperature is attained. The steam arising when the material is heated up to a definite high temperature in
50 a definite time is sufficient to loosen the material from the ironing surface and at the same time probably under the action of the steam generated a complete boiling of the starch is effected through the whole cross
55 section and over the whole surface of the material.

What I have invented is an ironing process consisting essentially of saturating the material with raw starch solution and then of the complete boiling of the raw starch in the material by shutting the latter off from the atmosphere whereby a certain high temperature and
60 steam generation takes place in the material, the whole process being carried out when the material and the surface heated up to a high temperature is stationary, whereby any displacement of the raw starch and an irregular treatment of the starch in the material is avoided. 65

I refer to this process as a preliminary ironing process but it can be also used as an effective boiling process and this process forms the basis for a mechanical treatment of the starch and according to my experiences only
70 by this way is there the possibility of the effective and equal ironing of material stiffened with raw starch, being carried out.

The further treatment of the material which is still damp after its treatment in the said ironing boiling process is not an important matter; and can be effected
75 by means of the usual ironing machines or by a flat iron. Even if the material is finished by means of a flat iron the working output of a laundress is greatly increased for example 600 dozen collars can be easily preliminarily ironed by means of such an ironing machine and
80 further the finishing ironing work consisting only in drying up the moisture and imparting luster is greatly facilitated with respect to former ironing processes.

In order to make my invention more clear, I will now refer to the accompanying drawing, in which: 85

Figure 1 is a cross section of a machine arranged for carrying out the new process, Fig. 2 shows the apparatus in its operative position. Fig. 3 is a front elevation of the apparatus shown in Figs. 1 and 2.

A stationary plate *a* heated by steam having inner
90 longitudinal and cross channels *l* and *q* respectively, through which steam at about a pressure of 3 atmospheres is allowed to flow, is mounted in a frame *g*, and the condensed water is led away continuously, from the lower portion of the plate. The steam serving for
95 heating purposes enters the plate *a* through the pipe *b* and is exhausted therefrom through the pipe *c*. The under side of this cast iron steam chest or plate *a* is smoothly polished and an ironing board *t* consisting of wood and provided with a felt cover upon which the
100 material saturated with raw starch is placed, is pressed by means of an under plate *u* actuated by a crank lever by the operator so that considerable mechanical pressure is set up between the felt covered ironing plate and the iron plate *a* when in their closed position (see
105 Fig. 2). The crank lever consists of bars *k'* *k*² pivotally connected with each other at *r*, the lever *k'* being pivotally joined to the plate *u* guided by the frame *g*. *s* is a shaft carrying rigidly at both of its ends a lever *k*². *n* is a foot lever fixedly mounted on the middle of the shaft 110

s and serving for operating the board *t*. In this position the felt covered plate is held about 10 seconds so that a complete boiling of the starch is effected in and on the material, a great reduction of time is effected and
5 therefore an increased rate of work results, when steam of a greater pressure is used.

It has been found that when the plate *a* is heated up to a temperature of about 135 degrees Celsius a complete boiling of the starch and drying and ironing of the
10 material is effected in the time above named and any creases in the material can be easily removed.

The material comes from the machine in a half humid and smooth state and can be immediately treated in the usual ironing machines after the process of com-
15 plete boiling of the starch is finished or by means of the usual flat iron

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is:—

A process for ironing raw-starched material, consisting 20 in subjecting the raw starched material to the action of a hot compressing surface when the material is stationary relative to this hot surface, the temperature to which the material is heated, being such that a complete boiling takes place, and then in treating the material still damp by 25 means of the usual ironing process or by a sad-iron.

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

LEBERECHT HOFFMANN.

Witnesses:

HENRY J. FULLER,
JEAN WALTERZ.